DISSERTATION

A CROSS-CULTURAL COMPARISON OF VISUAL LANDSCAPE PREFERENCES FOR THE NATURAL ENVIRONMENT

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY MUSTAFA KAMAL BIN MOHD-SHARIFF ENTITLED A CROSS-CULTURAL COMPARISON OF VISUAL LANDSCAPE PREFERENCES FOR THE NATURAL ENVIRONMENT BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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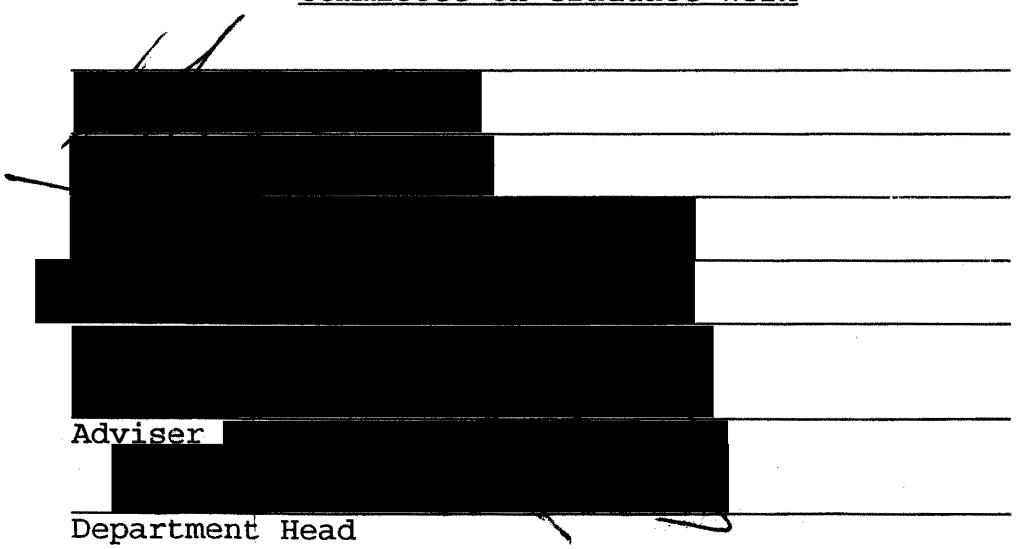

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ABSTRACT OF DISSERTATION

A CROSS-CULTURAL COMPARISON OF VISUAL

LANDSCAPE PREFERENCES FOR THE NATURAL ENVIRONMENT

The purpose of this study was (1) to identify significant differences in the landscape preferences for the natural environments of Caucasian, Hispanic, Black, Native, and Asian American students at Colorado State University, (2) to identify and compare the underlying perceptual dimensions of their preferences, and (3) to compare the effectiveness of the Kaplans' Informational Processing Model of Environmental Preferences predictors on the landscape preferences of each group.

The study found that all groups rated the mountain category highest and the grassland category lowest. However, within categories, Native Americans and Caucasians rated mountain and grassland categories significantly higher than Blacks or Asians. Though there were no statistically significant differences, Blacks and Asians rated the city park category relatively higher than Native Americans and Caucasians. Hispanics did not show significant differences from any other group in this study, in mean preference ratings for any of the three environment types depicted.

Four perceptual dimensions were found in the mountain category. These were labelled (1) Partially Screened Views,

(2) Rock Formations, (3) Enclosed Views, and (4) Exposed Rocks. In the grassland category, there were only two perceptual dimensions - (1) Pathways and (2) Buttes/ Escarpments. Some significant group differences were noted among these dimensions.

In utilizing the Kaplans' Informational Processing Model of Environmental Preference, it was found that Complexity and Mystery correlated highly with the landscape preferences of all groups. A multiple regression analysis of the predictors found that they have significant effects on the preferences of all groups and predicted the preferences of all groups, except for Blacks, in similar manner.

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DEDICATION

To those who gave

themselves to Beauty

Now I know why.....

Now I know why.....

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CHAPTER I

INTRODUCTION

For the past three decades, landscape preference research has focussed on what kinds of landscapes are preferred and why they are preferred. Other research has examined why some landscapes are more preferred than others and whether people of different cultures share the same perceptions of their environment. The issue of how culture affects perceptions about the environment, which is the topic of this research, has received increasing attention in recent years for several reasons. First, there is a growing global concern over the loss of pristine wilderness areas and their unique and scenic environments due to development. Second, accelerated urbanization throughout the world has hastened the need to provide for a more habitable urban environment. Finally, increases in recreation participation and rapid growth of the tourism industry have been cited as other reasons for the interest in determining what people like in the environment. In the United States, demographic trends such as the aging of the population and the growth of minority populations and their subcultures have contributed to the need for research in cross-cultural environmental perception.

Problem Statement

While society defines membership of individuals into social groups, culture determines how members of society think and behave (Heath,1988). In fact, culture is one of the determinants of ethnicity. Members of an ethnic group display cultural traits that are unique to that particular group (Marger,1985). Culture may be defined as ways and means whereby a society passes knowledge and experiences accumulated over time to the next generation. These norms, values and expectations of a culture are passed on through education. The main aim of culture is to ensure group survival in the environment.

An example of how culture affects perceptions about environment and survival in the environment can be found by comparing how Native Americans and early European settlers perceived wilderness. According to Zube (1991), the Native Indians revered the wilderness as life sustaining because they had learned to live in harmony with it after centuries of living there. In contrast, Nash (1982) described how the early European settlers in America believed that the wilderness was hostile and forbidding. This hostile belief, however, changed to that of affection and romance after much of the wilderness areas had been "tamed."

Lyons (1983) argued that people's preferences for landscapes are influenced by learned cultural values accumulated over a life time. She identified age and

familiarity of the landscape as factors influencing landscape preferences. Allison (1988), after reviewing cross-cultural studies in recreation, suggested that the "Ways in which different environmental settings are perceived by different ethnic populations should be systematically addressed." (p.256).

Studies that focus on cross-cultural issues in landscape preference have the potential to enrich the present knowledge of environmental perceptions and benefit society in several ways. In a multi-cultural society, knowledge on preferences for the environment can be used by educators to set up environmental education programs that are more attuned to sub-cultural beliefs and values.

Knowledge about environmental preferences of diverse ethnic groups would also be beneficial to landscape planners and managers in understanding the needs and demands of their constituencies. Landscape planners and managers could capitalize on this knowledge by highlighting the similarities between groups while acknowledging the differences in opinion of the people they are working with. Understanding these differences can facilitate compromises that will satisfy the majority of the people. This would be particularly beneficial in efforts to manage the landscape for recreation, resource utilization, amenity values as well as environmental quality and protection (Elsner and Smardon, 1979).

Knowledge on cross-cultural landscape perception is also invaluable in a global effort to protect and preserve scenic and unique environments for future generations. Cultural differences in values, attitudes, and perceptions have frustrated efforts at reaching international agreements on preservation values. On this issue, Zube and Pitt (1981) noted that:

> "...it would seemed prudent that heritage resource managers to be aware of such differences. Management practices developed in one culture may not be suitable in another, particularly if the experiential and educational differences between cultures are great. The management problem may also be compounded when landscapes attract visitors from diverse cultures and when host and visitor perceptions differ."(p.86).

Cross-cultural similarities and differences in perceptions and preferences have been noted by several researchers. Segall et.al.(1966), in a cross-cultural study comparing perceptions of geometric shapes among societies in Asia, Africa and the United States, found that perception was a learned process and that the inferential habits associated with perception differ across cultures.

In outdoor recreation, several studies pointed to the cross-cultural differences in leisure preferences among Americans. O'Leary and Benjamin (1982) and Kelly (1980) found that Blacks participated less than Whites in outdoor recreation pursuits such as skiing and snow-mobiling. Washburn and Wall (1980) reported that fishing and fishing related activities appeared to be the only activities enjoyed both by whites and blacks. In another study, Dragon

(1986) noted differences in beliefs, values and meanings among Caucasians and Native Americans regarding the use of national parks.

Several landscape preference studies have addressed the cross-cultural issue. However, these studies were not designed to address the issue directly but they just happened to include subjects of differing background (Kaplan and Talbot,1988). Some studies have compared landscape perceptions of Americans with people of other nationalities (Kaplan and Herbert, 1987; Zube and Pitt,1981). Other studies have examined differences between ethnic groups of Americans (Kaplan and Talbot, 1988) as well as other sub-cultural groups (Wellman and Buhyoff,1980; Daniel and Boster,1976) on their landscape perceptions. Results from these studies were mixed; some studies showed differences between groups while others detected none. Despite mixed results, these preliminary findings are encouraging enough to warrant further investigation into the issue of how people of diverse cultures perceive the environment.

Study Purpose and Objectives

The overall purpose of this study was to compare the landscape preferences for the natural environment of Caucasian, Hispanic, Black, Native and Asian American students at Colorado State University using the Informational Processing Model of Environmental Preference

as a theoretical foundation. The study objectives were:

1. To identify significant differences in landscape preferences among the five ethnic groups of students.
2. To identify and compare the underlying perceptual dimensions of their preferences.
3. To compare the effectiveness of the model's predictors on the landscape preferences of each ethnic group.

Research Hypotheses.

This study sought to test two research hypotheses:

H1. There are significant differences in the visual landscape preferences for natural environments among Caucasian, Hispanic, Black, Native and Asian American students at Colorado State University.

H2. There are correlations between Coherence, Legibility, Complexity, and Mystery and the visual landscape preferences for the natural environment of Caucasian, Hispanic, Black, Native and Asian American students at Colorado State University.

Definition of Terms

1. Visual landscape perception (cognitive definition).

   Meanings and values associated with a particular landscape.

2. Landscape preference.

   The degree of like or dislike for a particular landscape for whatever reasons (Herzog,1987).

3. Natural environment.

   Any environment which consists largely of natural features.

4. Landscape preference predictors.

   Attributes or combinations of attributes that can predict people's landscape preferences.

5. Coherence.

   The extent to which the scene hangs together through repetition of elements, textures, and structural factors which facilitate comprehension (Kaplan and Kaplan,1982).

6. Legibility.

   The recognition of an environment that looks as if one could explore it extensively without getting lost (Kaplan and Kaplan,1982).

7. Complexity.

   The amount of variety or diversity in a scene; a scene having enough information present to keep one interested (Kaplan and Kaplan,1982).

8. Mystery.

The degree to which more information may be gained by proceeding further into the scene (Kaplan and Kaplan,1982).

Assumptions and Limitations of this Study

This study was conducted based on several assumptions and had certain limitations:

Assumptions.

1. Each member of an ethnic group adopts and exhibits the main characteristics of that particular subculture. The adoption and exhibition of these characteristics are what determine ethnic groups (Marger,1985). Even though members of an ethnic group may be influenced by the mainstream culture through the education system, mass media, etc., Lang (1988) noted that:

> "Each culture is unique because it has its own history. This does not mean that certain values are not held by many cultures, but each culture is a result of past efforts of a people to deal with its physical and social environment."(p.23)

2. College students share similar economic level and educational exposure.
3. The subjects have similar environmental experiences as a result of spending years living in the United States and being exposed to the environments presented either through first hand experiences or through their reading and mass media exposures.

Limitations.

1. This study limits itself to a specific geographical location i.e. to environments located within Colorado and its vicinity. The findings should not be generalized to other environments in other places.
2. One limitation inherent in the Category Identifying Methodology is that only a limited number of scenes can be presented to the subjects. The rationale for limiting the number of scenes was subject fatigue and reduced research costs. In this study twenty five scenes were chosen to represent each category of environment from hundreds of possible samples. The randomized selection of samples also excluded the opportunity to set up *a priori* sub-categories within each of those environmental categories.
3. Water bodies and human figures were excluded from all scenes. This decision was based on results of previous studies which have found bodies of water and human figures to be powerful attractors or distractors of preference. However, human artifacts such as the presence of tracks, roads, and picnic benches were sometimes unavoidable especially in scenes representing city parks.
4. A non-probability, voluntary sample of subjects was used in this study. This form of sampling was necessitated by the difficulty in getting an adequate

number of minority subjects to participate in this study.

5. A metric exploratory factor analysis procedure was used to analyze data rather than the Gutmann-Lingoes Smallest Space Analysis III statistical program due to the inaccessibility of the program.

CHAPTER II

REVIEW OF LITERATURE

In this chapter research on environmental aesthetics and the role of culture in the appreciation of the environment will be examined. This is followed by discussions of research on environmental perception and visual landscape preference. Next, studies related to landscape preferences for the natural environments and cross-cultural preferences are discussed. Finally, several issues regarding research methodologies are examined.

Aesthetics, Culture, and the Environment.

Humans seem to be creatures obsessed by aesthetics and the world is full of things that can provide for that aesthetic pleasure. However, people tend to overlook these pleasures in their daily lives without realizing it. The daily routine of waking up, getting dressed, grooming, having breakfast and then going off to "face the world" are in fact organized around the idea of beauty and function, i.e. they have aesthetic elements. Since the brain tends to suppress the mundane and the familiar, these routine acts are often ignored. People rarely attend to the reasons underlying such actions. Thus, people fail to associate these actions with an aesthetic experience. It is only when viewing a piece of art work in an art gallery or listening

to a symphony in a music hall or standing in front of a waterfall in a national park that people begin to acknowledge the aesthetic experience. Perhaps, it is only in such places that society has taught people to seek out and anticipate such encounters. Given a clear goal and a purpose the senses are alert for such a confrontation (Berleant,1992).

Most people seems to agree that the aesthetic experience involves the activation of the senses (Tuan,1993; Berleant,1992). The aesthetic experience has been described as that "tingling" of the senses that occurs when an aesthetic object is encountered. Tuan (1993) noted that "All aesthetic responses must contain an element of magic: one is aware of being confronted by something out of the ordinary, miraculously right, 'more real than real.'"(p.29).

To be appreciated, the object must be in focus or "brought forward" against a background of "blooming buzzing confusion" before a person could experience such a sensation (Carlson,1979b:p.273). But anticipation may or may not precede such exhilarating encounters because such a feeling may exist whether we are contemplating a Van Gogh (anticipated) or are surprised by an encounter with a beaver in the wilderness (unanticipated). The quality of the encounter may vary depending on whether the encounter is anticipated or unanticipated. While the former is prolonged and contemplative, the latter is momentary but intense

(Rolston,1987). An aesthetic experience may be evaluated with wonderment, awe, and sublimity, or it could be distasteful and disgusting. Extremes seem to be a norm for the aesthetic experience. Aesthetic experiences involve the waking up of the senses as opposed to "anaesthetic" - the condition of the "living dead." (Tuan,1993).

The Aesthetic Appreciation of the Natural Environment.

How do we appreciate the natural environment? Hepburn (1993) suggested a spectrum in which nature can be viewed. On one end of the spectrum, nature can be examined as a single natural object (i.e. by itself), while at the other end, nature is appreciated as a total system.

Contemplating a natural object for itself is akin to admiring an art object. A piece of polished rock at the bottom of a river, for instance, can be admired for its color, texture, and form. Knowing how it came to be through a knowledge of geology can add to our appreciation of its expressive qualities. And when it is removed from the river bed and now sits on a mantel in a living room it is transformed into an art object. The polished rock as an art object is a found art (Sepanmaa,1993), or a reminder of an actual but long gone experience. The difference between this piece of pebble and an art object, however, is that a piece of rock assumes no maker and is therefore unintentional unless the admirer is a theist (Hepburn,1968).

Looking at nature from the other end of the spectrum, i.e. as a total system, is much more abstract. Berleant (1992) claimed that humans and the environment are continuous and that humankind and nature are one. This Spinozistic view of the world looks at humans as part of the whole system and not as separate and independent (Hepburn, 1993; Berleant,1992). Thus, the attempt to understand nature is to understand and to come to terms with oneself and ones origin. Rolston (1986) once stated that "To travel into the wilderness is to go to our aboriginal source, though our return is too often unawares; it is by homecoming to enjoy an essential reunion with the earth."(p.122).

