

The benefits of viewing sacred versus preferred landscapes

by

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Abstract

Restoration landscape theories propound the observation that landscape mitigates human emotion, mental functioning, and behaviour. Those environments that positively affect these spheres are called “restorative”. In recent years, many attempts have been made to quantify restorative landscapes, so that landscape architects and others can replicate them in the manipulated environment. An understanding of how certain combinations of landscape attributes affect humans is important in knowing the ramifications of certain designs.

A major finding in recent years is that preferred landscapes—or those high in scenic beauty—are generally more restorative than less-attractive environments. One realm of the environment not dealt with, however, is the sacred landscape. One reason for this is the relative difficulty in narrowing down the term “sacred” to something measurable.

The purpose of this thesis is to investigate the nature of sacred landscapes, and then to test sacred landscapes against preferred landscapes to measure their restorative potential. This testing involved subjecting participants to a psychological stressor, and then exposing them to slides rated highly in either sacredness or preference. A control group was also tested, but viewed a blank screen rather than images.

Implications of this research impact both researchers and practitioners in the fields of landscape architecture, environmental psychology, public land management, and visual resource management. This study found that sacred landscapes are very restorative, although not quite as restorative as environments that rate highly in scenic beauty. This confirms previous research efforts, and opens the study of restorative environments to other landscape typologies as well.

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Chapter 1: Introduction

Life is stressful. Tasks and challenges confront us, time demands, distractions and conflicts tax our emotional and mental capacity. While the challenges of survival on our planet have been taxing human beings since the dawn of humankind, the nature and causes of stress are shifting.

Part of this shift may be due to the evolving nature of the work we are most often engaged in and the environments in which most of us live. Increasingly, people are engaging in intellectual work as their primary occupation. With the mechanisation of many industries and the subsequent drop in physical activity incident to the Industrial and Technological Revolutions, many more people have undertaken intellectual tasks and a more sedentary lifestyle.

Rather than decreasing our stress, however, this lifestyle has led to a new kind of stress for which we are ill-adapted: mental fatigue. Mental fatigue is the wearing down of the brain's ability to complete mental tasks and respond properly to exterior stimuli. It comes about naturally as a consequence of trying to harness our brain's ability to concentrate over an extended periods of time, and can be aggravated by exterior distractions, the physical environment in which we live, and other stimuli.

With the majority of the world's population now living in urban areas, the prevalence of mental fatigue-induced stress may increase. As mental fatigue increases, the ability to concentrate is degraded, mental performance declines, and people become irritable and irrational (Kaplan 1995; Kuo and Sullivan 2001). Poor decisions are often made under conditions of mental fatigue, often demonstrated through increased risk tolerance (Robert et al. 2000).

As scientists have come to understand the interrelationships of body and mind, physiological consequences of mental fatigue have emerged. These classic symptoms of stress—elevated heart rate and blood pressure, heightened tactile and ocular sensitivity, ulcers, etc—are also indicative of the mental fatigue a person may be under. Other causes of stress have existed for centuries: confrontations, physical injury, emotional distress, and economic hardship all contribute to the stress burden we are faced with on a daily basis.

The costs of stress are high. The World Health Organization (WHO) Global Burden of Disease Survey has estimated that by 2020 mental disease, including stress-induced disease, will be the second leading cause of disability in the world (World Health Organization 1996). The American Institute of Stress has determined that up to 90% of all visits to the doctor in the United States are stress-related (Kalia 2002). The Property and Casualty Insurance Edition of Best's Review estimates losses in excess of \$150 billion (USD) in the United States alone due to poor decision making, absenteeism, lost productivity, substance abuse, and mental illness—all directly correlated with stress. It is also estimated that 25% of the U.S. workforce suffers from a mental illness rooted in stress (Kalia 2002). Other health costs of stress include burnout (46% of the American workforce), insomnia (33% of North Americans), and heart disease (20+ million Americans each year) (Stellman 1997; NIOSH 1986).

It is clear that stress has become an epidemic in today's society. Stress management clinics, spas, vacation packages, and magazine and news articles abound as we try to cope with stress. One especially intriguing aspect of stress relief is the restoration of mental functioning that may accrue from interaction with our surroundings.

Based in part on observations by eminent American landscape architect Frederick Law Olmstead and philosopher Henry David Thoreau, among others, research conducted in the last several decades supports what has long been thought; escaping the humdrum of daily life, with all of its attendant cares and stresses, and seeking out nature is beneficial to the human mind and body. By getting back in touch with nature, we can to some extent overcome the burden of stress we carry and restore our ability to think, concentrate, and interact properly with other people. By taking time to relax and remove ourselves from stressful situations, even temporarily, we in effect recharge our mental and physical batteries.

For landscape architects and other practitioners, the physical characteristics of the stress-relieving environment are of particular interest. By understanding why some environments are more restorative than others, and which characteristics of the landscape are most restorative, we can better design our world to mitigate the effects of stress. Research is beginning to show that those places that people find most beautiful or like the most, are the most restorative (van den Berg et al. 2003).

However, stress is only one part of the equation. People seek contact with nature for other reasons as well. For some, interacting with natural surroundings is a necessity, a means of obtaining a living. For others, an excursion from the city into the wilderness is recreational. Others, however, go to the country to rejuvenate their spiritual selves. Having sacred experiences in nature, whether intended or serendipitous, creates a physical and mental state in which the person feels as though they are one with their surroundings and a true part of the overlaying context.

The realm of the sacred in nature has long interested me and I have often sought out the serene and quiet places of nature with this precise intent. This inclination towards the sacred, however, took on an added intensity when my father suddenly passed away in 2004. Then, more than ever, I sought the solace that could be found only in the natural beauty of my surroundings. To be sure, I was seeking an escape from the stress and intense emotions incident with my father's passing. But I was also seeking something more, a reaffirmation of my deepest beliefs in the meaning and purpose of life.

Through these experiences, and many more since that time, I have come to believe that our surroundings offer much more than recreation or a way of life, more than resources to be extracted or pretty settings for our towns. Through interacting with our natural surroundings, we can derive physical and mental benefits that potentially supersede any to be found in our human-made world. In nature we can recover from stress, regain our cognitive functioning, and search for answers that seem somehow more apparent in the natural environment.

The purpose of this thesis is to investigate the correlation between sacred and restorative (in terms of stress reduction and mental fatigue) environments. I hypothesized that by first determining the nature of sacred places, and then testing these environments' restorative properties against beautiful, non-sacred, landscapes, a better understanding of the benefits of both sacred and non-sacred landscapes could be reached. This research aims to confirm previous research that beautiful landscapes are restorative. However, it also hopes to add to the understanding of the restorative environment by testing a new sphere of the human/environment relationship: the sacred.

Chapter 2: Research Context and Rationale

2.1 The Sacred

The term “sacred” has multiple connotations and interpretations. To one person, sacred may suggest a religious ritual; to another, an object that is imbued with meaning. Cultural and personal delineations abound. It is therefore impossible to measure the entire realm of the sacred in a single empirical work such as the one this thesis represents. Therefore, the sacred must be pared down and limited to a portion of it to facilitate measuring the effects of viewing it. To accomplish this, the decision was first made to limit the sacred to the natural or near-natural, meaning that scenes would lack perceivable traces human intervention. This decision was made partially in response to informal interviews (Section 3.2.1).

Furthermore, a literature review of many of the definitions of the sacred has been conducted, and the definition most in line with the intent of this empirical work chosen. Following is a discussion of this literature review.

2.1.1 Familiarity, Mundane-ness, and the Sacred

In her book *Ordinarily Sacred*, Lynda Sexton discusses how everyday objects become sacred as we become familiar with them, establish daily rituals around them, create memories and build associations with them. Ostensibly, such mundane objects as books, furniture, articles of clothing, or street trees can become sacred to certain people (ibid). For example, a person might identify a cherished book as their favourite not because it is especially well-written, but because of the memories that are associated with that book: perhaps long winter evenings curled up on a sofa with the book, a mug of cocoa, and a dear friend. The association of this happy time is connected to the physical artefact, the book,

and thus the book becomes the token of the memory. A story is told of a man and a toy car that is displayed in his home. There is nothing particularly special about the car itself, aside from the fact that it is now quite old, but the memory and the association connected to the car make it sacred. When this man was a small boy, a man and his wife moved into his community. One day they brought him the car, telling him that he reminded them of their son, who had died in the war, and that this car had been his favourite toy. They offered it to the boy, who accepted their gift and kept it safe in his own home. Now, as an older man, the toy car is displayed in his home. When visitors ask about the car, the man tells them the story about the son who died in the war, and the son's name and memory is preserved and perpetuated. In this way, the toy car has become sacred, as it is an object imbued with meaning (Paterson, 2007).

It is evident from these examples that literally anything may be sacred, depending on the viewer. However, this extends the study of the sacred to be the study of everything. Obviously, limits have to be imposed. One limit is the concept of collective memory. When people see the toy car in the man's home, it is nothing more than a toy car. They know nothing of its story at first. However, when they become participants in the car's history and symbolism, the car then becomes sacred to these people. In a way, the car and the son have been added to the collective memory of the people.

2.1.2 Collective Memory

Collective memory is the shared collection of myth, legend, and cultural history that allows a person to identify him or herself culturally. For a Jew, for example, collective memory includes the stories of Adam, Moses, Abraham, the Roman captivity, and the hopes for a Messiah. These myths, legends, or histories, depending on one's perspective,

along with a host of others from Russian pogroms to Nazi extermination campaigns, to the establishment of Israel as a nation, help to distinguish the Jews as a people, and give them a cultural heritage. This heritage then allows them to have traditions, a way of living, and a particular outlook on life, or bias, that other peoples do not have.

Sometimes, collective memory can be shared by different peoples, such as the pre-Abrahamic Bible history. This timeframe, from Adam to Abraham, is shared by Christians, Jews, and Muslims. Subsequent history, however, provide divergent outlooks for each of these three groups. The divaricating line for Jews and Muslims is the question of birthright between Isaac and Ishmael. Ishmael was born first to Hagar, Sarah's servant. When Sarah subsequently had Isaac, Ishmael and Hagar were excluded from the family circle (Gen. 21:1-21 King James Version). The reasons and appropriateness vary when different groups are asked (according to Muslims, Sarah was jealous of Hagar, and forced her and Ishmael out into the wilderness so that Isaac would have no competition for the birthright (the land of Canaan or Palestine); according to the Jews, Ishmael and Hagar wanted to kill Isaac for the same reason, so that there would be no competition for the birthright, but were found out and forced to leave the camp for young Isaac's safety). The Christians and Jews share their collective memory until the time of Jesus, when the majority of the Jewish population rejected Jesus' claim as the Messiah, while a few accepted him and became his followers-the Christians. Thus the majority of Christians acclaim Jesus as the Anointed One or Saviour of the world, while the Jews state that Jesus was a teacher and a prophet, but not the promised Messiah.

2.1.3 Religious Sacredness

This discussion of religion brings three other definitions or connotations of sacred to bear. For many people today, the word sacred has a religious context. A sacred cup in the Christian world, for example, is likely to be a cup that a saint or other “holy” person has touched or used. A sacred place is most often a church, grove, or other place, manmade or not, where organised religious rituals occur. These places are also imbued with meaning, and hold collective memories for different cultures. For example, the cathedral at Chartres was constructed to commemorate the healing miracles that reportedly occurred there during the Middle Ages. The miracles started as one miracle. People came to see the place where one miracle occurred, and some claimed that they, too, were healed there as a result of their religious devotions. They began to build grottoes and impromptu altars with candles and images of the Madonna there, and finally, the Church decided to institutionalize the locale with a cathedral. Thus, as people became participants in the place, collective memory began to form, and then became ritualized and regulated by the official body, the Church. This same process also served to create the pilgrimages to Mecca, Jerusalem, the Ganges River, the Nile River, and Mount Fuji that have endured for ages.

A further type of sacred experience or quest is going to the wild to commune with Deity. Religious texts are replete with examples of prophets, saints, hermits, and scholars, not to mention the Christian Saviour, Jesus, repairing to the wilderness to commune with their gods. Thus, Moses ascended Sinai in the Arabian desert to commune with God and receive the Ten Commandments. In the New Testament, it is related that before His official ministry began, Jesus retreated to the desert to fast and receive instruction from God. Later, Jesus was transfigured on a mountain in Palestine, and tradition holds that he was put to

death on a hilltop in Jerusalem. Mohammed was in exile in the wastelands of Arabia when he received his prophetic mantle and the revelations that make up the Koran. Many hermits and ascetics, literally striving to follow the admonition to flee the world to commune with God, set up monasteries and hermitages in the deserts and wilderness to come closer to God. In Chinese culture, the Taoist tradition led seekers of truth and life to the mountains to behold the spiritual essence of the world. Schama (1995, 407) reports that “the mountains were also the abode of the Immortals, persons who, while not fully divine, had added some centuries to their existence through diligent pursuit of the way of Tao. Such was their success at transcendence—in dissolving themselves into the vital breath of *ch’i*—that they could materialize on the backs of storks or, as in one spectacular Taoist painting, travel through the thin, vaporous air.” In some Native American cultures, the shaman or medicine man would commune with the gods of nature to receive intelligence or information, and then would report back to the group to determine their actions. In each of these examples, the object is to commune or communicate with the gods to receive enlightenment, knowledge, or passage to a higher level of existence.