In observing nature, the observer must be immersed in the medium of appreciation and at the same time detached. In immersing, the observer becomes a part of the environment. He must be aware not only of the physical object of appreciation, but of the sensations surrounding him and the consequences of his presence in that medium. A herd of elk foraging in a meadow is as much aware of the human presence as the human is the herd. At the same time the observer must be detached from that environment. Hepburn (1968) explained this sense of detachment in nature when he said, "This is the same environment from which we wrest our food, from which we have to protect ourselves in order to live, and which refuses to sustain our individual lives beyond a limited term."(p.57).

Nature involves motion. In some instances it is spontaneous and fleeting with an element of surprise (Rolston,1987). At other times it is more deliberate and lasting. Even a piece of rock has motion as sunlight moves across it and creates an illusion of movement. The observer is also dynamic rather than static. As he moves through the environment, the observer's viewing angles and perspectives are constantly changing. Viewing Long's Peak at its foot is a different experience than when it is viewed from the plains down below. As the observer moves, his body kinesthesia changes with the terrain and so will his perception of the environment.

Nature is unpredictable and full of surprises. It has an element of mystery and perpetual novelty. It offers the observer a multitude of experiences within the context of space and time. The observer is challenged to choose the scale in which to examine the environment around him. He could choose to view it at the microenvironment (e.g. the internal structure of diatoms), the mesoenvironment (e.g. a flight of birds) or even the macroenvironment (e.g watching meteor showers)(Sepanmaa,1993). Each level of appreciation offers a different experience.

Nature is not framed like a painting. Therefore, the observer is challenged to focus on the object of appreciation. This focussing is necessary if the observer is to make sense of what he encounter. Without focus, nature is

just a "blooming buzzing confusion" of sensuous experiences (Carlson, 1979b). The observer needs to decide the form of experience he wants the encounter to be. Nature could be educational, social, economic, or religious. Thus, nature is subject to a multitude of interpretations by the observer with little if any guidelines as to "correctness."

Nature invokes a multitude of feelings for the observer that are sometimes expressed as "awe and rapture" or even "anger and disgust." The majesty and grandeur of a snow-capped peak in the Alps has often been admired in wonderment through the ages (Tuan,1974; Nicholson,1959). On the other hand, the swift swoop of the Peregrine falcon on a screaming young prairie dog may evoke a feeling of anger at the cruelty of nature. The former may enlighten the observer to the wonder and grandeur of nature; the latter, life's other reality - the cycle of life, death and renewal. The observer is expected to accept both as the reality of nature. Accepting some while rejecting others would be just an illusion, a romantic but trivial attempt at appreciating nature "to the extent that it distorts, ignores, suppresses truth about its objects, feels and thinks about them in ways that falsify how nature really is." (Hepburn, 1993:p.69). Nature as illusion is unstable and fleeting no matter how wonderful it may seem to be. Hepburn (1968) again addressed this issue when he said:

> "If we want our aesthetic experience to be repeatable and to have stability, we shall try to ensure that new

> information or subsequent experimentation will not reveal the "seemings" as illusions."(p.62).

Carlson (1981) agreed that ethically, we should see nature as it is rather than what it seems to be. Can we reconcile such opposite emotions as an integral part of the aesthetic appreciation of nature? One way would be to enter into the discussion of the sublime, the beautiful, and positive aesthetics of nature.

The Sublime, the Beautiful, and Positive Aesthetics.

Nicholson (1959) discussed the development of the beautiful and the sublime in nature. The idea of the sublime referred to the intense feelings of joy, awe, wonder, mystery, and even terror, horror, and despair that one sometimes experiences when in the wild and uncontrollable nature. Tuan (1993) described the attraction of the sublime experience when he said, "Whenever people step outside the protective enclosure of their known world, they risk encounter with some large threatening force that yet holds an explicable attraction."(p.114).

Dennis (in Nicholson,1959) developed these ideas further by differentiating the sublime from the beautiful. Beauty was equated with proportion, order, regularity, and rules (Nicholson,1959). Beauty was within reason. In contrast, the sublime was not a form of higher beauty but the "antithetic" of beauty. It was the irregularity, the disorderly and the cruelty that is beyond understanding or

reasoning. Dennis' interpretation of the sublime has to do with the humility of Man and the greatness of the Creator for "Beauty might be found in the works of man. The source of sublimity was in God and in the manifestations of His greatness and power in Nature." (Nicholson,1959:p.282). While Dennis' description of the sublime is a theistic perspective, it nevertheless helped in the acceptance of the truth in nature as something aesthetic.

The position of "positive aesthetic" in nature appreciation was put forward by Carlson (1984). Positive aesthetics consider everything in the natural environment, if it is not modified by humans, as aesthetically good. He argued that in order to appreciate nature it not only has to be correctly viewed but viewed in its correct category. This, he believed, was analogous to the aesthetic appreciation of art. However, unlike art which is created, nature is discovered. Therefore, unlike art, the categories of nature are created to fit particular natural objects based on the knowledge provided by science. Thus, he said "..these categories not only make the natural world appear aesthetically good, but by virtue of being correct determine that it is aesthetically good" (p.31).

In other words, everything in nature is aesthetically positive if it is seen in its proper categories. Thus, prairies are aesthetically good when they are viewed as

prairies while a tidal basin will not be aesthetically good if it is appreciated as a beach (Carlson,1981).

Knowledge and Experience in Aesthetic Appreciation.

The aesthetic appreciation of nature is influenced by knowledge and experience. Knowledge enhances but at the same time may detract from the aesthetic experience. On this Hepburn (1968) said:

> "When I see the full moon rising behind the silhouetted branches of winter trees, I might judge that the scene is more beautiful if I think of the moon simply as a silvery flat disc at no great distance from the trees on the skyline. Ought I to be realizing the moon's actual shape, size and distance? Why spoil my enjoyment?...And this is exactly the difficulty we feel about the bearing of present-day science on our vision of the natural world. Sometimes our attempts at realizing are aesthetically bleak and unrewarding..."(p.63).

Carlson (1981) disagreed. Carlson argued that scientific knowledge is essential for the appropriate aesthetic appreciation of nature; without it we may be in danger of committing aesthetic "omission and deception." Rolston (1986b;1986c) described how geological, ecological and historical knowledge can add to the appreciation of the natural environment. Carlson (1981) reiterated the importance of scientific/common sense knowledge in the aesthetic appreciation of nature. To him, this knowledge gives the boundaries of appreciation, the focus of aesthetic significance and the proper way to examine that particular

environment. Carlson (1981) further argued that we can no doubt enjoy perceiving nature merely in its forms and colors but

> "if our appreciation is to be at a deeper level, if we are to make aesthetic judgements which are likely to be true and to be able to determine whether or not they are true; then we must know something about that which we appreciate." (p.25).

Saito (1984) cautioned that the appreciation of nature should not always be scientifically based. In the past, myth and religious knowledge as well as "formalist, historical, and literary" associations have been valid categories in the appreciation of nature (p.40).

Experience also seems to play an important role in the appreciation of nature. Much like knowledge it guides the observer on what to appreciate in the environment. It may bring about recognition, memory, and association (Lowenthal, 1978). Familiarity can induce the feeling of being at ease, secure and tranquil (Orians,1985). Experience may be an underlying factor in determining which landscapes are valued. Lowenthal (1978) suggested that " A highly valued landscape may be the locus of one unique experience or of many accumulated over time."(p.401).

The importance of knowledge and experience in the appreciation of nature suggests that appreciating nature is much more than mere surface sensations. Nature must also be examined for its expressive qualities that are pleasing to "the mind's eye"(Carlson,1985). These qualities of nature

are colored by memories, meanings and values as well as morals and ethics. Saito (1984) commented that:

> "When we appreciate an environment, therefore, we appreciate the way in which all its various sensory qualities.....and its cultural/historical/social background are integrated to create a unique character: a sense of place."(p.42).

Thus, the appreciation of the environment is not limited to an experience in sensation but is also an experience of perception and reflection.

The Role of the Senses in the Aesthetic Experience of the Natural Environment

The aesthetic appreciation of nature requires the functioning of all senses. Tuan (1993) grouped these senses into distance senses (vision, hearing, and smell) and the proximate senses (touch, sensitivity to changes in temperature, taste and smell, and kinesthesia). To experience nature requires not only that these senses function, but also that they work in harmony with one another.

Even though all the senses play a significant role in the aesthetic experience of the environment, the visual sense has received the most attention. The colorful and meaningful world turns dark and uncertain when the eyes are closed even momentarily, despite the functioning of the other senses. Without sight the ability to sense distant objects and to discern location in space is lost. It is

hypothesized (Kaplan,1992; Orians and Heerwagen,1992) that human's sight can be attributed to evolutionary development that favored the distance senses. To ensure survival in the open grasslands, human ancestors needed the ability to rapidly recognize danger and food from a distance. This was crucial if humans were to have an advantage over other, swifter and more agile animals (Woodcock,1984).

In addition to vision, hearing is the other sense that enables humans to detect the presence of objects from afar. Sound has been associated with movement and thus, life itself (Tuan,1993). The absence of sound is stifling and eerie. Thus, it is not the absence of sounds that attract city dwellers to the wilderness, but the sound and rhythm of nature. While sometimes "frightening, oppressive, or irritating," the sounds and rhythm of nature can also be reassuring, refreshing and delightful. They offer tranquility, peace and freshness to the tired mind. Sound can evoke emotion more easily than sight. A baby's cry in the middle of the night can easily stir emotion. The calling of the loon in the wilderness leaves an impression on the memory - long after the visual recollection has faded away (Berleant,1992).

Sounds in nature can vary according to the time of day as well as the season. In the tropical rainforest, dawn is filled with the calling of monkeys and other arboreal creatures while dusk is saturated with the chattering of

birds settling for the night. As night sets in, the shriek of cicadas replaces other sounds (Hansen,1988). In the temperate environment, the silence of winter is well appreciated. Similarly, people speak of the "sounds of Spring."

Sound waves travel more slowly than light and are easily scattered by the wind or reflected by other objects, changing sound quality. And unlike light which is unidirectional, sound is "permeating." Sound envelopes the listener. In the absence of light or where visual access may be hindered, this characteristic of sound can be more important than sight. However, this characteristic of sound can also be a setback in the enjoyment of wilderness. While it is relatively easy to visually isolate oneself, it is not easy to escape sound. The noise from flying aircraft over the wilderness can degrade a wilderness experience more than sight. However, sound in the wilderness may be perceived differently across cultures. In Western culture, the sound of other people in the wilderness can be degrading to the wilderness experience. However, to the natives of the rainforest, the clatter of human voices and their activities can be very reassuring to a lonesome traveller (Hansen,1988).

Little attention has been directed toward odor as part of the aesthetic experience even though odor permeates the environment. Odor has been shown to provide a more vivid

memory of objects than memories encoded from visual or sound stimulation (Tuan,1993;Porteous,1990). People met or places visited are easily recalled years later when similar body fragrances or cooking aromas are encountered. Smell is closely related to mood and emotion because it is connected to the primitive part of the brain that controls such feelings (Tuan,1993).

Although people are concerned with how others think they smell, little attention is paid to odor until it becomes offensive. In nature, the smell of rotten things is offensive and to be avoided. People prefer the smell of life and growth in Spring. The fragrance of pine needles is clean and refreshing. Various cultures and individuals differ in their preferences of smells. The very young were said to prefer fruity odors, but this affinity changes to flowery scents as they get older (Tuan,1993).

Touch is a contact sense. By touching, the nerves closest to the skin are stimulated and give us the ability to feel. According to Berleant (1992), the tactile sense belongs to the haptic sensory system. This system gives us the perception of smoothness or roughness, contour, pressure, temperature, humidity, pain and the "internal" sensation. Tuan (1993) noted that the human fingers provide us with the opportunity to pick up objects for examination. Therefore, unlike some other animals, humans are able to examine objects in the environment close up and from all

sides. This enables people to appreciate objects holistically and in minute details. Sepanmaa (1993) suggested that the appreciation of details is one of the levels on which the environment is experienced. Such an appreciation allows not only visual scrutiny but also the sensations associated with touch. The ability to come into physical contact makes touching the most reliable of the senses. By touching, people are certain that the object really exists.

Taste and smell are closely related and both are "intimately present in our awareness of place and time." (Berleant,1992 p.17). Our awareness of taste comes mainly from eating and drinking. In nature, the taste of certain wild fruits and berries can be an aesthetic experience. Unfortunately, the act of eating itself is associated with destruction and death which can be a repelling thought to some. Tuan (1993) described this basic human need to eat when he said that "Culture masks human animality; when the mask slips, the fact that we live by devouring other organisms rises to haunt us." (p.46). Nevertheless, culture has disguised eating and tasting to such an extent that it can be an aesthetic experience.

It is amazing how often people take for granted phenomena that are familiar. Movement or kinesthesia, done so effortlessly and unconsciously in daily life is such a phenomena. While beautiful when it is done unconsciously, it

can be awkward and pretentious when attended to. It is only in an unfamiliar terrain that people tend to be aware of movement. People tread lightly in the wilderness, to avoid losing their footing, falling or accidentally stepping on dangerous creatures.

Movement involves not only muscular sensation but also sensation in the joints and skeleton (Berleant,1992). These sensations make us aware of our environment, of "climbing, descending, turning, twisting, obstruction as well as free passage."(p.17). Excessive movement produces aches and pains. Fatigue negatively influences appreciation of the environment (Hull and Stewart,1992).

Humans are mobile animals. Locomotion enables people to move around the environment and assume the role of observer and participant (Hepburn,1968). Movement also facilitates the viewing of objects from many perspectives and thus, enriches environmental experiences. Movement in nature may be constrained by the terrain and other hindrances such as loose sand, mud and snow. Constraints affect comfort and the appreciation of the environment.

Although people use all their senses to experience the environment, perceptions seem to depend on their unconscious and integrated functioning. Berleant (1992) argued that analytical discussions of the independent functions of these senses can only be theoretical. In reality, these senses act together as synaesthesia -- the fusion of the senses. It is

amazing how this fusion of senses "gives us the world." Deprived of any one of the senses, perception of the world will change.

People experience the world not only by passive superficial sensations, but also through active participation that associates sensations with attitudes, meanings and values. According to Berleant (1992) the term "aesthetic", when first introduced, included the role of perception. This ideosensory experience of the environment is often filtered by culture, knowledge, and experience.

Environmental Perception

According to Ittleson (1973), perception includes affective, cognitive, interpretive, and evaluative components. These components operate at the same time and involve several senses. Each of these components is discussed in greater detail below.

The Affective Component.

Affects or emotions are innate and cross-cultural. Each affect or emotion has characteristic experiential, facial and neurophysiological components (Izard,1977). Tuan (1974), related affect and landscapes when he suggested that in a preferred landscape the mind can find peace and excitement. Zajonc (1980), claimed that affect formed the first initial reaction to an environmental stimuli. This

initial reaction is spontaneous and considered beyond cognition since liking or fear can precede thought. This primacy of affect occurs as a result of the class of features and stimuli characteristics that are stored in the brain. Zajonc called these stored images the "preferenda." Zajonc noted that the quality and intensity of affect would depend on several factors such as the internal states or conditions of the individual immediately preceeding exposures to stimuli that may produce contrast or similarity, and the individuals's affective state immediately prior to the encounter. Ulrich (1983), in agreement with Zajonc, suggested the first stage of response to stimuli consisted of global, generalized affects related to preferences and approach-avoidance behavior. The presence of an affective code whereby an organism is able to instantly detect good or bad in the environment is certainly an added advantage to the organism's ability to survive and is predicted to be high on a natural selection potential (Woodcock,1984).

The Cognitive Component.

Kaplan (1987) and others (Holyoak and Gordon,1984; Lazarus, 1984), do not believe that affect is the first response to environmental stimuli. Kaplan and Kaplan (1982) suggested that environmental perception is largely a cognitive process. The informational approach to environmental

perception assumes that humans need to acquire information in order to function effectively in the world (Kaplan and Kaplan,1982). This cognitive process involves making sense of the available information as well as seeking and acquiring additional information which may be beneficial to the individual. This process involves recognition, prediction, and evaluation of the available information which may lead to possible actions. However, Kaplan (1987) did not exclude the possible role of affect in the informational approach when he noted that:

> "From the perspective of research and theory in environmental preference, there appear to be not two but a whole spectrum of different relationships between input and affect, with cognitive components varying considerably across this spectrum." (Kaplan,1987:p.21).

The Interpretive Component.

Knowing about the environment also involves interpretation. Interpretation of the environment depends on past experiences with similar stimuli and under similar circumstances. These experiences may not necessarily be direct or first hand experiences but may include those taught by society. Familiarity with a certain environment has been shown to be an important factor in influencing the preference for that environment. However, it does not mean that a familiar environment is the one most preferred (Kaplan and Herbert,1987).

The Evaluative Component.

Finally, the evaluative component of perception determines which of the experiences is good or bad. It deals with the perceived quality of the environment and may be influenced by such things as knowledge and education (Bell et.al.,1990).

The Role of Evolution in Environmental Preference.

The notion that landscape preference is biologically determined has been suggested by several authors. Appleton (1975), forwarded the idea that human landscape preferences were determined by the need to see without being seen. He argued that this "prospect and refuge" situation was what gave the advantage to our hunter-gatherer forebearers to seek game and avoid being attacked by enemies.

Orians (1980) attempted to determine if the choice of garden trees was correlated with the shape and structure of trees found in the wet savanna. The savanna environment was long thought to be the place of origin of the human species. He concluded that the choice of garden tree forms did correspond to those found in the wet savanna suggesting an evolutionarily determined preference. In similar study, Balling and Falk (1982) found that young children most preferred savanna when asked to rate several types of natural environments. They concluded that landscape preferences of the young may be strongly influenced by

biologically determined factors. However, preferences changed with age suggesting that over time preferences may be influenced by socio-cultural factors such as familiarity and previous experiences (Lyons, 1983).

The Role of Culture in Environmental Preference.

The role of culture in influencing landscape preferences appears obvious. Cultural influences permeate every aspect of an individual's life influencing both thoughts and behavior, and determining how one looks at the world (Tuan,1974). The meaning of landscapes is closely associated with the different social, economic, and political systems in which the concept evolved (Uzzell,1991). Greenbie (1988) noted that in the Western world, the idealization of nature began with the writings of Rousseau at a time when Europeans had relatively "lost" nature in Europe. Primitive societies, on the other hand, both feared and revered nature but could not afford to idealize it. In countering the biological notion of landscape preference, Uzzell (1991) noted that:

> "Even when we do respond to the physical or aesthetic characteristic of the landscape such as water, pattern or colours, it has to be recognized that water, pattern and colour have a cultural history and meaning for the individual and the social group."(p.9)

Cultural versus Biological Roots of Landscape Preference.

There is a wide divergence of opinion between those who regard landscape preference to be an innate and biologically inheritable response and those convinced that the phenomenon is a learned response to natural stimuli colored by personal experiences and filtered by cultural biases (Parry-Jones, 1990). The convincing evidence presented by both camps suggested the possibility that landscape preference may accomodate both approaches working in some, still inexplicable, fashion. This compromise position is explained by S.Kaplan (1992):

> "There appears to be ample room for cultural influences as well as for echoes of early human experiences in the landscape people prefer.....(and perhaps) aesthetics is not merely a luxurious thought but relates to human needs to find his place in this world."(p.593 and 595).

One recent evidence of this compromise was suggested by Parson (1991). He suggested some physiological evidence on how the brain might process environmental information in different ways depending on the nature of the information. Based on LeDoux's model of subcortical affective processing, he suggested two routes whereby information can travel for affective processing. One is through the sensory thalamus, sensory neocortex, cortical association areas and then to the amygdala for responses by the hypothalamus. The other is also via the sensory thalamus but passes directly to the amygdala. The information going by the former route is specific and detailed while comparatively gross information

passes through the latter route. This led Parson (1991) to speculate that:

> "one possibility is that the amygdala acts as a kind of feature detector, only the 'feature' being detected (with respect to environmental preferences) is a good or bad environment composed of a particular arrangement of preferenda....Such a scenario is also consistent with the notion that humans may have a particular type of environment (i.e. savanna-like) that we respond to most positively."(p.11).

This speculation may provide an insight into the role of biological and cultural factors in landscape preferences.

Visual Landscape Preference

Even though environmental experiences have been argued to be multi-sensory, much emphasis has been given to the visual aspect of this experience. A number of factors have contributed to this but the most important factor is the urgent need to find valid methodologies that can be used to assess landscapes for the purposes of planning and management (Zube and Pitt,1981). The need for assessing landscapes arises from legislation requiring that the value of outstanding landscapes be considered along with the economic values derived from more traditional uses of natural resources. The National Environmental Policy Act of 1969 (NEPA), specifically stated the need to provide and protect visual resources when it directed relevant agencies to "..use all practicable means..(to) assure for all

Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings." (NEPA,1969)

The focus on the visually derived experience is understandable since humans are largely visual animals. According to Nash (1982), humans' visual ability developed only after ancestral man began to adapt to life in the grasslands from an arboreal origin. Increased visual acuity of humans helped them to compensate for the superior sense of hearing, smell, etc. that other faster and more agile animals possessed. Thus, the human visual ability gave man an advantage over other animals in terms of searching for food and avoiding dangers in the open grasslands. This advantage may have enabled human species to survive and become dominant to other species.

The development in visual acuity alone, however, was not sufficient for survival in the world. It had to be followed by an equal development in the understanding or perceptions of what was being seen. Perhaps one of the most difficult and mysterious of these perceptions is the perception of beauty. Even late in this century students of aesthetics still lament their inability to define the concept. Lynch (1976) warned those studying landscape aesthetics that "esthetic is often considered a kind of froth, difficult to analyze, easy to blow away."

In the past, people considered beauty to be idiosyncratic as expressed in the cliche, "Beauty is in the eyes of the beholder." However, landscape preference studies over the last several decades have begun to discern several facts about our "love affair" with scenic and beautiful landscapes. First, landscape preference seems to be a shared concept among groups of people. Second, certain groups of underlying categories seems to be embedded in these preferences. Third, people's liking for landscapes appears to be a stable concept. Even though no studies have focused specifically on relating landscape preferences with aesthetics, some researchers have begun to relate environmental aesthetic (expressed as preference) to a more basic need of finding one's way around the environment (Kaplan,1992; Orians and Heerwagen, 1992; Woodcock,1984).

Whether landscape preference is a universal phenomena shared by people of different cultures is not yet known. Some preliminary findings in cross-cultural studies on this subject found similarities as well as differences. Differences have also been noted between people from the same culture but with different professions and interests (Kaplan and Herbert,1987; Daniel and Boster,1976). These findings are not conclusive and await further research.

Preference for the Natural Environment

One of the most consistent findings in landscape preference research has been that people prefer natural over man-made environments (Kaplan,1992). The preference for the natural environment appeared to be a cross-cultural phenomenon (Kaplan and Talbot,1988; Schroeder and Anderson,1984). However, the pattern of preference may differ between different groups. For example, blacks and whites like nature in their neighborhood, but they differ in what they like about it specifically. Blacks prefer natural environments that are well managed and contain some man-made structures while their white counterparts prefer natural environments that are wild, unmanaged, and devoid of any man-made structures (Kaplan and Talbot, 1988).

Generally, Americans prefer "park-like settings with manicured grass, the absence of underbrush, and scattered mature shade trees." (Balling and Falk,1982:p.7)). In terms of environmental contents, people like snow-capped peaks, green mountains, green vegetation, lakes, and rivers. They dislike close and even-sized trees, bare areas, sparse vegetation and the presence of smoke or smog in the natural environment (Magill,1992). In a study on urban nature, Herzog et.al.(1982) found that nature formed a distinct perceptual category in the minds of observers. According to Ulrich(1986) Americans seem to categorize natural settings

as those scenes where the "...landscape content is predominantly vegetation and/or water, and (where) man-made features such as buildings and cars are absent or inconspicuous."(p.36). Herzog (1984), in a preference study of field and forest environments found that the content and spatial arrangements of scenes affected how people rated them. Large trees were highly preferred. Old trees seemed to be in a group of their own. No explanation was suggested of why old trees were singled out by observers, but their value for preservation was suggested. What spaces meant to the observer seemed to be an important factor in determining preference. Space organization that offered concealment or vantage points were favored. The findings gave support to Appleton's Prospect-Refuge Theory (Appleton,1975).

Benefits of Natural Environments.

Several studies have examined the physiological and psychological effects of natural and urban environments on humans. Some research has shown that scenes of nature, and especially of vegetation, seemed to be beneficial in hastening recovery of post operative patients and lowering the stress and anxiety levels of these patients (Ulrich,1981). Parson (1991) proposed that there might be a link between environmental information processing and human immuno-deficiency system which could explain the restorative effects of natural environments. Kaplan and Kaplan (1989),

speculated that people find natural environments to be more restful and relaxing than urban environments. This may be due to increased stimulation of involuntary attention resulting from interest and curiosity in natural environments. The increased use of involuntary attention can help restore depleted voluntary attention capacity which people depend on in urban living. Other research supports the conclusion that natural environments are restful and relaxing. Hartig, Mang and Evans (1991) found exposure to natural environments relieved mental fatigue. However, study results also indicated that the benefits from a wilderness encounter might not appear immediately after the experience. In fact, mood might be slightly depressed temporarily. In addition, the restorative effect can occur not only in the wilderness but also in urban parks. How restorative effects occur may vary by setting. In the wilderness, attention may be directed toward self awareness, while in urban nature the presence of other people might direct one's attention elsewhere (Taylor,1990).

Not all aspects of the natural environment elicit positive responses, however. Ulrich (1993), presented evidence from other studies that suggested humans are aversive to the sight of "snakes, spiders, heights, closed spaces and blood" (p.77) and that this response is part of the human defense/aversive response. Even though these perceived physical dangers (e.g. falling down a cliff, being

bitten by snakes, etc.) may depress preference for a natural environment, the effect is not as pronounced as perceived social dangers (e.g. getting mugged in a dark alley, etc.) in an urban environment (Herzog and Smith, 1988).

Mountains, Canyons, and Deserts.

Mountains have been a source of fascination for people in various ages and cultures (Tuan,1993). But this view has not always been positive. Nicholson (1959), studied changes in Europeans perceptions of mountains and noted that perceptions about mountains changed over the centuries from liking, to despising and back to liking again. These changes were influenced by philosophical and religious writings on the subject at that time. Miller (1984), in examining the effectiveness of the Bureau of Land Management's landscape assessment procedure, found that rock outcrops and cliffs formed a category that was highly preferred. Herzog (1987), in a study to find out people's preferences for uneven terrain scenes, found that the statistical categories of mountains, canyons, and deserts coincided rather well with *a priori* categories of those environments. Furthermore, the subcategories of snowy mountains and small mountains were well liked.

Perceptions about canyons were found to be related to visual access such as narrow canyons and spacious canyons (Herzog, 1987). The spacious canyons were better liked than

the narrow canyons even though narrow canyons registered high in mystery. This combination of high mystery and low preference, however, is uncommon in the literature. The author suspected that perceived danger (e.g. falling down) might have played a role in lowering the preference for that particular environment which was high in mystery.

The most preferred scenes in a desert depicted cliffs and needles (Herzog, 1987). These scenes possessed high levels of complexity and mystery. The least liked scenes were those of plain cliffs and rock formations which offered little variation in color and form, and little opportunity for concealment. In general, the desert environment was disliked by all ages as a place to visit and disliked even more as a place to live (Balling and Falk,1982). Professional foresters, however, found the desert to be as likeable as any other environments as a place to visit. The preference rating fell sharply when it was considered as a place to live. The researchers concluded that lack of water in a desert environment must have been a salient factor in lowering preferences for such an environment.

Grasslands.

Age related differences were found in the preferences for grasslands (Balling and Falk,1982). Eight and eleven year olds rated the savanna environment highest of all scenes. However, with increasing age the pattern of

preference began to shift towards other biomes. Older subjects had lower preference for scenes depicting dry grasslands. The researchers posited that at a young age, biological factors influence younger children's preferences for the savanna environment. Older subjects' preferences seemed to be colored by cultural influences. Cues such as a lack of water and sparse vegetation may have depressed their preferences for the savanna in favor of more luscious environments. Concern for the availability of water was also noted by Lyons (1983) in a study replicating Balling and Falk's earlier work. However, she concluded that landscape preferences were influenced by culture.

Woodcock (1982) looked at the influences of environmental affordances on landscape preferences. He found gender differences in preference for the grassland environment. Male subjects grouped the wet and dry savanna scenes together while female subjects separated them. Females also had a lower preference for scenes lacking in cover. He related these results to the early roles of male as hunters and female as gatherers (Woodcock,1984). Another interesting finding in this study was the influence of agoraphobia (fear of open spaces) in depressing preferences of the subjects.

Bodies of Water.

Preferences for bodies of water were studied by Herzog (1985). Four dimensions of bodies of water resulted from having subjects rate scenes containing water. They were termed mountain waterscapes; swampy areas; rivers, lakes and ponds; and large bodies of water. These dimensions appeared to be distinguished by the amount of movement of water and the spaciousness of the water bodies. Subjects in the study preferred scenes of mountain lakes and rushing water while swampy areas were least preferred. An unexpected finding was that the large bodies of water were liked better than rivers, lakes and ponds. Herzog (1985) attributed this finding to those scenes having a spaciousness factor but also cautioned that it might reflect the "sand and surf" mentality of his college age subjects. The dislike for swamps was consistent with results of an earlier study where subjects rated swamps even lower after they were taken for a tour of the environment (Kaplan,1984).

Urban Nature.

A number of researchers have examined people's preferences for urban nature, particularly for urban parks. Herzog (1989) found that the "Tended Nature" category characterized by "carefully arranged flower pots, well trimmed hedges, or other noticeably manicured natural elements"(p.33) was the most preferred type of urban nature.

He concluded that what people preferred in an urban park was a sense of neatness as well as order. Scenes depicting such an arrangement were also rated high in coherence.

The affect (pleasure and arousal) that people associated with city parks, as a function of their physical characteristics (tree density, understory density and pathways), was investigated by Hull and Harvey (1989). They found that tree density had a linear and positive relationship with affect. At the same time dense understory decreased pleasure. The presence of pathways interacted with understory densities; pleasure increased when pathways were present together with thick undergrowth. On the other hand, paths seemed to decrease pleasure in scenes with little understory. They attributed this interaction to the need for way-finding. However, the presence of cues indicating potential social dangers (Herzog and Smith,1988) could also have played a major role. This latter notion was supported by Schroeder and Anderson (1984) who investigated perceived safety issues as well as scenic quality in a number of city parks. Subjects perceived insecurity when confronted by scenes of densely forested sites. Perceived safety was associated with "developed parks, long distance views, and access to nearby streets and buildings."(p.187). Scenic quality was associated with the presence of natural features such as trees and water. Preference for scenic quality was low when man-made features like cars and fences appeared in

the scenes. Grahn (1991), in an extensive study (involving more than 2,200 subjects) of parks in Sweden concluded that the feelings of security and peacefulness were important determinants of whether an urban park would be liked or not.

Factors Influencing Landscape Preferences

Several factors that seems to influence preference have also been investigated. These include age, gender, experience and familiarity, personality, and culture. Each is discussed in more detail below.

Age.

Bernaldez, Abello, and Gallardo (1989) in a study of Spanish children's landscape preference found that older children (16 year-olds) tended to prefer environments that were challenging while younger children (11 year-olds) preferred environments that offered more security.

In another study, Balling and Falk (1982) found younger children (8 and 11 year-olds) favored savanna scenes more than youths (16 year-olds), college students, adults and senior citizens. The study also found that the older age groups were more discriminating toward the biomes(savanna, deciduous forest, coniferous, tropical rain forest and desert) as a place to live or to visit. They concluded that while the younger age groups preferences might have been triggered by some innate mechanism, for the older groups culture might have played an important role.

The pattern of preferences was also found to vary according to age. Lyons (1983) noticed that her grade three subjects had stronger preferences than any other groups. She noted "..preference scores decreasing from grade three to grade nine, then stabilizing for college-aged and adult subjects, and dropping again for elderly subjects." (p.500).