A final religious sacred typology is the sourcing of the sacred within myth or legend. Mircea Eliade, an eminent cultural anthropologist, devoted his life to discovering the origins of modern religion. He found that contemporary religious rituals have their basis in the pagan myths and legends of antiquity. Thus, modern Christian baptism of water, with the symbolized watery death and resurrection as a “new man” is reflected in Ancient Egypt’s veneration of the Nile as the burial place of Osiris, who is reborn each year. Thus, when the Nile flooded the pastures and killed hundreds of people, it also renewed the land, adding nutrients and organic matter to the soil that were essential for a

healthy crop that year. In this way, life, death and rebirth were interconnected in a continual cycle that, if interrupted, would disrupt civilization. Greek mythology is replete with gods and demigods who used the forest as their abode, especially Apollo and Artemis, and their cults of fertility, the hunt, and the tree-oracle. As Simon Schama notes in his work, *Landscape and Memory*, Christian missionaries in the early Christian era would take advantage of the similarities between pagan and Christian beliefs, and couple the two together to “convert” as many pagans as possible to Christ. As Pope Gregory theorized in the 7th Century, “When this people see that their shrines are not destroyed, they will be able to banish error from their hearts and be more ready to come to the places they are familiar with, but now recognizing and worshipping the true God” (Flint 1991, 76). In keeping with this vision of conversion and coupling, Christian missionaries often built churches and monastic cells on top of or within pagan fertility groves or worship sites, thus marrying the two cultures (Schama 1995). Again, collective memory plays a leading role in determining the sacredness of the place or object.

2.1.4 The Order of Nature and Sacredness

Another viewpoint of the sacred is presented by Christopher Alexander, an architect and theorist who emphasizes the inherent ordering found in nature. To notice, understand, and thus appreciate, this ordering is to become more a part of nature, and the universe at large (Alexander 2001).

For example, a person walking in a desert might come across a barrel cactus. Pausing to examine it, this person may notice that the spines on the cactus, or clusters of spines, all occupy a certain position on the ridges of the cactus, and that everything is regularized, so that as one proceeds up the cactus to the top, the spines begin to whorl

around and become smaller until they finally meet at the flower on the top. Each spine on the cactus has a specific place on the ridges, and ridges and spines and flower all work together to create the whole: the cactus. And it is thanks to these characteristics that the cactus can hold water from the wet period throughout the dry season, expanding and contracting according to need. Once these processes are observed and understood, the correlation between a cactus and a city transit system can begin to be comprehended, and application made. In this way, the cactus is sacred because it is ordered and forms a complete, integral whole. It is also sacred because we have seen and understood it, and have thus participated in the process, albeit in an outsider type of way (Alexander 1997).

Similarly, a beehive is a sacred system, because every individual within the hive is operating for the overall benefit of the whole: worker bees go out and find flowers that will provide an acceptable food source for the colony, nurses stay at the hive and tend the larvae, while the queen stays home and lays eggs. Each insect has its role to play, and the end result is the continued health of the entire hive (Miller 2007).

2.1.5 Authenticity, Ethics, and the Sacred Experience

A final viewpoint on the sacred, closely related to Alexander and Sexton and the focus of this thesis is best explained by Margaret Somerville, a lawyer and ethicist at McGill University in Montreal. Somerville's 2006 book, *The Ethical Imagination*, calls for a rethinking of our decision-making process and basis. In it, she states the case for revitalizing our ethical imaginations, solving problems and making decisions based on our interior, fundamental values rather than political correctness or commercial gain. Somerville states that people in North America and Europe, in particular, are floating adrift in a sea of uncertainty and moral vagueness. As an illustration of this point, the Vancouver

Sun recently reported that nearly 12% of Canadians call themselves “undecided” or “not sure” about moral questions ranging from illegal drugs to having children out of marriage to abortion to pornography (Moral Compass 2007). The survey, conducted over several months in 2007, found that many respondents had not given any thought to their moral standing on these issues prior to participation in the survey, and that when pressed, could not answer either for or against these issues. It is hardly to be expected that other post-industrial nations like the United States, the United Kingdom, or many of the countries in mainland Europe would be any different.

The concern arising from this, in Somerville’s mind, is that people who have no idea where they stand ethically or morally cannot make important decisions about policies ranging from abortion to global climate change—decisions which could ultimately impact everything on earth. She claims that people in a democratic or quasi-democratic state, the common situation in North America and Europe, cannot consistently make good decisions, or even justifiable decisions, without a conscious ethical foundation. Thus Somerville calls for individuals and societies at large to begin a process of rediscovering their ethical priorities. She frames this process in terms of finding one’s most “authentic individual self” (2006, 57), and states that sacred experiences help people to do this. For Somerville, then, a sacred experience consists of “the complex interaction of knowing ourselves, relating to others, appreciating our place in the great web of all life, and seeing ourselves as part of the earth, the stars, the universe, and the cosmos” (ibid). Once this relationship has been established, and people begin to understand how their decisions and actions affect everything around them, and also begin to measure these impacts against their own ethical metre stick, societal perspectives will begin to change, and people will begin to make

decisions that benefit the greater whole, and thus themselves. Sacredness, then, is about sustainability.

Somerville, after defining the sacred experience, then postulates about some of the specific experiences that might be considered sacred. Harkening back to Sexton's discussion of the ordinarily sacred, Somerville identifies several commonplace, ordinary events that might give a person a peek into the greater context of the cosmos, and thus increase a person's awareness of his or her most authentic self:

“Many people experience [that primordial sense of amazement] on first seeing their newborn baby. We can also experience it...when we watch a magnificent sunset, hear the birds' dawn chorus, or hold a newborn kitten or puppy; see two foxes wandering in the moonlight, along a grassy treed slope, beside a busy downtown expressway, or gaze at a pair of blue herons flying home at sunset high over a great river; are surrounded by beautiful music or art; feel an intimate bond with another human; or have the intricacies and order of the universe revealed to us by science. A sense of the sacred is present when we feel awe at being alive and conscious of the beauty, world, and life around us. It is no accident that we often find that experience in nature – in perceiving the exquisite minuteness of a tiny flower or insect, or in being lost in the grandiosity of wilderness and vast night skies” (*The Ethical Imagination*, p. 59).