Distinct age group differences in preferences were also noted in a study by Zube, Pitt, and Evans (1983). Young children (6-11 year-olds) and the elderly 36-65 year-olds seemed to have a different perception of the natural environment than the other age groups. These two groups were found to be least affected by the degree of naturalism in the environment. Young children were also found to be less sensitive to human presence and land use incompatibility but showed strong affinity for the presence of water.

Gender.

Bernaldez, Abello, and Gallardo (1989) noted gender difference in preferences of Spanish children. Boys liked scenes offering challenges and girls preferred more secure and less challenging environments. Gender differences also showed up in a study by Woodcock (1982). Males were found to discriminate significantly between a rainforest and a deciduous forest while female subjects did not. On the other hand, female subjects differentiated between wet and dry

savannas, disliking the latter. Males, however, did not discriminate between these two biomes.

Experience and Familiarity.

Few empirical studies were found that directly addressed the question of experience and landscape preference. However, there was an abundant anecdotal literature on the subject (Tuan,1993; Lowenthal,1978). Results of one empirical study (Tips and Savasdisara,1986a) focus on landscape preferences of Southeast Asians, found that subjects who had more travel experiences did not rate the landscape differently from those who had little travel experience.

The effect of familiarity on landscape preference has received more research attention than effects of experience but is conceptually very similar. Hull and Harvey (1989) noted that residents of inner city and more urban neighborhoods were more aroused by city parks than residents from the outer fringes. They attributed this difference to the former finding parks to be a novelty due to lack of such amenities in their own inner city neighborhoods. Some evidence of the influence of familiarity on preference was also found in a study by Lyons (1983). She found that "subjects from the desert biome showed a higher preference for the drier, opener landscape of savannah and desert than did the northern coniferous forest natives."(p.503).

Familiarity also seemed to play an influential role in a cross-cultural study of Australian landscapes by Kaplan and Herbert (1987). They found that the Australian groups rated the scenes higher than the Americans. They attributed this to the Australians being more familiar with the local landscapes. However, they also noted that familiarity did not assure liking. Members of the Wildflower Society did not rate some Australian scenes high even though the environment was familiar to them.

The influence of familiarity in determining the meaning associated with the landscape was noted by Hull and Revell (1989a). They noticed that western tourists and Balinese subjects focussed on different landscape features. They reasoned that the differences might result from the Balinese's familiarity with their local landscape. They concluded that familiarity gave meanings to a landscape which influenced scenic beauty evaluations.

In contrast, Zube and Pitt (1981) found that familiarity was not a major factor in perceived scenic quality among their Virgin Island subjects. A similar finding was reported by Balling and Falk (1982) when they compared preference ratings of Arizona college students familiar with desert environments with those from eastern colleges.

In a study of preferences for garden styles, Yang and Kaplan (1990) reported that Koreans did not rate their own

garden style favorably. Even though this did not indicate that familiarity had no influence on preference, it suggested that familiar environments were not necessarily favored. This conclusion was suggested by Kaplan and Kaplan (1989).

Personality.

The role of personality in landscape preference was hinted at by Sonnenfeld (1967) in a study comparing environmental perceptions of Delaware residents and Alaskan natives. He suggested that personality could be a more important factor in determining landscape preference than culture, age, or gender. In a study of Spanish subjects, Abello and Bernaldez (1986) reported that subjects with high "responsibility" personalities disliked risky and hostile environments. Meanwhile, people with low "emotional stability" preferred landscapes that were regular and predictable even if the landscapes were less exuberant. It was speculated that people of low emotional stability could be trying to compensate for their instability through their preferences. A similar finding was reported by Macia (1979). She noted further that individual's who were "independent, aggressive, and competitive" disliked landscapes that were dry and hostile and those high on the "mature" personality preferred humanized landscapes instead of the "wild ones."

Culture.

The roles culture play in influencing environmental perceptions have been suggested by many authors (Tuan,1993; Zube,1991; Uzell,1991; Saito,1985). The role of beliefs associated with landscape preference was studied by Tips and Savasdisara (1986b). They compared landscape preferences of Asians who were Christians, Buddhists, Hindus and Moslems but found no significant differences among the preferences of these subjects. Lyons (1983) argued that landscape preferences were influenced by cultural factors such as place of residence (urban or rural) and the amount of time spent outdoors.

Cross-cultural Landscape Preference Studies.

A number of studies have compared landscape preferences of people from different cultures.

Studies Comparing Americans with Other Nationalities.

Zube and Pitt (1981), in studies comparing perceptions of scenic quality of Americans, Yugoslavians and West Indians found that black American city center subjects gave highest ratings to scenes with pronounced man-made structures. Similarly, West Indians did not seem to be sensitive to the presence of hotel and apartment buildings in their landscapes. They discounted economic symbolism to explain this liking for man-made structures but did not

include novelty as a possible factor. Americans and Swedes responded positively to scenes of nature in a study that compared their physiological responses to natural and urban landscape scenes (Ulrich,1986). The physiological responses were higher in scenes characterized by the presence of trees and other vegetation.

Western tourists (including Americans) and local Balinese shared similar preference for the natural environment (Hull and Revell, 1989). Nevertheless, differences were noted in the choice of landscape features deemed important to each group. These differences were thought to have been caused by the different meanings associated with the features by the groups. Similar differences were reported in preferences for garden styles between Western tourist and Korean residents (Yang and Kaplan,1990). Both groups preferred a more naturalistic garden style and not the more formal and rigid Korean gardens.

An earlier study on American and Scottish campers (Shafer and Tooby,1973) also failed to detect any significant cultural differences in the preference of the subjects. However, some differences in preference between Americans and Australians were noted by Kaplan and Herbert (1987). They noted that the Australians rated Western Australian landscapes higher than their American counterparts. They attributed this discrepancy to the

Australian samples having more familiarity with the local landscapes. The study also found that the two sub-groups of Australians (college students and members of the Wildflower Society) differed in their liking. The differences occurred for scenes showing the presence of some exotic plant species. The investigators concluded that this difference of opinion must have been caused by the Wildflower Society members' sensitivity to the issue of exotic plants being introduced to local landscapes.

Comparing Different Groups of Americans.

Studies comparing landscape preferences of Americans of different ethnicity have also been conducted. Urban whites and blacks preferred natural scenes to those devoid of nature (Kaplan and Talbot, 1988). However, blacks preferred well manicured scenes with some evidence of structures present. Whites, on the other hand, liked scenes that were overgrown and unmanaged. This led the investigators to conclude that even though both groups preferred natural over man-made environments, there were differences in the types of spatial arrangement being preferred.

In another study, Sonnenfeld (1967) compared environmental preferences between residents of Delaware and several groups of Alaskan natives. The study did not find any significant differences in perceptions of environmental variables between the groups as a function of culture or

place of residence. All groups had positive perceptions of snow, different seasons, night, sun, moon and northern lights. Rain, storm and fog were negatively viewed. However, Sonnefeld (1967) suspected that personality might have played a more important role than cultural variables in determining the preferences.

Other Cross-cultural Studies in Landscape Preference.

Few cross-cultural studies have been conducted that examine non-American subjects. One study that compared landscape preferences of Asian subjects was reported by Tips and Savasdisara (1986a). Their study compared landscape preferences of students from Nepal, Thailand, Sri Lanka, Taiwan, Bangladesh, Malaysia, Pakistan and Indonesia who were studying at an institute in Thailand. The study did not find any significant difference in group preferences based on size of city of origin, travel experiences, or nationality.

An Evolutionary Perspective to Landscape Preference

The notion of an evolutionary perspective in landscape preference was forwarded by a number of authors (Kaplan,1992; Orians and Heerwagen,1992; Woodcock,1984).

The Prospect-Refuge Theory.

After studying English landscape paintings, Appleton (1975) suggested a landscape preference theory in his book

"The Experience of Landscape." In his Prospect-Refuge Theory, he suggested that human preferences for a landscape may be governed by two important components. Prospect, which is the ability to have a wide expanse of view from a vantage point, enables the observer to have the advantage of looking afar and thus, anticipate danger. Refuge, on the other hand, is a location whereby the individual is hidden but could see without being seen. Refuge enables the individual to hide from enemies but at the same time enables him to see his adversaries.

According to Appleton, prospect and refuge function to protect individuals from immediate and extreme environmental threats which evoke fear and avoidance. However, extreme hazards when viewed from a safe vantage observation point can be attractive and interesting. He suggested that these components might have given an advantage to our hunter-gatherer forefathers and that this adaptive advantage is biologically inherited and is expressed as a preference for certain landscape scenes.

The Kaplans' Informational Approach to Landscape Preference.

Kaplan and Kaplan (1982;1989) working from an informational approach to landscape preference, suggested that skill and information played important roles in the survival of human ancestors. Early humans must have depended on some cognitive processing of environmental information

for essential tasks such as finding food, wayfinding and danger avoidance. In studies that spanned more than two decades, Kaplan and Kaplan (1989) found that the contents of an environment (such as water and foliage) and their spatial arrangement were an important part in people's preferences for an environment. Their research in this area led them to propose the Informational Processing Model of Environmental Preference. A number of empirical studies have provided strong support for this model (see Kaplan and Kaplan,1989).

Orian's Savanna Theory.

The next stage in the development of the evolutionary notion to landscape preference was the work of Orians (1980). Based on knowledge of animal behavior in habitat selection he suggested that landscape preference might be related to an innate habitat selection behavior. He proposed the Savanna Theory (Orians and Heerwagen,1992) which posited that the most favored environment during the evolution of our ancestors was the savanna. This was very logical because the savanna provided nutritious food, protection from the elements and predators, as well landscape features that aided in wayfinding. The theory postulated that if the savanna was truly the environment most favored in the development of our ancestors, then some remnants of its characteristics should still generate positive responses in our habitat preference behavior. As Orians and Heerwagen

(1992) explain "The needs of our ancestors were the same as our current needs - food and water and to protect themselves from the physical environment, predators and hostile conspecifics." (p.557).

Empirical support for the savanna theory was reported by Balling and Falk (1982). They hypothesized that, if our preference for an environment is biologically inherited, then it should be most noticeable in young children who have received minimal acculturation. Their study confirmed this hypothesis. However, Lyons (1983) disputed this conclusion by saying that even at that young age, the subjects could have been exposed to culturally fostered environmental knowledge through reading and the mass media.

Further evidence to support the evolutionary notion of landscape preference was found in a study by Woodcock (1982). The study found some evidence that human landscape preferences were related to environmental affordances such as prospect and refuge. However, only secondary refuge and secondary prospect were found to be effective in determining landscape preferences and only in a savanna environment.

More evidence supporting the savanna theory was reported in a study on the choice of tree architecture in Japanese gardens. Orians (1985), found that these trees resembled the form of trees found mostly in high quality savannas. This led him to speculate that modern landscape gardens did have vestiges of the savanna origin.

Even though the evolutionary approach to landscape preference is still in its infancy, there appears to be sufficient evidences for further enquiry (Kaplan,1992; Orians and Heerwagen,1992).

The Informational Processing Model of Environmental Preference

The Informational Processing Model of Environmental Preference (Kaplan and Kaplan,1982) suggests that two groups of information are essentially needed by humans in order to function effectively in the world. These are information regarding the content of the environment and information relating to its spatial configuration.

The role of environmental content in landscape preference was first realized in early research when subjects rated scenes of the natural environment consistently higher than those of the built environments (Kaplan and Kaplan,1972). Further studies (see Kaplan,1987) confirmed the importance of content in people's preference for landscapes. The role of contents has far reaching ethical implications. Kaplan (1987) noted that "if content in fact does not matter to people, then, in principle urban development replacing a natural area could be equally preferred." (p.7).

The other type of information that is thought to be essential to human functioning in the environment is

information on spatial arrangement of the landscape. The model postulates that making sense of and getting involved with the environment are important concerns to people. Making sense of the environment connotes a two dimensional analysis, much like what occurs when a person looks at a scene in a photograph. Making sense of an environment is the process by which an observer comes to understand the environment.

Making sense of an environment is determined by the coherence and legibility of the environment. Coherence refers to the degree of fittingness of groups of elements within the scene. Environments which are high in coherence are those that can easily be organized by the brain. Kaplan (1987) hypothesized that "a scene yielding 5 +/-2 chunks would be more highly preferred." (p.10). Legibility refers to the perceived ability to find one's way in a three dimensional environment without getting lost. In summary, coherence represents the immediate assessment of elements in the scene. Legibility is the promise of exploring further without the fear of getting lost.

While making sense seems to be important in identifying and understanding the environment, maintaining interest and learning more about it is only possible by getting involved with the environment itself. Involvement entails two additional concepts, complexity and mystery. Complexity is defined as the degree to which there are different elements

present in the scene that would immediately sustain the interest of the observer. Mystery is a promise of more information if the observer is willing to proceed further into the scene. In summary, complexity constitutes the amount of information immediately encountered in the environment that sustains interest, while mystery is the predicted information available in the environment. The Kaplans (1982) developed a landscape preference matrix that incorporated these concepts (Figure 1.)

Figure 1. Landscape Preference Matrix

	Making sense	Involvement
Immediate	Coherence	Complexity
Predicted	Legibility	Mystery

The model postulates that environments that are high in Coherence, Legibility, Complexity, and Mystery will be preferred.

Studies Supporting the Model.

A number of studies lend support to the Kaplans' Informational Processing Model of Environmental Preference. In a study of urban nature, Herzog (1989) found four

perceptual categories of urban nature labelled Older Buildings, Concealed Foreground, Tended Nature and Contemporary Buildings. Among the four categories, Tended Nature was liked best while Older Building was liked least.

The usefulness of the model was also tested in environments where water was the major feature (Herzog,1985). In that study Mountain Waterscapes (lakes and ponds in the mountains) were found to be the best liked while Swampy Areas were rated the lowest.

Numerous other studies also gave support to the model (Gimblett, Itami and Fitzgibbon,1985; Kaplan,1985; Herzog,1984). Kaplan (1987) noted that:

> "While obviously still incomplete and in need of refinement, an informational approach to environmental preference appears to be, in light of these studies, reasonably useful and productive."(p.14).

All studies quoted above supported the model by pointing to the relationship of both contents and arrangement of features in the environments and people's preferences for those environments.

The Model's Landscape Predictors.

The model suggests that Mystery, Coherence, Complexity, and Legibility can be used to predict people's landscape preferences. Each of the four components is described in greater detail below.

Mystery.

One of the predictors that most often appeared to be correlated positively with landscape preference is Mystery. Mystery refers to the promise of more information to be gathered if the observer was to proceed further into the scene. Kaplan (1987) cautioned that the term "Mystery" was never intended to convey a suggestion of the element of surprise. Instead it was supposed to indicate a situation of incomplete information and a prediction of more related information to be acquired from the scene. The model postulated that Mystery functions to sustain the interest of the observer as well as inviting involvement with the environment.

The effectiveness of mystery as a predictor of landscape preference was reported in a number of studies. Mystery was shown to be positively correlated with preference in the urban environment (Kent,1989; Herzog and Smith,1988). Positive correlations were also reported between mystery and several perceptual categories of urban nature that were liked (Herzog,1989).

Mystery was also shown to be a positive predictor of preference in the natural environment. It predicted landscape preferences for mountains, canyons, and deserts (Herzog,1987). However, it did not correlate positively with preference for narrow canyons. Herzog speculated that another factor (danger) might have played a role in

depressing preference in that particular situation. A subsequent study (Herzog and Smith,1988) failed to relate mystery with perceived danger.

Mystery was also reported to be an effective predictor of preference in watery environments (Herzog,1985). It was positively correlated with the mountain waterscapes category, which was the most preferred waterscape category in that study. In a study that compared the effectiveness of several domains of predictor variables (landcover, informational, perceptual, and physical) in predicting landscape preferences, mystery was the only informational variable that significantly predicted preference (Kaplan, Kaplan and Brown,1989).

Finally, Gimblett, Itami, and Fitzgibbon (1985), in attempting to operationalize further the concept of Mystery, reported that "the promise of information and locomotion are two components of mystery that aid the observer in developing a mental image of the landscape." (p.92). Results from the study indicated that the promise of information was affected by screening which can be caused by vegetation or by a contrast in light and darkness. In contrast, the opportunity for locomotion (involvement) was strongly affected by physical access, distance of view, and spatial definition.

Coherence.

Coherence refers to the degree of grouping of different features in the scene that facilitates understanding of the environment. The effectiveness of coherence in landscape preference prediction has been reported in several studies. Coherence was found to be a strong predictor of preference in all categories of urban nature (Herzog,1989). Coherence also played a positive role in predicting preference for environments involving water (Herzog,1985). High coherence was found to be positively correlated with high preference (mountain waterscapes) while low coherence was associated with low preference (swampy areas). Coherence also predicted preference in a forested environment (Herzog,1984).

Complexity.

The degree to which there are different groups of elements within a scene is termed complexity. Complexity sustains interest and involvement. The concept of complexity has a long history in research on landscape preference. In earlier research complexity was thought to be the factor associated with arousal and preference for an environment (Berlyne,1971;Wohwill,1968). Now it is known that complexity is only one variable among several that play an important role in determining landscape preferences.

Some evidence of the effectiveness of complexity as a preference predictor was found in a study on preference for

waterscapes (Herzog,1985). In this study, complexity played a significant role in predicting the level of preference for swampy areas (not preferred) and large bodies of water (preferred).

Legibility.

Legibility refers to the perceived ability to find one's way in the environment. No recent studies were found that examined the relationship between legibility and landscape preference. Kaplan (1987) noted that while mystery, coherence, and, to some extent complexity were shown to be effective predictors of preference, the role of legibility is not well documented. This may result from the way the concept has been defined. The definition of legibility warrants further refinement.

In summary, mystery and coherence have performed well as landscape preference predictors. Complexity fared only moderately well while legibility has received little support as a predictor of preference. It should be noted that all studies with the predictors mentioned were done with Caucasian subjects. Nothing is known about how these predictors would function in predicting preferences for subjects of different races or cultures.

Category Identifying Methodology

In the last two decades, the Kaplans and their associates have developed and refined a methodology for measuring people's reactions to landscapes. Using the procedure, people's responses to landscapes are elicited by using photographs or slides that are surrogates of the landscape. Factor or cluster analysis techniques are used to discern the perceptual categories underlying people's preferences for the rated scenes. The Kaplans labelled the technique the Category Identifying Methodology (Kaplan and Kaplan,1989), since the procedure seeks to extract the perceptual categories underlying preferences. Research studies using this methodology have shown consistent and reliable results (Kaplan and Kaplan, 1989).

The basic assumption underlying this methodology is that humans require information about their environment in order to function successfully in it. The information gathered requires cognitive processing. The information is stored as cognitive maps. Humans must be able to process all the necessary information in a rapid and most efficient manner in order to act successfully in their environment. Zajonc (1980) suggested that stored images of the environment enable humans to respond quickly to environmental cues by triggering affect.

Proponents of the Category Identifying Methodology claim that the method enables researchers to tap into

people's cognitive maps of the environment by analyzing their preferences for the landscape. Studies using this methodology in the last two decades have yielded interesting insights into what people preferred and construed as beautiful in the environment (Kaplan,1992). The methodology has been employed in numerous studies (Herzog,1989; Kent,1989; Herzog,1987; Herzog;1985; Gimblett, Itami, and Fitzgibbon,1985; Lyons,1983; Woodcock,1982; Balling and Falk,1982). R.Kaplan (1985) summarized the advantages of this methodology in the following statement:

> "While direct questioning regarding environmental perception is unlikely to be useful, it has been shown that the use of preference reactions to photographic material is a highly effective procedure for deriving salient perceptual categories...(that) draws on the strengths of the public and designers alike."(p.161 and p.176).

Landscape Surrogates

The use of surrogates representing actual environments is common to empirical landscape preference studies. Kaplan and Kaplan (1989) noted several advantages in using surrogates as compared to *in situ* evaluations. These included the ability to compare large number of scenes, better control over testing conditions, ease of conducting tests, and facilitating the use of a large number of subjects. The most popular media to represent landscapes are black and white photographs, color photographs, and color slides. Other forms of representation such as video film and drawings have been used infrequently in landscape preference

research. Their validity as surrogates have not yet received much attention (Bechtel, Marans, and Michelson,1987).

The validity of surrogates such as photographs and slides representing actual environments has been addressed in a number of studies (Stewart et.al.,1984; Nassauer,1983; Shuttleworth,1980). These studies found high correlations in results of studies using surrogates and actual landscapes. However, the investigators cautioned that these surrogates only acted as cues that triggered the memory of the environment they represented. Thus, it is important for the subjects to be familiar with the environment that is depicted (Nassauer,1983). Kroh and Gimblett (1992) noted that while photographs may be used to investigate unidimensional (visual) landscape preference, it is not effective in measuring the multisensory environmental aesthetic experience.

Descriptive Techniques in Landscape Preference Research

The use of numerical scales to elicit people's reactions to landscapes is not without its critics. Fishwick and Vining (1992) suggest that numerical scales "reveal little of how individuals react to these landscapes." (p.57). One alternative to the use of numerical scales in assessing landscape preferences is content analysis. Content analysis methodologies have been employed successfully to measure people's reactions to landscapes. Carney (1972)

described content analysis as a way of asking a fixed set of questions consistently in a body of writings so as to produce results that could be counted.

A number of content analysis techniques have been employed in landscape preference studies. These included Vocabulary Diversity and Natural Language processing software (Kroh and Gimblett,1992) and word count (Magill,1992; Schroeder,1991). These techniques, coupled with relevant statistical procedures, can be used to measure thoughts, feelings and memories that people associate with the scenes or landscapes (Kroh and Gimblett,1992; Schroeder,1991).

Combining Objective and Descriptive Techniques in Landscape Preference Research.

While the cognitive approach to seeking people's reaction to landscapes provides objective information about the phenomenon (Ribe,1989), qualitative information can be obtained through content analysis of descriptive responses (Zube,1984; Chenoweth and Gobster,1990). The latter provides sensitive insights into what people value in landscapes as well as what these landscapes mean to them. Used together, the two approaches help to assure that the information gathered is both reliable and valid (Taylor, Zube, and Sell,1987). Combining the two approaches also provides an opportunity to investigate the landscape

preference experiences holistically and enables investigators to cross validate results (Kroh and Gimblett,1992).

Landscape Sampling

Landscape sampling is an important issue in landscape preference research. Kaplan and Kaplan (1989) noted that while a lot of attention has been given to the selection of respondents, careful selection and adequate sampling of scenes is essential in all sampling criteria. A popular method of collecting landscape samples employs random or systematic selection by the investigators (e.g. Herzog and Bosley,1992; Kent,1989).

Choice of vantage points where landscape samples are taken has been examined by Hull and Revell (1989b). They classified sampling points (vantage points) used in previous studies into four types. These were points located randomly in a selected area; random points along commonly used pathways; points representing landscape types; and locations which provided samples appropriate for the hypotheses to be tested.

Some studies have used Visitor Employed Photography or participant photography, in which the respondents were given the opportunity to choose the scenes important to them (Hull and Revell,1989b; Cherem and Driver,1983). In this procedure, respondents are normally given cameras and

instructions or guidelines on what criteria to use when taking photographs in a particular area. The investigators collect and process the film at the end of the task. Having the respondents themselves select the samples, ensures that the scenes selected have purposes and meanings to the subjects or at least coincide with the use levels of the sites (Hull and Revell,1989).

CHAPTER III

METHODOLOGY

This chapter explains the scientific methodology adopted in testing the hypotheses. It begins with an explanation of the research design, collection of landscape photographs and pretesting. This is followed by discussion of the development of the data collection instruments, survey procedures, and data analysis. The latter topics will be discussed with respect to each hypothesis.

The Research Design

The research design for this study was a one shot quasi-experimental design involving five ethnic groups of American college students; Caucasians (X_1), Hispanics (X_2), Blacks (X_3), Native Americans (X_4) and Asians (X_5).

X_1	O_1
X_2	O_2
X_3	O_3
X_4	O_4
X_5	O_5

Time

Subjects in each group (X_1 - X_5) were exposed to a set of 75 colored photocopies of scenes representing mountains, grasslands and city parks. Subjects were asked to evaluate each scene by answering the question, "How much do you like

the scene you are looking at, for whatever reasons." The responses of the subjects in each group (O_1 - O_5) were made on a seven point, Likert-type scale with response categories of 1 = not at all to 7 = a great deal.

Collecting Landscape Photographs

Procedure for Collecting Samples.

Color photographs of mountains, grasslands, and city parks were taken by volunteers. These volunteer photographers were given instructions on the types of scenes to focus on and the correct way to capture those scenes (Appendix A). They were told to capture scenes that attracted their attention regardless of whether they were pleasant or not. Human subjects, their artifacts, and water were to be excluded from the scenes. In the case of city parks, photographers were told to exclude human subjects and water and to keep human artifacts to the minimum. These volunteers were provided with Kodakcolor 100 ASA films and used their own cameras. Once the task was completed, the film was returned to the investigator for processing.

Sampling Locations.

The mountain, grassland, and city park scenes were photographed at a variety of locations. Most of the mountain photographs were taken in the State of Colorado. These included the Rocky Mountain National Park, and the

southwestern San Juan-southeastern Sangre de Cristo mountains. A few of the mountain scenes used were from Canyonlands, Utah. All grassland scenes were taken in Pawnee National Grassland located in northeast Colorado. Photographs from parks in Fort Collins, Loveland, and Greely, Colorado made up the bulk of city park scenes. More than 350 photographs were collected between December 1992 and July 1993.

Selecting and Categorizing the Photographs.

The pool of more than 350 photographs were processed into 4" x 6" color prints. Photographs that were of poor quality and duplicated scenes were discarded. A total of 243 photographs were selected to be shown to a group of panelists. Each photograph was identified with a number, written on the back.

The Selection Panel.

A group of panelists was selected to assign the photographs into the three environmental categories. The criteria used to select panelists included i)their professional interest in the use of the land, or ii) their interest as a user of the land, and iii) sufficient experience with the environmental categories to be judged. Based on these criteria, ten panelists were selected. The panel of ten people included staff and students in Natural

Resource Recreation and Tourism, Landscape Architecture, Forestry and Agriculture at Colorado State University as well as some members of the public in Fort Collins.

Once a panelist was selected, an appointment was made for completing the classification task. Each panelist was given the 243 photographs and told to put them into three boxes marked "Mountain", "Grassland" and "Parks." The panelists were told that the selection would be strictly based on their personal judgements. After each panelist completed the task, the photographs in each box were identified by their numbers and data was recorded under the three categories.

Final Landscape Samples.

Once the selection procedure was completed, the frequencies with which the photographs were classified into each of the three categories were calculated. Photographs that were selected more than fifty percent in one category and in no other categories were chosen to represent that category. Of those photographs meeting the above criteria, twenty five photographs from each category were randomly picked to be the final representatives of that category.

Originally, the final seventy five photographs were to be enlarged to 5" x 7" prints. However, due to financial constraints, a decision was made to duplicate the photographs using laser color printers. The 5" x 7"

photocopies appeared to be reasonably good duplicates of the original photographs. Four sets of the 75 photograph were made to facilitate implementation of the survey. Each photocopy was mounted on a piece of hard board. This was done to ease handling of the photocopies during testing.

Pretesting.

Pretesting of the data collection instruments and procedures was carried out prior to the actual survey. The data collection instruments consisted of a Preference Rating Sheet and an open ended Reasons for Preference Sheet. On the Preference Rating Sheet, subjects responded to each scene on a seven point Likert-type scale. The Reasons for Preference Sheet was used to elicit the salient thoughts of the respondents regarding their preferences.

A Predictor Rating Sheet was used by the subjects to rate for the presence of the landscape predictors in the scenes. A list of definitions for the landscape predictors was also prepared to accompany the Predictor Rating Sheet.

Respondents for the pretest were students enrolled in a Research Methods class in Natural Resource Recreation and Tourism. Nineteen students agreed to participate and subsequently appointments were set up for the pretesting. A maximum of four participants were surveyed at any one time.

The participants were briefed on how the study was to be conducted. They were told to focus on the scenes

represented by the photocopies rather than the quality of the photocopies themselves. They were asked to rate each scene for how much they liked the scenes they were looking at, for whatever reasons, on a seven point rating scale (1 = not at all and 7 = a great deal).

On completing the rating procedure, they were told to pick out five scenes that they rated the highest and five scenes that they rated the lowest. For each of the selected scenes, they were asked to describe the reasons for their preferences based on i) the feelings they had when looking at the scenes, ii) the memories that came to mind on looking at the scenes, iii) the landscape features that caught their attention, iv) the spatial arrangements of the scenes, and v) any other reasons for their preference.

Some of the subjects agreed to participate in the predictor survey as well. They were asked to look at each selected scene and rate for how much of each predictor was present on a seven point rating scale similar to those described above.

The time taken to complete the procedure was recorded. At the end of the task, written as well oral comments were obtained from the subjects. The pretesting spanned two weeks.

Based on the results of the pretest and relevant comments of the pretest respondents, changes were made to the survey instruments before administering the final

survey. A decision was made to reduce the number of scenes evaluated in the "Reasons for Preference", from ten scenes to only four (two most preferred and two least preferred scenes). The reason for this decision was that respondents complained that the procedure was too long (an average of 40 minutes) and too tiring. Few comments were made regarding the quality of the photocopies. Most participants when asked later commented that they were too absorbed in the scenes to notice whether the pictures were color prints or photocopies.

Testing Hypothesis 1.

The same seventy five color photocopies, mounted on hard boards and identified on the back with numbers, were used for the actual study. However, only two subjects were administered the survey at any one time. This made survey administration easier for both the subjects and the researcher.

A four page Consent Form (Appendix B) was also prepared in accordance with the requirements and guidelines of the Colorado State University's Human Subject Research Committee. All subjects were required to read and sign the Consent Forms prior to taking part in the study.

Data Collection Instrument.

The data collection instrument had two parts, a Preference Rating Sheet and the Reasons for Preference Sheet. The Preference Rating Response Sheet (Appendix C) was used to elicit preference responses from the subjects. It included a Demographic Section to collect demographic information of respondents such as age, gender, ethnic group, sub-ethnic group, academic major and class standing. The Preference Rating Section consisted of eighty blank spaces for writing the picture numbers and the corresponding seven point rating scales. Extra spaces were included to avoid the end effect.

The Reasons for Preference Sheet (Appendix D) consisted of instructions for respondents as well as blank spaces for writing responses. The subjects were asked to choose two of their most preferred scenes and two least preferred scenes and evaluate them on the following four criteria: descriptions of feelings on seeing the scene, memories associated with the scene, features in the scene that catch their attention, and the arrangement of features in the scene. Spaces were also provided for any other comments regarding their preferences.

Sample Selection Procedure

The total sample of subjects for the preference study consisted of 324 American students in Colorado State

University. They were divided into five ethnic groups - Caucasians, Hispanics, Blacks, Native Americans and Asians.

Several methods were used to solicit study subjects. These included getting assistance from the students' advocacy offices such as the Office of Greek Life, El Centro-Hispanic Student Services, the Native American Student Services and the Asian American Student Services. Obtaining membership rolls of student organizations such as the Black Students Alliance, the Hispanic Business Students Association and the Asian American Student Association. Additional subjects were solicited for the study by contacting them using the Colorado State University Telephone Directory as well as distributing posters and flyers asking for volunteers.

The difficulty in locating minority subjects was compounded by the refusal of the Colorado State University's Equal Opportunity Office to grant permission for the release of names of minority students. When further efforts to solicit minority students for the study failed, a decision was made to obtain the remainder of the sample by approaching students at the Lory Student Center.

Preference Rating Survey Procedure.

The Preference Rating Survey was administered to subjects between November 1993 and March 1994. Most subjects were administered the survey in CSU's Lory Student Center.

However, for a few of the subjects, the survey was administered in the offices of El Centro-Hispanic Student Services or the Native American Student Services.

Each subject was contacted and an appointment was set up for survey administration. For those students approached at the Lory Student Center, the survey was conducted as soon as consent was achieved.