The sacred experience, then, is something more than an object or church or ritual. It consists instead of an interaction of organisms and processes in a way that encompasses everything around you and truly makes you feel that you are a part of everything you see. The person becomes, in the truest sense of the word, an insider rather than an outsider, and begins to feel empathy for the other organisms in the relationship, whether they be people, animals, or even plants. It is only then that people can evaluate the many interrelationships and potential impacts that their decisions will make, and decide which route or alternative will be the best one.

Of course, the decision-making process will never be a perfect one, no matter how aware we are of our most authentic selves. We are still subject to bounded rationality, or

the limited ability of the human mind to process vast quantities of information and relationships. However, recognizing that there are many possible outcomes, and some are better than others, one can still strive to make the best possible decision, and one can still strive to measure the foreseeable outcomes and implications of the different alternatives against each other and against one's own internal ethical priorities.

2.1.6 The Role of Landscape in Sacredness

What role does landscape play in all of this? The setting in which a sacred experience may occur is potentially critical. Through an analysis of accounts of sacred experiences found in common religious texts, as well as informal discussions with people of varying backgrounds and expertise in culturally sacred landscapes, some telling trends have emerged surrounding the landscape or setting in which sacred experiences tend to occur.

In the initial researching phases of this thesis, it was postulated that a sacred landscape, or a landscape that would facilitate having a sacred experience, could potentially have a few different, but related, characteristics. First, there would be a feeling of expansiveness or infiniteness. As Somerville suggests in her book, "being lost in the grandiosity of wilderness and vast night skies" is a recurring theme when talking to people about the sacred landscape. Another characteristic commonly mentioned is a feeling of loneliness; as C.S. Lewis puts it in one of his novels, "a nice kind of loneliness" (Lewis 2001, 441). Being alone, or perhaps being with one other intimate acquaintance to share the moment with, is a critical factor to having a sacred experience.

However, these two characteristics are not enough, it seems. Recently, I presented a series of 120 images to 12 people, who were asked to rate the images for sacredness. In

other words, the people were given Somerville's definition of a sacred experience and asked to rate the slides (1-10, with 10 being the highest rating), which landscape settings would best facilitate having an experience of this type. Of the 120 images, 15 were consistently rated very high (an average score of 7 or above, with 8.67 the highest average score recorded). These images, included in Appendix 1, have one primary common characteristic: the lighting in each image is somehow spectacular. Whether it is a golden sunset, broad contrasts between light and shadow, or misted light streaming through trees, in each instance, the image suggests that light and contrast play a significant role in determining a sacred landscape (see Figure 1).

Figure 1 Typical sacred slide illustrating lighting characteristics (Oregon Coast, USA; Photo by author).



People often describe being alone on the top of a mountain, at the edge of the ocean, or in the middle of the plains. This feeling of loneliness, aloneness, combined with

the expansivity of the setting, often lends itself to a sacred experience. Many people also mentioned having become “one with the mountain” or feeling completely absorbed by their surroundings, either through the effort required to scale the summit, or through the sheer overwhelming qualities of the place. This phenomenological atonement, letting go of one’s self and becoming integrated into the greater context, is precisely what Gaston Bachelard spoke to in many of his essays and writings. In speaking of his hometown and region in the French countryside, Bachelard relates the following:

“I was born in a country of brooks and rivers, in a corner of Champagne, called le Vallage for the great number of its valleys. The most beautiful of its places for me was the hollow of a valley by the side of fresh water, in the shade of willows...

My pleasure is still to follow the stream, to walk along its banks in the right direction, in the direction of the flowing water, the water that leads life towards the next village...

But our native country is less an expanse of territory than a substance; it’s a rock or a soil or an aridity or a water or a light. It’s the place where our dreams materialize; it’s through that place that our dreams take on their proper form...Dreaming beside the river, I gave my imagination to the water, the green, clear water, the water that makes the meadows green. I can’t sit beside a brook without falling into a deep reverie, without seeing once again my happiness...The stream doesn’t have to be ours. The anonymous water knows all my secrets. And the same memory issues from every spring” (*L’eau et les Rêves. Essai sur l’imagination de la matière*, as quoted in Schama: *Landscape and Memory*, p. 244).

These passages suggest that the water, the stream, to Bachelard represents the form and substance of his dreams and thoughts. In order to accomplish this, it is necessary to become “one” with the stream and rock and aridity and light that make up his surroundings. Bachelard is so much a part of his native land that he truly sees himself as a tiny part of it, and it as an integral part of him. Indeed, his very dreams are made up of the substance of his patria.

This phenomenological atonement is also a common thread in each of the sacred typologies that have been mentioned thus far in this thesis. Whether becoming so intimately familiarized with one's mundane surroundings that the routines of the day become daily sacred rituals, or so acquainted with the ordering inherently found in surrounding nature that the ordering can be applied to one's life, becoming one with one's surroundings, letting go of self to take part in the experience of living, is fundamentally what the sacred is all about.

The roots of this type of experience, at least for modern Europeans and North Americans, can be traced to the search for and discussion of the sublime in the Romantic period. In the mid-1700s, Thomas Gray and Horace Walpole, two English writers and intellectual adventurers, ventured up Mont Cenis in Switzerland in search of delightful horror. Their subsequent writings about the perils and adventures of the Swiss and Italian Alps became so popular amongst Enlightenment contemporaries that a series of travel guides evolved from them to lead the seeker of the sublime through the highlights of the Alps. In one passage from Gray's writings, he relates that the road ascended for six miles of "magnificent rudeness...on one side the rock hanging over you, and on the other a monstrous precipice. In the bottom runs a torrent, called Les Guiers morts, that works its way among the rocks with a mighty noise, and frequent Falls. You here meet all the beauties so savage and horrid a place can present you with" (Gray 1935). This edge-of-the-seat mixture of fear and delight over the years metamorphosed into a search to become so enveloped by the experience of nature that one would be completely incorporated into it. By highlighting and capitalizing on the extremes of human emotion, ecstatic terror, the subliminal Romantics sought to overcome all other senses by the scene and obliterate the

sense of self in the magnitude and euphoria of the awe-full experience. As Schama states, it is the “hero made miniscule by the mountain” (1995, 462).