Each subject was briefed on the general purpose of the study and was asked to sign the Consent Forms. A verbal explanation of the procedure was given to compliment the written instruction on the Preference Rating Response Sheet. Subject were told to look at the scenes represented by the color photocopies and to rate for "how much they like the scenes they were looking at, for whatever reasons" (Herzog and Bosley,1992). The seventy five pictures were randomly arranged into two piles. Dividing the pictures into two piles made it appear as if there were fewer pictures to be rated so that subjects would not become discouraged. On completing the rating task, each subject was asked to pick two pictures that they preferred most and two pictures that they preferred least from the piles of photocopies. They were instructed on how to respond to the Reasons for Preference task. Each subject was told to give his/her responses to each question in one or two keyword or in short phrases. This was done to facilitate the analysis. However, respondents who wished to describe their reasons in more

detail were told to write them on the back of the response sheet.

On completing this task subjects were given a Colorado State University key chain as a reward for participating in the study. The pictures were reshuffled to avoid the same order of presentation for the next subject. The average time taken to complete the two parts of the survey was about thirty minutes.

Data Analysis Procedure

Data for the Preference Rating Survey were analysed using an SPSS PC+ program.

Group Means Comparisons.

Data were grouped according to the mountain category (scenes 1-25), the grassland category (scenes 26-49), and the city park category (scenes 50-75). Split-half reliability coefficients were calculated based on the three category of scenes. A reliability coefficient of not less than 0.50 was considered to be acceptable (Nunnaly,1967).

An analysis of variance (procedure ONEWAY) was performed with ethnic groups as treatments and the preference ratings of each scene as the dependent variable. The mean differences between each ethnic group for each scene was then compared using the Scheffe's test ($p=.05$).

The means for each category of scenes was calculated based on the group means of the scenes in a category. An

analysis of variance (procedure ONEWAY) was again performed with ethnic groups as treatments and the average preference ratings of each category as the dependent variable. Scheffe's test (p=.05) was conducted to test for mean differences between ethnic groups in each category of scenes.

Comparing Perceptual Categories.

An exploratory factor analysis procedure (FACTOR) was conducted on the data to determine the underlying perceptual dimensions in the ratings of each category of scenes. Both orthogonal (VARIMAX) and oblique (OBLIMIN) rotations were applied to find solutions that best fit the perceptual categories. Factor reliability was then assessed to determine the degree of agreement of the scenes within each factor.

Comparison of ethnic group preferences for each of the perceptual dimension was done by calculating the mean preference ratings of each ethnic group for the scenes within that dimension. A one way analysis of variance with preference ratings as the dependent variable and ethnic groups as treatments was performed on the data. Scheffe's test (p=.05) was used to test for mean differences between ethnic groups.

Content Analysis of Reasons for Preference.

A content analysis of the responses for the reasons for preference was achieved by dividing the responses into those scenes that were most preferred and those that were least preferred. For each category of preference, keyword that described feelings, memories, features, arrangements, and other reasons for preference were selected and recorded. A count of the frequency of each keyword appearing under these headings was made. In the case of short phrases and detailed descriptions only keywords were picked out.

A keyword list with the frequency of each word appearing was prepared. These keyword were grouped into general categories based on closely related meanings. The importance of each general category was ranked according to the percentages of the number of keyword in each category compared to the total number of keyword in all categories.

Testing Hypothesis 2

The Predictor Rating Survey was conducted to determine the presence of coherence, legibility, complexity, and mystery in the preferred and non-preferred scenes.

Data Collection Instrument.

Once the Preference Rating Survey was completed, the mean ratings of each scene for each ethnic group were calculated. Five scenes with the highest rating and five

scenes with the lowest ratings by each ethnic group were selected for use in the Predictor Rating Survey. Due to many overlapping scenes with the highest and lowest preferences between the groups, only nineteen scenes were selected.

The Predictor Rating Sheet (Appendix E) was used to measure the presence of the four predictors (coherence, legibility, complexity, and mystery) in the selected scenes. It consisted of instruction to respondents, blank spaces for filling in the predictor codes and picture numbers, and the corresponding seven point rating scale. Definitions for the predictors (Appendix F) were from Herzog (1989) and Kaplan and Kaplan (1982). Whenever possible both definitions were used to help explained the constructs to respondents.

Sample Selection Procedure.

Twenty five subjects were needed for this survey. Participants included staff and students at Colorado State University as well as several members of the public. All subjects were Caucasians. The final sample sizes were as follows:

i)	Natural Resource Recreation and Tourism	- 9
ii)	Landscape Architecture	- 11
iii)	Members of Public	- 5
		25

Predictor Survey Procedure.

Subjects were briefed on how to proceed with the task. They were told that they would be rating each scene for the presence of four predictor variables one predictor at a time. They were cautioned to rate for the presence of the predictors in the scenes and not whether they liked the scenes or not.

Subjects were given definitions of each predictor to be rated. They were then asked whether they understood what the definition meant. Further explanation was given if requested. Most subjects indicated that they understood the meanings of the predictors. The subjects then rated each scene for how much of the predictor was present in the scenes that they were looking at. A seven point rating scale (1 = not present at all and 7 = present a great deal) was used to evaluate for the presence of the predictors. The order of the scenes and the predictors were randomly changed for each subject.

The survey was carried out for two weeks in March/April 1994. The study was conducted in the Department of Natural Resource Recreation and Tourism Conference Room, the Landscape Architecture studios as well as the Lory Student Center.

Data Analysis.

To test for the effectiveness of the predictors in predicting preference, the first step was to determine reliability of the four predictors for the most and least preferred scenes. A split-half reliability coefficient of more than .50 was considered to be acceptable (Nunnaly,1967).

The predictors were then correlated with each other to determine the degree of association between them. In addition, Pearson's Product-Moment correlations were calculated to assess how the predictors correlated with the preferences of each ethnic group.

Multiple regression analysis was conducted to examine the contribution of the four predictors in predicting the preferences of each ethnic group.

CHAPTER IV

RESULTS

In this chapter results from the study are presented beginning with a description of the samples. Further descriptions of results are described with respect to each hypothesis.

Demographic Information.

The final sample size for this study consisted of 324 American students at Colorado State University divided into five ethnic groups. There were 148 Caucasians(45.5%), 51 Hispanics(15.7%), 39 Blacks (12.0%), 37 Native Americans (11.4%), and 49 Asians(15.1%). Out of these 54.5% were male and 43.7% were female.

Fifty six sub-ethnic groups were represented by the samples. Eighty percent of the subjects were less than twenty five years old. In term of class standing, there were approximately equal numbers of Freshmen, Sophomores, Juniors and Seniors. There were only 6.2% Graduate students. The participants represented more than seventy different majors in Colorado State University.

Hypothesis 1.

Hypothesis 1 stated that there were significant differences in the visual landscape preferences for natural

environments of Caucasian, Hispanic, Black, Native, and Asian American students at Colorado State University. Before testing this hypothesis reliability measurements were made for each of the *a priori* environmental categories, using a split-half reliability coefficient. Reliability coefficients for mountains (r=.95), grasslands(r=.97) and city parks(r=.98) were above the minimum acceptable coefficients.

A one way analysis of variance was conducted on the data to find the effects of the ethnic groups on mean preferences for each of the categories (Table 1). The results indicated that there were significant mean differences (p=.01) between ethnic groups in the mountain and grassland categories. However, no significant difference was noted between ethnic groups in the preferences for city park scenes.

TABLE 1

Tests of Simple Main Effects of Ethnic Groups and Preference

Category	SS	MS	F	Sig.level
Mountains	20.77	5.19	7.98 **	.0000
Grassland	27.21	6.80	5.90 **	.0001
City Parks	11.77	2.94	1.91 ns	.1093

** $p < 0.01$

ns non significant difference

Tests of mean differences between ethnic groups using the Scheffe' test at p =.05 was conducted on each of the scenes representing the mountain and grassland categories. Results indicated that there were significant mean differences in sixty percent of the mountain scenes (Table 2) and sixty four percent of the grassland scenes (Table 3).

TABLE 2

Significant Differences in Mean[1] Preference Ratings of Scenes between Ethnic Groups[2] for Mountain Category

Scene #	Cau	His	Bla	Nat	Asi	PopMean
1			5.2a[3]	6.2a		5.6
2			4.6b	5.8ab	4.4a	5.0
3	5.0a			5.7b	4.3ab	5.0
4	4.7a	4.7b	4.3c	5.6abcd	4.1d	4.7
5				5.0a	4.0a	4.6
7	4.6ab		3.7a	4.8	3.5bc	4.3
9	4.1a				3.00a	3.7
11	5.8a	6.0b	5.1abc	6.0c		5.8
14	5.8a			5.6b	4.7ab	5.2
16	4.5a		4.3b	5.4abc	4.3c	4.6
20	5.0a				4.2a	4.7
21				6.0a	5.2a	5.6
22	4.6ab		3.7ac	4.9cd	3.8bd	4.3
23	5.8ab		5.0ac	6.1cd	5.2bd	5.6
25				5.3a	4.3a	4.8

Notes:
1. Preference rating scale of 1 = not at all to 7 = a great deal in response to "how much do you like the scene you are looking at, for wharever reasons?"
2. Cau = Caucasian; His = Hispanics; Bla = Blacks; Nat = Native Americans; Asi = Asians.
3. Same letter across groups denotes significant differences between means using Scheffe's test(p=.05).

TABLE 3
Significant Differences in Mean[1] Preference Ratings of Scenes between Ethnic Groups[2] for Grassland Category

Scene #	Cau	His	Bla	Nat	Asi	PopMean
26				3.8a[3]	4.3a	3.1
27				4.1a	2.9a	3.3
32	2.8a			3.1b	2.2ab	2.7
33				4.0a	2.8a	3.4
34				3.4a	2.5a	2.9
35				3.3a	2.5a	2.9
37				3.3a	2.4a	2.8
38	3.2a			3.4b	2.0ab	2.9
39	2.9a		2.2b	3.4bc	2.2ac	2.7
41			2.4a	3.5ab	2.3b	2.9
42			2.3a	3.3ab	2.1b	2.6
43	3.2	3.1b	2.8c	3.9bcd	2.5ad	3.1
44	2.9a	2.7b	2.5c	3.6abcd	2.3d	2.8
46	3.1a	2.6b	2.6c	3.7abcd	2.4d	2.9
47			2.7a	4.2ab	2.7b	3.3
50	3.6a			3.8b	2.6ab	3.3

Notes:
1. Preference rating scale of 1 = not at all to 7 = a great deal in response to "how much do you like the scene you are looking at, for whatever reasons?"
2. Cau = Caucasians; His = Hispanics; Bla = Blacks; Nat = Native Americans; Asi = Asians.
3. Same letter across groups denotes significant mean differences using Scheffe's test(p=.05).

Mean preference ratings for each group were then calculated for each of the three environmental categories (Table 4). A one way analysis of variance was conducted to determine how ethnicity effected preference ratings for each category. Significant main effects (p=.01) were detected for the mountain and grassland categories with no significant differences found between ethnic groups in the city park category. Tests of mean differences between the ethnic groups was conducted using the Scheffe's test (p=.05). The tests indicated several significant differences in the preferences of each group.

TABLE 4

Comparison of Group[1] Means[2] by Environmental Categories

Category	Cau	His	Bla	Nat	Asi
Mountain	5.2ab[3]	5.0	4.7bc	5.5cd	4.7ad
Grassland	3.1a	3.0	2.8c	3.6bc	2.5ab
City Park	4.1	4.2	4.6	4.1	4.5

Note:

1. Cau = Caucasians; His = Hispanics; Bla = Blacks; Nat = Native Americans; Asi = Asians.
2. Preference rating scale of 1 = not at all to 7 = a great deal in response to "how much do you like the scenes you are looking at, for whatever reasons?"
3. Same letter across groups denotes significant mean differences using Scheffe's test(p=.05).

Overall, subjects rated mountain scenes (mean=5.0) higher than either grassland (mean=3.0) or city parks (mean=4.3). However, Native Americans (mean=5.5) showed the highest preference for mountains while Blacks (mean=4.7) and Asians (mean=4.7) had lower ratings for these scenes. Significant differences were also noted between Caucasians (mean=5.2) who rated mountains higher than Blacks and Asians. Hispanics (mean=5.0) were the only group that showed no significant difference with any other group for any of the environments tested.

Scenes of the dry grasslands were rated lowest (mean=3.0) by all groups. Nevertheless, Native Americans (mean=3.6) and Caucasians (mean=3.1) showed significantly higher preferences for those scenes than Asians (mean=2.5).

Native Americans also rated grassland scenes significantly higher than Blacks (mean=2.8).

Even though no statistically significant difference was detected among the group preferences in the city park category, a pattern of preferences was noted. Overall, scenes representing city parks were rated lower than mountains scenes but higher than grassland scenes. In contrast to the mountain and grassland categories, Blacks (mean=4.6) and Asians (mean=4.5) rated city park scenes higher than Hispanics (mean=4.2), Caucasians (mean=4.1), or Native Americans (mean=4.1).

Factor analysis on the preference ratings was used to discern underlying perceptual dimensions within each of the three environmental categories. An oblique (Oblimin) rotation was chosen as it provided clearer solutions when compared to the orthogonal rotation. Labelling of factors in both categories were solely based on the investigator's judgement.

Four factors resulted from factor analysis of the mountain category (Table 5). Factor 1 was labelled Partially Screened Views. It consisted of seven scenes showing partial screening of the views by vegetation, topography, or the contrast between dark foreground against a lighter background. Factor 2 was labelled Rock Formations. It included six scenes of vertical rock formations. Factor 3 was called Enclosed Views and was made up of seven scenes

where the views were enclosed by hills and mountains. Finally, Factor 4 consisted of two pictures showing an exposed rock surface and a pile of rocks and was subsequently labelled Exposed Rocks. Reliability of each factor was assessed using Cronbach's alpha. The following reliabilities were obtained: Partially Screened Views (.88), Rock Formations (.86), Enclosed Views (.83), and Exposed Rocks (.47).

Two factors were found in the grassland category. Factor 1 consisted of eleven scenes depicting meandering lines of depressed ground and was subsequently labelled Pathways. Six scenes showing buttes and escarpments made up Factor 2. Cronbach's alpha reliabilities for the factors were the following: Pathways (.93) and Buttes/Escarpments (.89).

The uniformity of preference for city park scenes resulted in only a single factor.

To determine if there were any differences between ethnic groups for their preferences for each of the perceptual factors, the average score of the scenes included in each factor for each ethnic group was calculated. Analysis of variances and Scheffe's test of mean differences were then conducted. In the mountain category (Table 5), the only significant difference for the Partially Screened Views factor occurred between Native Americans (mean=6.3) and Blacks (mean=5.4). In the Rock Formation factor, Caucasians'

preference ratings (mean=4.9) were significantly higher than Blacks (mean=4.2) and Asians (mean=4.1). Native Americans (mean=5.3) showed significantly higher preferences for the Enclosed Views factor than either Blacks (mean=4.4) or Asians (mean=4.2). Caucasians (mean=4.9) ratings were also significantly higher than Asians in this factor. Finally, Native Americans (mean=4.9) significantly rated higher than Asians (mean=4.1)in the Rock Formation factor.

TABLE 5

Comparison of Mean Group Preferences (factors)[1] in Mountain Category

	Cau	His	Bla	Nat	Asi
Partially Screened Views	5.8	5.8	5.4a[2]	6.3a	5.6
Rock Formations	4.9ab	4.4	4.2b	4.9	4.1a
Enclosed Views	4.9a	4.7	4.4b	5.3bc	4.2ac
Exposed Rocks	4.6	4.3	4.6	5.2a	4.2a

Notes:
1. Preference rating scale of 1 = not at all to 7 = a great deal in response to "how much do you like the scenes you are looking at, for whatever reasons?"
2. Same letter across groups denotes significant mean differences using Scheffe's test(p=.05).

TABLE 6

Comparison of Mean Group Preferences (factors)[1] in Grassland Category

	Cau	His	Bla	Nat	Asi
Pathways	3.1a[2]	3.0	2.8	3.6b	2.5ab
Buttes/ Escarpments	3.5	3.3	3.0	3.8a	3.0a

Notes:
1. Preference rating scale of 1 = not at all to 7 = a great deal in response to "how much do you like the scenes you are looking at, for whatever reasons?"
2. Same letter across groups denotes significant mean differences using Scheffe's test(p=.05).

For the grassland category (Table 6), Native Americans (mean=3.6) and Caucasians (mean=3.1) rated the Pathways factor significantly higher than did Asians (mean=2.5). For the Buttes/Escarpments factor, only the Native Americans (mean=3.8) and Asians (mean=3.0) differed significantly in their ratings.

Results of Content Analysis.

Results of content analysis of the descriptive responses are reported here with the numbers in parentheses representing the range of percentages of the keyword appearing in each general category (e.g. happy, disgust, etc.).

For the preferred scenes, all groups mentioned peaceful (24%-42%), happy (13%-27%) and awe (11%-18%) frequently on their list of keyword for feelings. Recreational activities

(22%-39%), places they have been to (12%-22%), specific locations (e.g. forest, golf courses, etc.)(8%-16%), and being with their families and friends (13%-19%) were frequently mentioned in response to the question about memories on looking at the scenes.

Features in the scenes that attracted their attention were vegetation (31%-37%), topography (12%-20%), and sky (10%-24%). The colors in the scenes were more frequently mentioned (17%-18%) by Caucasians and Hispanics than any other groups. The presence of Rocks (11%-20%) caught the attention of all groups except Asians.

Neat (36%-58%) was the most common word that described the arrangement of the most preferred scenes by all the groups. The most preferred scenes were also described as cluttered (9%-18%). However, the use of this word was normally accompanied by "natural" such as "cluttered but natural." Differences were seen in the use of "natural" to describe the most preferred scenes. Caucasians, Hispanics, and Native Americans used "natural" (6%-22%) frequently. However, the use of the word did not occur as frequently for Blacks and Asians.

In scenes that were least preferred, all groups mentioned boring (25%-46%), desolate (15%-24%), and lonely (11%-17%) to represent their feelings. All groups except the Native Americans also frequently felt the scenes to be dry (5%-20%). Native Americans were the only group that wrote

down the feeling of disgust (19%) frequently to scenes that they least preferred. The feeling of insecurity (19%) was mentioned by Blacks.

All the groups related the scenes with geographical locations they know of (14%-31%). For Caucasians, Hispanics, and Native Americans those scenes brought memories of recreational activities (7%-11%) they had participated in. All groups, except Blacks, associated the scenes with some locations that they know of (6%-20%). Driving experiences (13%-19%) figured prominently in the minds of all groups except the Native Americans.

Vegetation (36%-51%) once again caught the attention of all groups. However, the type of vegetation differed between the most and least preferred scenes. In the most preferred scenes, trees figured prominently while in the least preferred scenes, grasses, shrubs, and brush were mentioned frequently. Man-made structures caught the attention of Caucasians and Native Americans (12%-17%) more than any other groups. Hispanics and Asians also thought that the least preferred scenes contained nothing much to see (11%-12%). Least preferred scenes were also described to be empty (7%-12%) by all groups. All groups also responded that these scenes were too neat (11%-28%) or messy (13%-41%). Hispanics and Asians least liked the scenes because they were too open (5%-12%). Scenes that were of manicured vegetation (17%) were least liked by Native Americans.

Summary of Findings for Hypothesis 1.

All groups gave mountain scenes the highest preference ratings, followed by scenes of city parks and grasslands, respectively. However, in the mountain category, Caucasians and Native Americans rated the scenes significantly higher than Blacks or Asians. Similarly, Caucasians and Native Americans rated scenes of grasslands significantly higher than Blacks or Asians. Hispanics preference ratings for the mountain and grassland scenes did not differ significantly from any other group. Even though there were no statistically significant differences between preferences of ethnic groups in the city park scenes, a preference pattern was noted with the Blacks and Asians giving higher ratings for these scenes than Caucasians, Hispanics, or Native Americans.

Based on this evidence, it is concluded that there are significant differences in the visual landscape preferences for natural environments among Caucasian, Hispanic, Black, Native, and Asian American students at Colorado State University.

Hypothesis 2.

According to Hypothesis 2 there are correlations between Coherence, Legibility, Complexity, and Mystery and the visual landscape preferences for natural environments of Caucasian, Hispanic, Black, Native, and Asian American students at Colorado State University.

Split-half reliability coefficients for the most preferred and least preferred scenes were .93 and .96 respectively. Correlations between the four predictors indicated that Coherence correlated well with Legibility (r=.74) while Mystery correlated well with Complexity (r=.98). These relationships were significant at p=.01.

Correlations between each predictor and the preferences of each group was noted (Table 7). It was found that Complexity and Mystery positively correlated with the preferences of all groups. However, Coherence and Legibility correlated below the level of significance for all groups; coherence was negatively correlated with the preferences of every group. Complexity and Mystery showed significant positive correlations with the preferences of all groups at p=.01.

TABLE 7

Correlations between Landscape Predictors[1] and Groups Preferences

	COH	LEG	COM	MYS
Caucasians	-.0188	.0409	.9762**[2]	.9603**
Hispanics	-.0179	.0435	.9660**	.9524**
Blacks	-.0049	.1000	.9566**	.9541**
Natives	-.0430	.0610	.9751**	.9635**
Asians	-.0278	.0375	.9714**	.9540**

Notes:
1. COH = Coherence; LEG = Legibility; COM = Complexity; MYS = Mystery
2. ** $p < 0.01$

The contribution of the four predictors in predicting the preferences of the groups was examined by using multiple regression analysis (Table 8). The total variance explained (R-square) for each group ranged from .92 to .95. Complexity had a higher beta coefficient than Mystery for Caucasian, Hispanic, Native American and Asian groups. In the case of Blacks, Complexity and Mystery were equally important in the prediction of preferences. Coherence and Legibility were much less important than Complexity or Mystery in prediction of preference for all groups. Legibility was a positive predictor of preference for the Caucasian, Hispanic, Native American, and Asian groups while Coherence was the negative predictor for those groups. For Blacks, however, Coherence was a positive predictor and Legibility was a negative predictor.

TABLE 8

Multiple Regression Analysis of Predictors[1] with Preference as Criterion

	COH	LEG	COM	MYS	R-sq
Cau[2]	-.0360[3]	.0053	.7734	.2074	.9423
His	-.0436	.0121	.7158	.2556	.9179
Bla	.0229	-.0801	.4999	.4724	.9075
Nat	-.1379	.0948	.6122	.3663	.9507
Asi	-.0494	.0132	.7882	.1868	.9302

Notes:
1. COH = Coherence; LEG = Legibility; COM = Complexity; Mys = Mystery; R-sq = R-square.
2. Cau = Caucasians; His = Hispanics; Bla = Blacks; Nat = Native Americans; Asi = Asians.
3. Beta coefficients.

In summary, Complexity and Mystery correlated higher with the landscape preferences of all groups than Legibility or Coherence. Coherence was negatively correlated with preference for all groups. Complexity contributed more than Mystery, Coherence, or Legibility in predicting the landscape preferences of all groups except Blacks. For Blacks Complexity and Mystery contributed equally in the prediction of their landscape preferences.

Based on this evidence, it is concluded that there are correlations between Complexity and Mystery and the visual landscape preferences for the natural environments of Caucasian, Hispanic, Black, Native and Asian American students at Colorado State University.

CHAPTER V

DISCUSSION AND CONCLUSION

The study found a number of similarities as well as significant differences in the landscape preferences of the Caucasian, Hispanic, Black, Native, and Asian American students at Colorado State University.

Similarities Among Groups.

All groups gave higher preference ratings to mountain scenes than to city park or grassland scenes. In the city park category, all groups agreed on a single underlying perceptual dimension of its scenes. No significant group differences were noted in the city park category. Although there were no statistically significant differences, there appeared to be a pattern of preference for city park scenes with Blacks and Asians rating these scenes relatively higher than Native Americans or Caucasians.

Every group expressed feelings of peace, happiness, and awe in response to scenes that they most preferred. They expressed boredom, desolation and loneliness in response to least preferred scenes. Recreational activities seemed to be a salient memory for all groups when looking at the most preferred scenes. They also related them to places they had been or known. These scenes reminded them of being with family and friends. Vegetation (mainly trees), topography,

and sky were features in most preferred scenes that attracted the attention of all groups. In least preferred scenes vegetation was again a feature that attracted their attention. However, in this case, the type of vegetation mentioned were mainly shrubs, brush, and grass rather than trees. All groups seemed to agree that "neat" and "cluttered but natural" described the arrangement of their most preferred scenes. Least preferred scenes were empty, too neat, or messy.

In term of their effectiveness in predicting preference, Complexity and Mystery correlated significantly with the landscape preferences of all groups. Coherence and Legibility correlated lower with the landscape preferences of the groups. The predictors also functioned similarly in the landscape preferences of Caucasians, Hispanics, Native Americans, and Asians with Complexity having relatively higher weight than Mystery. Differences were seen in the prediction of Blacks' preferences.

Differences Between Groups.

Significant differences between ethnic groups were also noted and are discussed in greater detail below. Discussion is organized by examining each ethnic group independently and noting where differences between groups occurred.

Caucasians.

For this group the major differences were:

* Caucasians rated scenes in the mountain category significantly higher than did Blacks or Asians;
* They rated scenes in the grassland category significantly higher than did Asians;
* Caucasians mean rating for the Rock Formation dimension of the mountain category was significantly higher than the mean ratings given this category by Blacks and Asians;
* They rated the Pathways dimension in the grassland category significantly higher than did Asians;
* Colors attracted Caucasians attention more than any other groups, except the Hispanics;
* Naturally arranged environments were most preferred and man-made structures and facilities were least preferred by Caucasians.

That mountain environments were favored is not surprising. Mountainous environments have always captivated people's attention throughout history (Tuan,1993). Nicholson (1959), for instance, documented the changing perceptions of Europeans towards mountains during seventeenth and eighteenth century Europe. A number of studies have documented people's preferences for mountain areas for recreational purposes as well as places to live (Magill, 1992; Daniel,1988; Herzog,1987).

Caucasians rated city park and grassland scenes lower than mountain scenes. City parks may be less preferred as they were man-made. A hint of the lower preference for man-made structures and higher preference for natural arrangements were found in Caucasians' descriptive responses to reasons for preference. The lower preference for grassland scenes could also be a function of the fact that grassland scenes depicted were arid environments (Pawnee National Grassland). Arid environments tend to be less preferred than wet environments according to Balling and Falk (1982). Caucasians did mentioned feeling of dryness quite frequently in scenes that they preferred least. Frequent mention of driving experiences was also associated with least preferred scenes. This may indicate subjects' lack of familiarity with these scenes as they only experienced them in a passing.

Differences between preferences of Caucasians and Blacks for the natural environment was consistent with results of other studies. Kaplan and Talbot (1988) noted that, even though Caucasians and Blacks preferred nature in their neighborhood, they differed in the types of nature preferred. Caucasians liked wild and unmanaged nature while Blacks preferred manicured nature with some man-made facilities such as those found in city parks.

This study provided evidence that there were significant differences between the landscape preferences of

Caucasians and Asians. However, no previous studies were found that could throw much light on these differences.

As predicted, Complexity and Mystery correlated highly with landscape preferences of Caucasians. However, Coherence and Legibility did not. In fact, Coherence correlated negatively with preference. While low correlation between Legibility and preference has been noted before, Coherence has been found to be a moderately good predictor of preference in the past (see Kaplan,1987). The failure of Coherence and Legibility to predict preference in this study may have resulted from respondents having difficulty in understanding these two concepts. Larger variability was found for Coherence and Legibility than for Complexity or Mystery.

Hispanics.

Hispanics were the only group that did not differ significantly from the other groups on most issues. However, some differences did exist and were noted:

* Colors attracted Hispanics' attention more than for any other group, except the Caucasians;
* Although they most preferred natural arrangement, they least liked scenes that were too open;
* they least preferred scenes that were described as having "nothing much to see."

Generally, Hispanics' preference for the environments closely resembled those of the Caucasians. For instance, the mean preference ratings of Hispanics and Caucasians for the three environmental categories were quite similar. In comparing the pattern of preference of Caucasians and Hispanics, both rated Partially Screened Views highest and Exposed Rocks dimension lowest for mountain scenes. In grassland scenes too, both groups' rating of the Buttes/Escarpment and the Pathway dimensions were similar.

Like the Caucasians, Hispanics were attracted by colors in the preferred scenes. Nevertheless, they were not as sensitive to man-made features as the Caucasians. They rated low for scenes that they described as "too open."

The similarity of preference of Hispanics and the Caucasians for the landscape scenes are somewhat puzzling as studies in other areas such as recreation preferences indicate significant differences between these two groups (Hutchison,1988). However, it is speculated that the home environment of the subjects may have played a part in their preferences. Hispanic subjects in this study could have come mainly from rural areas and thus, their closer attachment to the natural environment.

Blacks.

Several major findings for this group included:

* Blacks rated the mountain category significantly lower than Native Americans or Caucasians;
* Blacks rated the grassland category significantly lower than did Native Americans;
* Blacks had a mean rating for the Partially Screened Views dimension in the mountain category significantly lower than the Native Americans;
* Blacks' mean rating for the Rock Formations dimension was significantly lower than Caucasians';
* Blacks' mean rating for the Enclosed Views dimension was also significantly lower than Native Americans;
* Blacks also associated insecure feelings with scenes that they least preferred. These scenes also brought memories of insecurity;
* Natural arrangement also did not figure prominently in scenes that they preferred most;
* Complexity and Mystery have more or less equal weights in the prediction of their landscape preferences. In other groups Complexity was relatively much more important;
* Legibility was a negative and non-significant predictor for Blacks but positive and non-significant for all other groups;

* Coherence was a positive and non-significant predictor of preference for Blacks but negative and non-significant for all other groups;
* Blacks' rated highest in city park category preference among all the groups.

Blacks' lower preferences for the mountain and grassland scenes were somewhat expected. Other studies had found that Blacks preferred urban parks more than the wild and rugged natural environment [Dwyer and Hutchison (1988) as reported in Hutchison,1988; Kaplan and Talbot,1987; Washburn and Wall,1980]. These studies indicated that Blacks preferred a more organized natural environment with some presence of facilities over environments that were largely unmanaged and wild (Kaplan and Kaplan,1989). No reason was mentioned for this preference. However, Blacks were the only group that mentioned insecurity to describe their feelings for scenes that they did not like. The cause of this pattern of preference is still a matter of speculation. However, since they too associated these environments with recreational activities, it could be assumed that their landscape preferences for the natural environment closely parallel that of their recreational behavior patterns which favor urban settings rather than wild nature.

Native Americans.

Major findings in this group that differed from other groups included:

* Native Americans rated the mountain category significantly higher than did Blacks or Asians;
* They rated the grassland category significantly higher than did Blacks or Asians;
* They rated the Enclosed Views dimension significantly higher than did Blacks or Asians;
* Native Americans' mean rating for the Exposed Rocks dimension was significantly higher than Asians' rating;
* In both the Pathways and Buttes/Escarpments dimensions of the grassland category, Native Americans' mean rating was higher than Asians';
* Native Americans most preferred scenes with natural arrangements and least preferred scenes with man-made features or that were manicured;
* They were the only group that expressed being "disgusted" with scenes that they preferred least, but did not mention a feeling of dryness associated with these scenes;
* Native Americans rated the mountain and grassland categories higher than did any of the other groups and the city park category lower than any others, except Caucasians.

Generally, Native American subjects rated the rugged and wild natural environments higher than did Blacks or Asians. This preference was echoed in their reasons for preference. The value and reverence of Native Americans for their "mother earth" is well documented (Callicott and Overholt,1993; Zube,1991) and these are manifested in their rituals and ceremonies. However, whether the pattern of their ratings in this study was related to this belief is only a matter of speculation.

The lack of mention of "driving experiences" or "dryness" associated with least preferred scenes (which included dry grasslands) suggested Native Americans may be very familiar with such environments. A look at the demographic information did indicate that the Native American subjects in this study belonged to tribes that had reservations located in the arid environments of the Southwest, North and South Dakota, and Nebraska.

Asians.