This fantastic experience, then, leads to another purpose of defining the sacred landscape. Might there not be some emotional or mental benefit to having a sacred experience, or at least experiencing a sacred landscape? Could sacred landscapes also be *restorative* landscapes?

In order to further discuss this possibility, a discussion and explanation of the term *restoration* is needed.

2.2 Restoration

Environmental psychologists have identified two primary regions of benefits that landscapes generally afford us: psychological and physiological. Psychological benefits have been generally clumped under the umbrella of “Attention Restoration Theory” (Kaplan 1995), while the physiological benefits have been classed as “stress recovery” (Ulrich et al. 1991). While these two different groups of psychologists have been at odds throughout the last two-and-a-half decades, in recent years, there seems to have been a mute reconciliation between them, with the full range of non-physical environmental benefits coming under the heading “restoration”. With or without this reconciliation on the part of the academics and researchers, however, to fully understand the implications of sacred landscapes and the sacred experience, a discussion of the two different realms of restorative landscapes must be conducted.

2.2.1 Attention Restoration Theory (ART)

Environmental psychologists Rachel and Stephen Kaplan at the University of Michigan are the primary generators of the Attention Restoration Theory (Kaplan & Talbot

1983; Kaplan & Kaplan 1989). Central to the theory is “directed attention”. This term was inspired by psychologist William James’ observations about the two types of human attention, voluntary and involuntary (James 1892). James observed that the human brain perceives and processes things in two ways. Some things or tasks hold our attention effortlessly. When we come across them, we automatically look at them, coming later to a realization that we are giving so much attention to them. These things range from blood and snakes on one hand to brilliant sunsets and waterfalls on the other. We have to make an effort to not look at them or spend time on them if they are not removed from the scene. Authors and advertisers use the words “mindless”, “captivating” or “spellbinding” to describe these elements of the scene or tasks. James uses “involuntary”. The Kaplans use “fascinating” or “fascination”.

The other type of attention is “voluntary”. James observed that other components of the landscape or some tasks require a good deal of effort and concentration to be completed. These tasks for many include scholarly work, driving, or looking at minute details. This type of mental exercise or work makes up a great deal of the job description for today’s workforce. If one is not vigilant while doing a task that requires voluntary attention—or as the Kaplans have modernized it, “directed attention”—one’s attention will wander and the mind will search for something that is rich in fascination instead to hold the attention.

The Kaplans have identified a mechanism in the brain that allows people to bear down on a task with directed attention. This mechanism, appropriately, is called the “directed attention mechanism”. While thinking of the brain as a machine is potentially misleading about the true functioning and character of the grey matter, it does provide a

useful analogy to help us better understand what happens inside our own heads. Stephen Kaplan in his 1995 paper “The Restorative Benefits of Nature” draws a parallel between the brain and a highly tuned machine. The purpose of the machine is to generate solutions to problems, sometimes very abstract and obtruse problems that require a high degree of effort. Our machine takes inputs (knowledge, judgment, previous experience), winnows down the vast reservoir of information to those facts which are most relevant, and then works through the problem to come up with one or more answers, or more questions, or a demand for more input, depending on the problem. This “working through” process requires a high amount of directed attention, employing the directed attention mechanism at a greater rate than normal, perhaps. This use wears down the mechanism, which is thought to be the most fragile component of the machine, like a gear made of gold or highly brittle, over-tempered steel. Eventually, through continued use, the mechanism will need to be fixed or restored, which will in turn boost productivity and reliability of the dependent system.

It is easy, of course, to take this analogy too far and thus distort its meaning and applicability. Suffice it to say that the directed attention mechanism, which is used almost constantly for everything ranging from having a conversation with an associate to not bumping into someone on a crowded sidewalk, is incredibly fragile, wears down often, and needs to be restored. Failure to do so will decrease a person’s ability and effectiveness in solving problems, interacting with others, inhibiting inappropriate behaviour, and feeling well. In fact, when a person is mentally drawn out, there is an increased chance for mental illness or criminal or irrational behaviour. In many cases, the safety of many people’s lives depends upon the mental acuity of a very few persons. One classic example of this is the

airline pilot. According to Wolfe (1992), a large percentage of airline accidents not associated with equipment failure are directly correlated to a fatigued directed attention mechanism, or mental fatigue for short. In every instance, sleep patterns for key personnel had been disrupted, which led to the mental fatigue.

Sleep, then, is a primary mechanism for the restoration of mental acuity. However, there are certain connotations with sleep that render it a less-desirable workplace solution. How else might a mentally fatigued person gain restoration? The Kaplans suggest that our surroundings may hold characteristics that effectively restore the directed attention mechanism. Four restorative characteristics have been identified in ART, each of which merit a brief discussion.

The first, and perhaps most essential, characteristic for the Kaplan model is *fascination*. As stated above, fascination is the ability of the landscape to effortlessly hold one's attention. The point of fascination is to disengage the directed attention mechanism. While it is not in use, it has the ability to restore itself. There are two kinds of fascination: soft and hard. Hard fascination typically involves excitement and stimulation, such as encountering a grisly scene or watching a fast-paced NASCAR race. This type of fascination can lead to heightened adrenaline levels, heart rate, and stress, which in turn can lead to a need for restoration to a more relaxed state. This physiological restoration need will be discussed later. Soft fascination is usually calming, such as a walk along a nature trail or sitting in the park beside a rushing brook. This allows for reflection, another key to a restorative experience (Kaplan 1993).

The second restorative characteristic is *being away*. People often seek an escape from their lives and problems. This often takes the form of going somewhere, be that a two

week vacation to Majorca or the Caribbean, or a walk in the park nearby. Either way, getting away—stepping back from one’s problems—again allows the directed attention mechanism to disengage from the problem at hand and either succumb to fascination, or switch focus to a new problem. Being away is a question, then, of both physical and abstract proportions, as one must both get out of the physical situation (leaving for the islands) and the mental or cognitive one (switching to a new problem, or disengaging altogether).

Extent refers to the scene’s perceived expansiveness and richness. An environment should represent “a whole other world” (Kaplan 1995, 173) to the viewer, being made up of new and different stimuli, elements, and attributes to engage the mind. “It must provide enough to see, experience, and think about so that it takes up a substantial portion of the available room in one’s head” (ibid). Extensive landscapes can include historic artefacts that link the viewer with generations and civilizations other than his own. They do not have to be large areas, but rather can appear large through the use of borrowed landscapes or mystery (a path leading the gaze around a bend, and disappearing into a grove of trees). This will engage the mind, leading the person to mentally experience the scene, to mentally proceed through the landscape and discover what might be around the bend, without necessarily leaving their position on the bench at the viewpoint.