Major differences between Asians and other groups are summarized below:

* Asians rated mountain and grassland categories significantly lower than did Native Americans or Caucasians;
* They rated scenes significantly lower than did Caucasians in the Rock Formations dimension;

* Asians mean rating for the Enclosed Views dimension was significantly lower than Native Americans' or Caucasians' rating;
* For the Exposed Rocks dimension, Asians' rating was significantly lower than Native Americans';
* They rated the Pathways dimension significantly lower than did Caucasians and Native Americans;
* Asians' mean preference for the Buttes/Escarpments dimension was significantly lower than the Native Americans';
* Asians were the only group that was not attracted by the presence of rocks in the landscapes;
* Like Blacks, Asians did not mention natural arrangement frequently in their description of most preferred scenes;
* Similar to Hispanics, Asians preferred least scenes that had "nothing for them to see," and scenes that were "too open."

Both Blacks and Asians seemed to rate mountains and grassland scenes significantly lower than did Caucasians or Native Americans. Conversely, they tended to rate city park scenes higher than the other ethnic groups. It is possible that Asians' landscape preferences were related to the nature of their recreational preferences. Unfortunately, no

studies were found that could throw light on their recreational preferences.

Implications of Research Findings.

Results from this study indicated that there were significant differences as well as similarities among the landscape preferences of different ethnic groups. These results have several implications as discussed below:

1. Landscape planners and managers should be aware that differences in the landscape preferences do exist among people of different cultures. While the landscape preferences of mainstream American Caucasians have been researched, little is known about the landscape preferences of minority populations. In areas where constituencies are more ethnically diverse, these differences could lead to conflicts of interest over resource allocations in amenity planning and management. Furthermore, in areas where non-Caucasian populations are the majority, planning and management based on Caucasian preferences alone may receive very little support and may lead to failures and waste of resources.
2. Results also have implications for educators. This study did not assess differences in preference relationship with level of exposure to environmental information. Nevertheless, results may partly be a

function of differences in subjects' exposure to environmental information. For instance, greater exposure of Native American and Caucasian subjects to the outdoor environment, as well as more readings about outdoor adventure writings, may have led them to prefer wild nature more than did other groups. If this is true, than educators might be able to facilitate ethnic groups' enjoyment of these environments by providing more opportunities for these groups to gain knowledge and information about the environments.

3. Meanings and values associated with the landscapes may play an important role in influencing their preferences. In the case of the Native Americans, their traditional reverence and respect for nature may have affected their higher preference for the natural environments. If these positive values regarding the natural environment exist among ethnic groups, they should be identified and used appropriately to augment modern values in environmental education. This could be a means of more effective education for reaching these groups about environmental values.

4. These findings could facilitate environmental interpretation efforts in reaching a culturally diverse audience more effectively. Interpretation that incorporates the meanings, values, and symbols that different groups can identify with should be more

effective in conveying interpretive messages than messages that are alien to a particular group of people.

5. Landscape designers could benefit from understanding ethnic differences in environmental preferences. Findings of this study indicated that different ethnic groups responded differently to the landscape elements and to their spatial arrangements. Variations in preferences should be acknowledged and responded to in efforts to provide better living environments for all people.

6. Findings regarding cross-cultural variations in preference could be used as a basis for a better understanding of global environmental concerns, involving different cultures having different values, meanings, attitudes and behaviors towards their environments. Acknowledging that differences exist could be a first step in creating a better understanding that could lead to better international cooperation in the preservation and conservation of scenic and unique environments around the world.

7. Results from this study provide support to the Kaplans' Informational Processing Model of Environmental Preference. Contents and spatial arrangements of the landscapes were important concerns of all groups in this study. Responses to these types of information,

however, may be different for different ethnic groups. This study found Complexity and Mystery to be more effective predictors of landscape preference than either Coherence or Legibility. As had been suggested, the lower effectiveness of Coherence and Legibility could be due to difficulty in understanding the two concepts.

8. Finally, future research should address the shortcomings of this study as outlined by its assumptions and limitations.

Conclusion

The purpose of this study was (1) to identify significant differences in the landscape preferences for the natural environments of Caucasian, Hispanic, Black, Native, and Asian American students at Colorado State University, (2) to identify and compare the underlying perceptual dimensions of their preferences, and (3) to compare the effectiveness of the Kaplans' Informational Processing Model of Environmental Preferences predictors on the landscape preferences of each group.

The study found that all groups rated the mountain category highest and the grassland category lowest. However, within categories, Native Americans and Caucasians rated mountain and grassland categories significantly higher than Blacks or Asians. Though there were no statistically

significant differences, Blacks and Asians rated the city park category relatively higher than Native Americans and Caucasians. Hispanics did not show significant differences from any other group in this study, in mean preference ratings, for any of the three environment types depicted.

Four perceptual dimensions were identified for the mountain category. These were labelled (1) Partially Screened Views, (2) Rock Formations, (3) Enclosed Views, and (4) Exposed Rocks. In the grassland category, there were only two perceptual dimensions - (1) Pathways and (2) Buttes/ Escarpments. Some significant group differences were noted among these dimensions.

In utilizing the Kaplans' Informational Processing Model of Environmental Preference, it was found that Complexity and Mystery correlated highly with the landscape preferences of all groups. A multiple regression analysis of the predictors found that they have significant effects on the preferences of all groups and predicted the preferences of all groups, except Blacks, in similar manner.

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APPENDIX A

LANDSCAPE PREFERENCE STUDY

GUIDELINES FOR TAKING PHOTOGRAPHS

Thank you very much your willingness to take part in this study. This study will deal with the preferences of the American public (that means you!) for the natural environment. The result of this study will certainly help us understand how you perceive the visual natural environment and in turn will aid in their protection.

The method used in this study is known as Visitor Employed Photography or VEP. To help you in this task, here are some do's and dont's.....

THINGS TO DO

1. Use the disposable cameras provided or if you are using your own camera, please use a normal lens (set it to normal for zoom lenses).

2. Take shots of natural sceneries that you find appealing to you (both liked and disliked scenes).

3. Take advantage of popular vantage points if the opportunity exist.

4. It would be helpful to note down why you like or dislike the scene you just shot for later recall.

THINGS TO AVOID

1. Avoid large bodies of water however appealing they are.

2. Avoid human built structures.

3. Avoid any human figure or part of human figure (heads, shoulder, fingertips, etc.)

4. Avoid composing the scene if you are using a zoom lens. We want to capture the scene as a normal eye would see it.

THANKS!

APPENDIX B

COLORADO STATE UNIVERSITY
INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT

Title of Project: A Cross-cultural Comparison of Visual Landscape Preference for the Natural Environment.

Principal Investigator: Glenn E. Haas, Ph.D
Professor.

Co-Investigator: Mustafa Kamal Bin Mohd-Shariff.

Contact name and phone number for questions/problems:

Mustafa Kamal (303) 491-6591 (office) (303) 491-8124 (home)

Sponsor of Project: None

Purpose of the Research:

The purpose of this study is to compare the visual landscape preferences of different ethnic groups of American students at Colorado State University. It will also test the validity of a set of landscape preference predictors on each of these groups. Participants in this study will be shown a set of interesting colored photographs of the natural landscape. They will then be asked to rate their preference for each of those photographs. The whole procedure will not take more than 30 minutes.

Procedures/Methods to be used:

1. Each participant will be given a set of 75 colored photographs to evaluate. A 7-point rating scale will be used to rate the preference for each scenery.

2. At the end of the session participants will be asked to describe the reasons for their preferences on 5 of the most and 5 of the least preferred scenery.

3. In a different session, 5 of the most and 5 of the least preferred sceneries selected by each ethnic group will be picked out. Participants will be asked to rate for the presence of the landscape predictors (coherence, legibility, complexity and mystery) in each scenery.

Risks inherent in the procedures:

No known risks are perceived.

I understand that it is not possible to identify all potential risks in an experimental procedure, but I believe that reasonable safeguards have been taken to minimize both the known and the potential, but unknown, risks.

Benefits:

Participants in this study will have a chance to enhance their visual aesthetic appreciation of the natural environment.

Confidentiality:

All responses will be coded with a number and initials (no names will ever be used).

The data gathered will be matched through codes rather than names.

All questionnaires and response sheets will be the property of the Department of Recreation Resources, Colorado State University, Fort Collins, Colorado.

Financial Obligation:

Colorado State University is a publicly funded institution of higher education and, because it is a state institution, recourse for injuries sustained during the course of this research may be limited under a Colorado law known as the Colorado Governmental Immunity Act (Colorado Revised Statutes, Section 24-10-101, et seq.). If injuries should occur which the subject believes are the responsibility of Colorado State University or its employees, the University advises the individual to seek independent legal counsel.

In addition, under Colorado law, any claim against the University must be filed with the Risk Management Liaison Office at Colorado State University, <u>within 180 days from the date of the injury.</u> In light of these laws, participants are encouraged to evaluate their own health and disability insurance to determine whether coverage exists for any injuries sustained during the course of research as it may be necessary to rely on individual coverage for any such injuries.

Participation:

I understand that my participation in this research is voluntary. If I decide to participate in the study, I may withdraw my consent and stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.

I have read and understand the information stated and willingly sign this consent form. My signature also acknowledges that I have received, on the date signed, a copy of this document containing 3 pages.

_____
Subject name (printed)

_____ _____
Subject signature **Date**

_____ _____
Investigator/co-investigator signature **Date**

APPENDIX C

Preference Rating Response Sheet

Resp #:_____

Instruction to respondents:

Please answer all questions in the demographic section. Then look at each scene depicted by the photograph in front of you. **Imagine that you are in the scene.** Then, indicate **how much you like that scene for whatever reasons,** on a 7 point scale (1 = not at all to 7 = a great deal). Please circle all responses.

DEMOGRAPHIC INFORMATION.

1. Age
   1. under 20 years old.
   2. 21-25 years old.
   3. 26-30 years old.
   4. 31-35 years old.
   5. over 36 years old.

2. Sex 1. female 2. male

3. Ethnic group
   1. Anglo/Caucasian.
   2. Mexican American/ Latinos.
   3. Blacks.
   4. Native American.
   5. Asian American/Pacific islander.

4. Sub-ethnicgroup(pleasespecify) :_____
   (e.g.tribal affiliation, parental country of origin, etc.)

5. Academic major (please specify):_____.

6. Class standing
   1. Freshman.
   2. Sophomore.
   3. Junior.
   4. Senior.
   5. Graduate.

PREFERENCE RATING

How much do you like the scene in the photograph, for whatever reasons?

Photo. #	Not at all						A great deal
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7

How much do you like the scene in the photograph, for whatever reasons?

	Not at all					A great deal
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7

How much do you like the scene in the photograph, for whatever reasons?

	Not at all					A great deal	
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7

How much do you like the scene in the photograph, for whatever reasons?

	Not at all					A great deal
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7
________	1	2	3	4	5	6	7

How much do you like the scene in the photograph, for whatever reasons?

	Not at all						A great deal
_____	1	2	3	4	5	6	7
_____	1	2	3	4	5	6	7
_____	1	2	3	4	5	6	7
_____	1	2	3	4	5	6	7
_____	1	2	3	4	5	6	7
_____	1	2	3	4	5	6	7

APPENDIX D

REASONS FOR PREFERENCE

Resp #:_____

Instruction to Respondents:

We will choose two pictures that you have rated the highest and two pictures that you have rated the lowest. **Please look at the pictures one at a time.** Then answer the following questions. Answers should be **one or two words or in short phrases.** However, if you need to be more detailed please write on the back of this sheet.

1. Describe **your feelings** when looking at the scene in the picture.

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

2. Describe any **memory that comes to mind** on looking at the scene in the picture.

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

3. Describe **features** (e.g rocks, grass, trees, etc) in the scene that **attract your attention.**

Photo#_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

4. Describe the **arrangement** (e.g. neat, messy, cluttered, etc) in the scene.

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

5. Describe **other reasons** why you prefer (or not prefer) the scene.

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

Photo #_____: _____
_____
_____

APPENDIX E

PREDICTOR RATING SHEET

Resp #_____
Predictor: _____

INSTRUCTION TO RESPONDENT

Please write down the Pic # in the spaces provided on this sheet and look at each scene in the picture. Then rate for **How much of the predictor is present in the scene** on a 7 point scale (1 = **not present at all** to 7 = **present a great deal**) by circling the appropriate answer.

1. Pic #_____ 1 2 3 4 5 6 7	2. Pic #_____ 1 2 3 4 5 6 7	3. Pic #_____ 1 2 3 4 5 6 7	4. Pic #_____ 1 2 3 4 5 6 7
5.Pic #_____ 1 2 3 4 5 6 7	6. Pic #_____ 1 2 3 4 5 6 7	7. Pic #_____ 1 2 3 4 5 6 7	8. Pic #_____ 1 2 3 4 5 6 7
9.Pic #_____ 1 2 3 4 5 6 7	10. Pic #_____ 1 2 3 4 5 6 7	11. Pic #_____ 1 2 3 4 5 6 7	12. Pic #_____ 1 2 3 4 5 6 7
13.Pic #_____ 1 2 3 4 5 6 7	14. Pic #_____ 1 2 3 4 5 6 7	15. Pic #_____ 1 2 3 4 5 6 7	16. Pic #_____ 1 2 3 4 5 6 7
17. Pic #_____ 1 2 3 4 5 6 7	18. Pic #_____ 1 2 3 4 5 6 7	19. Pic #_____ 1 2 3 4 5 6 7	20. Pic #_____ 1 2 3 4 5 6 7
21. Pic #_____ 1 2 3 4 5 6 7	22. Pic #_____ 1 2 3 4 5 6 7	23. Pic #_____ 1 2 3 4 5 6 7	24.Pic #_____ 1 2 3 4 5 6 7
25. Pic #_____ 1 2 3 4 5 6 7	26. Pic #_____ 1 2 3 4 5 6 7	27. Pic #_____ 1 2 3 4 5 6 7	28. Pic #_____ 1 2 3 4 5 6 7
29. Pic #_____ 1 2 3 4 5 6 7	30. Pic #_____ 1 2 3 4 5 6 7	31. Pic #_____ 1 2 3 4 5 6 7	32. Pic #_____ 1 2 3 4 5 6 7
33. Pic #_____ 1 2 3 4 5 6 7	34. Pic #_____ 1 2 3 4 5 6 7	35. Pic #_____ 1 2 3 4 5 6 7	36. Pic #_____ 1 2 3 4 5 6 7
37. Pic #_____ 1 2 3 4 5 6 7	38. Pic #_____ 1 2 3 4 5 6 7	39. Pic #_____ 1 2 3 4 5 6 7	40. Pic #_____ 1 2 3 4 5 6 7
41. Pic #_____ 1 2 3 4 5 6 7	42. Pic #_____ 1 2 3 4 5 6 7	43. Pic #_____ 1 2 3 4 5 6 7	44. Pic #_____ 1 2 3 4 5 6 7
45. Pic #_____ 1 2 3 4 5 6 7	46. Pic #_____ 1 2 3 4 5 6 7	47. Pic #_____ 1 2 3 4 5 6 7	48. Pic #_____ 1 2 3 4 5 6 7
49. Pic #_____ 1 2 3 4 5 6 7	50. Pic #_____ 1 2 3 4 5 6 7	51. Pic #_____ 1 2 3 4 5 6 7	52. Pic #_____ 1 2 3 4 5 6 7

APPENDIX F

DEFINITIONS OF PREDICTORS

COHERENCE

The extent to which the scene "hangs together" through repetition of elements and structural factors which facilitate comprehension.

OR

How well the scene "hangs together"? How easy is it to organize and structure the scene?

LEGIBILITY

The recognition of an environment that looks as if one could explore it extensively without getting lost. Environments that are high in legibility are those that look as if it would be easy to make sense of as one wandered farther and farther into them.

COMPLEXITY

The amount of variety or diversity in a scene; a scene having enough information present to keep one interested or occupied.

OR

How much is going on in the scene? How much is there to look at? How much the scene contains a lot of elements of different kinds?

MYSTERY

The degree to which more information may be gained by proceeding further into the scene.

OR

How much does the scene promises more to be seen if you could walk deeper into it?