The least definable characteristic of a restorative landscape is *compatibility*. The Kaplans state that for a landscape to be restorative, it must be compatible with the fatigued person’s needs in going there. A person in search of a quiet, peaceful place would hardly find restoration at a circus, however much fascination the circus provided. Thus, having the

affordances of the landscape supporting the needs of the person is paramount to a restorative experience.

It is believed that these four components combine to help make a restorative landscape. The Kaplans and their associates have found that natural settings are more restorative, generally, than are urban or non-natural settings. Frederick Law Olmstead, the eminent landscape architect, stated in 1865 that natural scenery “employs the mind without fatigue and yet exercises it; tranquilizes it and yet enlivens it; and thus, through the influence of the mind over the body, gives the effect of refreshing rest and reinvigoration to the whole system” (1865, 22).

More recently, empirical studies have quantified what had previously been anecdotal or personal experience. Hartig et al. (1991) conducted a study in which participants were subjected to intentionally mentally fatiguing tasks, and then were required to walk for 40 minutes in either an urban or a natural setting, or listen to soft music and read magazines in a room for the same period of time. After the 40-minute intervention, the subjects were given a proofreading task, which was evaluated. The evaluation found that those who participated in the natural-setting walk performed better in the proofreading task than did those who walked in the urban setting or listened to music and read magazines. The study also asked the two walking groups to evaluate their settings for the four components of restorative landscapes, as set forth in the ART. These four characteristics were rated most highly in the natural setting group. This group also rated their environment more restorative than did the urban setting group.

Van den Berg et al. (2003) further tested the natural versus urban hypothesis. Video clips were taken of four settings; urban, urban with water present, natural, and natural with

water present. Subjects were shown a scary movie depicting animals being slaughtered, and then were shown one of the four video clips. The subjects were then required to complete the d2 cognitive test (Brickenkamp and Zillmer 1998). This test “is a letter cancellation task that consists of 14 rows, each row containing a random sequence of the letters *p* and *d*. Placed above and below each letter, there are one, two, or no apostrophes. Participants [are] given 14s to check in each row as many *d*’s having two apostrophes as possible” (van den Berg et al. 2003, 140). Both errors of omission and commission are counted against the final score. Those having the fewest errors thus have the highest scores. This test checks a person’s ability to concentrate and to quickly accomplish a task that requires a high amount of focus and directed attention. The findings of this study were that those people who viewed the natural scenes (with or without water) had higher d2 scores than those who viewed the urban scenes, indicating that their directed attention mechanism had been restored more effectively.

Numerous other studies quantify the greater restorative potential of natural environments over their urban counterparts (Herzog et al. 1997; Parsons 1991; Ulrich et al. 1991; Ulrich 1984). It could be stated that given two environments that both had equal portions of extent, compatibility, fascination, and being away, the natural environment would still be the more restorative one. This would be somewhat impossible to test perfectly, as the amount of each restorative characteristic would have to be judged subjectively, but the indication is that natural environments are more restorative than urban ones. One potential reason for this is environmental preference. A discussion of environmental preference follows in Section 2.3. For now, however, suffice it to say that natural environments are more cognitively restorative than urban ones, and that Attention

Restoration Theory prescribes four main characteristics of restorative landscapes: fascination, being away, compatibility, and extent.

2.2.2 Stress Relief

Another, equally important aspect of restoration is that of relief from stress. Daily life is full of stressors, both acute and chronic. City life, in particular, is stressful. From car horns and traffic congestion to interpersonal conflict and deadlines, stress is omnipresent. The effects of stress are evidenced through physical changes to the body's systems and functioning, and through mood modification. For example, a person presented with a stressful situation—say a vehicular near-collision—would experience an increased heart rate and blood pressure, a change in sensory sensitivity, heightened adrenaline in the bloodstream, and faster breathing patterns. Moreover, this person would feel anxiety, alarm, and potentially panic while the event was occurring, and anger, frustration, confusion, or even a feeling of weakness in the incident's aftermath. The person would also have, for some time after the near-collision, some anxiety related to driving. Similarly, a person under the chronic stress of working in an emotionally charged environment day after day would begin to be lacklustre, unhappy, or angry both at home and at work, would begin to develop ulcers or other symptoms as a result of the increased acids and hormones in the bloodstream and gastro-intestinal areas, and could ultimately be hospitalized from stress-induced illness. The American Institute of Stress estimated in 2002 that 75%-90% of all reported illnesses in the United States were stress related (Kalia 2002), while another source estimates that \$150 billion (US) of revenue is lost annually in the United States due to stress-related absenteeism, injury, loss of productivity, or turnover (ibid). Clearly, stress is everywhere, and afflicts nearly everyone in North America to one degree or another.

Stress to some extent is beneficial. It can enhance reaction times, motivate people to action, and often accompanies feelings of euphoria, happiness, or excitement. It is a natural, normal factor in life. However, too much stress, good or not, takes its toll on both body and mind. Before the symptoms of stress become severe enough to warrant a visit to the doctor or a stay in the hospital, however, measures should and can be taken to alleviate them. Roger S. Ulrich, a behavioural scientist at Texas A&M University, has spent his career examining the restorative effects of landscape on symptoms of stress and other physiological or affective measures. In a landmark study in 1984, he examined the hospital records of in-patients that underwent gall bladder surgery (Ulrich 1984). Some patients had rooms with views toward a wooded area adjacent to the hospital. Other patients had a view of a brown brick wall out their windows. When the records of each patient were analyzed and grouped according to view, it was seen that patients with the more natural view required fewer and less potent analgesics and had shorter stays in the hospital overall than did those with the view of the brick wall.

This study led to many more over the next two decades, as Ulrich and his colleagues tested everything from mood while driving along treed versus non-treed highways (Ulrich et al. 1991) to responses to everyday landscapes (Ulrich & Simons 1986). Each study has served to underpin the general observation that typically, natural landscapes are more restorative than built or urban landscapes. There are notable exceptions in the Ulrich work, however. Some natural landscapes are very stressful to the human mind, especially where there is high evidence of destruction or where the landscape appears to represent danger or harm to the viewer (Kaplan 1987). Likewise, landscapes where a

person feels trapped or exposed rank high in causing stress, rather than relieving it (Balling and Falk 1982).

The affective line of study, then, is related in large measure to the psychophysical changes, including lightening or positively changing mood, lowering blood pressure and the presence of adrenaline, or slowing heart rate. Some landscapes have the ability to do this. These physiologically restorative landscapes are closely related to the mentally restorative landscapes defined by Rachel and Stephen Kaplan. The main tie between the two theories, in fact, seems to be *preference*. A relatively new line of research is showing that the most preferred landscapes are the most restorative landscapes. This positive correlation between preference and restoration is basically intuitive, as it follows well in line with the “compatibility” factor of ART, but it, too, is a topic worthy of a more in-depth discussion.

2.3 Preference

Research in restoration is rooted in landscape preference research. In the 1970s, most research done in the field of environmental psychology was focused on environmental perception, and why certain landscapes are preferred over others. This research has bearing on decision-making processes for government and land managing agencies such as the Department of Fisheries and Oceans, the Ministry of Transportation, and the National Parks Service in Canada, and their federal, provincial and state counterparts in the United States and other nations. Most research began in the United States in the U.S. Forest Service, as decisions about logging, forest management, and visual resource management (VRM) came to the forefront in the 1970s and 1980s (Gobster 1999; Daniel and Boster 1976). Research began with tests of scenic beauty—evaluating landscapes as to how

beautiful they were perceived. This measure of scenic beauty evolved into a measure of preference, or how much a person liked what was represented. Scenic beauty and preference are basically two terms for the same thing, for humans tend to prefer those things that are most beautiful or aesthetically pleasing (Zube et al. 1975). In fact, in languages where the term “preference” does not exist, the term “beauty” has been substituted in landscape assessment studies (van den Berg et al. 2003).

Preferred landscapes rely on several factors. One prevalent theory is that there are bioevolutionary preferences for certain landscapes based on human origins in the savannahs of Africa. This evolutionary concept incorporates the ability to survive in a landscape, to see without being seen (Appleton 1975), and to fully understand the affordances of the landscape, which then leads to a certain affective and cognitive comfortability there (Kellert and Wilson 1995; Kaplan and Kaplan 1989; Kaplan 1987). At the other end of the preference spectrum, individual culture, race and ethnicity, gender, age, and preferred recreational pursuits or hobbies are all acknowledged as playing a role in environmental preference (Ribe 1994; Kaplan and Talbot 1988; Zube et al. 1983; Lyons 1983). However, in North America and Europe, culture and history are the most often cited determinants of environmental preference, especially preferring naturalistic environments over urban environments (Cox 1985; Nash 1982; Huth 1972). In these areas of the world, landscape awareness holds a long tradition and owes great influence to the romantic and transcendentalist movements of the 1800s. Landscape artists such as Frederick Church and Thomas Cole, essayists like John Muir and Henry David Thoreau, and landscape architects like Andrew Jackson Downing and Frederick Law Olmstead, all contributed to a reverence for naturalistic places that seem both wild and tame. These features of the landscape are

highly preferred, and also feature in the sacred and restorative perceptions of landscape discussed earlier in this work.

Two other factors in determining preference are affective and cognitive judgments. Much discussion and debate has been generated over which factor, affect or cognition, is most responsible for human preferences. While that particular discussion is not central to the topic at hand, it is very interesting. For the interest of the reader, a list of relevant articles has been provided in Appendix 2. The thread of primary importance to this work is that when presented with a scene, a person first experiences a “gut reaction” to it-whether one likes the scene or not (Parsons 1991). However, that rating can change rapidly based on additional information (the beautiful blue lake is man-made and contains pollutants; the dead and dying trees are the result of naturally-occurring insect damage, not clear cutting) and analysis (Gobster 1999; Eaton 1997). The expected preference ratings may thus vary depending on the length of exposure to the scene, the ability of one to cognitively process the information presented by the scene, and the eventual entrance of other stimuli into the scene.

Regardless of the effects of affect or cognition, preference is important on a number of levels to both restorative and sacred landscapes. A relatively recent thread of study within environmental perception and psychology is attempting to quantify the relative effectiveness of preferred landscapes in a restorative role. The intuition behind this research is that a person would seek out a landscape that he or she prefers to recuperate from stress and mental fatigue. The preferred landscape corresponds highly to each of the four categories of Attention Restoration Theory, and would also be a place where the fear or

worry of encountering a stressor would be lowered. Thus, the highly preferred or beautiful landscape setting should also be the most restorative setting.

Several studies have begun to delve into the restorative effects of preferred landscapes in recent years. Among these, van den Berg et al. (2003) serves as the framework for the present research. Conducted in the Netherlands, the van den Berg study examined the role of preference in terms of both cognitive and affective restoration. Using video clips with audio tracks, the study first introduced participants to a stressor (a short [3 minute] video clip showing animals being butchered), then were exposed to one of the four landscape segments. The participants were required to a) rate the landscapes in the videos for preference, b) self-report their mood before the stressor, after the stressor, and after the landscape movie, and c) complete a proofreading test to evaluate their cognitive capacity after the landscape movies.

The landscape videos were taken in two primary settings, urban and natural. The urban videos were taken in Utrecht, a large city in the centre of the Netherlands. One urban film was taken walking along a canal, with houses and shops on the other side of the street. The street is tree-lined, and the area is entirely pleasant in appearance. The second urban scene was taken in an adjacent street, where the composition of shops and residences on the street was similar to the first, but on both sides of the street; the canal was not present in the second video. The natural films were both taken in an estate in the Dutch countryside. A forested, park-like setting was depicted, the first film walking along a path in the forest alongside a creek, the second further up the same path, but without the creek. The forest is open-feeling, with good visibility and a low presence of people. Each of the videos lasted seven minutes. The participants were asked to imagine themselves as actually walking in

the environment presented in the film. This mental engagement is potentially important, as it gives a somewhat more realistic experience to the participant.

The results of this study are interesting. It was found that the study participants generally preferred the natural environment to the urban environment, but that the presence of water did not play a significant role in preference or beauty ratings. The researchers surmise that this could be due to the water not being a notable enough feature in these particular settings to make much impact on the participants. Also, those viewing the natural settings experienced a significantly greater restorative benefit than did those viewing the urban or built environments, both affectively and cognitively. These results lead to the conclusion that preferred environments really are more restorative. Furthermore, the results indicate that the perception of restorative potential in a landscape increases its preference rating. Thus, preference and restoration are interwoven and interdependent factors of environmental perception.

2.4 Preference, Restoration, and the Sacred: A Nexus

The relationship between preference and restoration is one half of the present research focus. The other half of the focus is the relationship between sacred landscapes, preference, and restoration. In the initial phases of this research, the author compiled 120 slides which were then rated for their sacredness. The criteria for these slides were based on interviews held between the author and both journeymen and academic experts in the area of culturally sacred landscapes, including an art historian, two anthropologists, a cultural geographer, a psychologist, a landscape architecture professor, and others. Journeymen or laypersons were acquaintances of the author with no particular expertise in either environmental perception or sacredness. These people simply related personal

anecdotes that featured a sacred experience of the type that Margaret Somerville describes, and then described the circumstances around those experiences. The general consensus amongst all of these different interviewees was that sacred experiences generally contained elements of infinity, occurred in connection with mountains, oceans, or prairies, and occurred after effort on the part of the subject was put forward, either in climbing up a mountain, or working in a field, or some other form of physical or mental labour. For many of the interviewees¹, the reason many of them were outside in the first place was because they were trying to get some distance between them and their problems. They were usually stressed out, seeking some peace and quiet, or simply trying to get back in touch with Nature. Thus, it was in pursuit of a restorative environment that they received a sacred experience. Anecdotally, some people reported feeling uplifted, that when they came back to their occupations, their problems, and life in general, they were better equipped mentally and emotionally to solve these problems and keep a better perspective on life. Due to the highly subjective nature of these interview results, a more objective system of determining sacredness was needed. Thus, following loosely the characteristics of sacred places identified in the interviews and other reading (see Section 2.1), a set of slides was compiled and rated for sacred potential. These slides were then added to an additional set of slides that did not necessarily follow the sacredness characteristics, and all slides were then evaluated for preference (see Chapter 3).

¹ It should be noted that interviews were held informally, and did not follow any structured format. In most cases, the author did not obtain permission to use the interviewees' names or other details in the research. Often, during interviews with laypersons, the recounting of the sacred experience and the circumstances around it came up during the course of conversation, and a ready means of recording this information was not available. The author made the best effort to preserve the major points and themes of the conversation, but the details were generally not recorded at all.

Chapter 3: Methodology

3.1 Methodology

The purpose of this thesis and research is to determine the relationship between sacred landscapes, restoration, and preference. This research has three aims:

- a) to support the finding that highly preferred landscapes are more restorative than less-preferred landscapes;
- b) to establish the relationship between sacred landscapes and preferred landscapes; and
- c) to investigate the relationship between sacred landscapes and restorative landscapes.

To accomplish these aims, a multi-faceted approach has been employed.

3.2 Determining Sacredness

First, a determination of the nature and type of sacred landscapes under investigation needed to be made. As stated in Section 2.1, the term “sacred” has many connotations. The problem with attempting to identify a sacred landscape without first bounding the meaning of “sacred” opens the field of study to a much broader scope than would be possible to treat in any single project. Thus, the sacred landscape for the purposes of this research is a landscape which facilitates the type of experience described in Somerville’s *The Ethical Imagination* (2006), i.e. a finding of one’s most authentic self, that lies in “the complex interaction of knowing ourselves, relating to others, appreciating our place in the great web of all life, and seeing ourselves as part of the earth, the stars, the universe, and the cosmos” (p. 57). In other words, understanding our place and role in the

order of life, and understanding the consequences of our actions and decisions within the system called the universe.

3.2.1 Informal Interviews

To determine the physical form that sacred landscapes most often take, informal qualitative interviews were conducted with several experts and non-experts on sacredness. Among the experts were cultural geographers, anthropologists, art historians, theologians, philosophers, and psychologists. Many from this group have conducted research relating to the perception of the landscape in terms of cultural sacredness and collective memory.

The non-experts included outdoors enthusiasts, college students, engineers, airline pilots, and others of my acquaintance. The non-experts have only one thing in common: each of them has had an experience that they felt was sacred. When pressed to describe the experience itself, many of the themes common to Somerville's definition emerged, especially the feeling that they were miniscule, yet integral, parts of a greater system, and a sympathy evolving between them and other parts of the system.

Special care was taken on the part of the interviewer to not ask leading questions during the discussion. Thus, the descriptions of sacred experiences expressed by the interviewees evolved throughout the course of the conversation, and were pieced together afterward. Some clarification was asked during the conversation, but again, special attention was given to not leading the interviewees in their answers.

The informal interviews led to a determination that a few themes are common to sacred landscapes, and that these could then be tested and refined. First, the sacred experience is most likely to occur when the person is alone, either in reality or in perception. Second, the more natural the landscape, the more likely it is to be perceived as

sacred. Thus, limited or unperceivable traces of human intervention, both cultural and physical, are important. Third, a place where the extremes of scales can be witnessed and absorbed is critical. The most commonly referred-to typologies were mountaintops, beaches, prairies, or oceans. The never-ending vistas or feeling the immensity of the surrounding system seem to lend themselves to having a sacred experience.

3.2.2 Rating for Sacredness

From this rudimentary framework, images were compiled and then rated by a separate group of people for sacredness. Raters were given the Somerville definition of a sacred experience and then asked to rate each image for its potential to facilitate such an experience. Ratings were from 1 to 10, with 1 being the lowest rating and 10 being the highest. In all, 120 images were rated by 18 people. The 120 images represented the common typologies discussed above, namely mountains, large bodies of water, beaches, and prairies. An attempt was made to provide at least a partial vista or elevated view, to better represent the feeling of immensity or eternity, and to keep the scenes as free from human traces as possible. The findings of these ratings are described in Chapter 4.

3.3 Preference Ratings

After obtaining sacredness ratings, the images were then rated for preference. To open the range of preference, additional “non-sacred” slides were added to the experiment. These slides were deemed non-sacred due to either the presence of manmade artefacts, such as bridges or roads, or because they did not come from the “sacred” typologies (mountains, prairies, oceans, etc) or feature grand vistas. Because of their non-sacred content, they were not rated for sacredness, but preference only. In all, 169 slides were

rated for preference by an independent group of 21 raters, unaffiliated with the sacredness group.

The preference test took a slightly different format than did the sacredness test. In the sacredness test, people were asked to rate the slide on how much it would facilitate having a sacred experience. Raters were given approximately 7 seconds to evaluate each slide, giving them time to think and weigh each picture against the definition. During the preference test, raters were asked to rate how much they liked each slide, on a scale of 1 to 10. Participants were asked to do this as quickly as possible, and were given half the time that the sacredness groups were given. In this way, the possibility of second-guessing one's self or getting lost in an evaluation of external factors was limited. Thus, the preference test was more of an affective evaluation, while the sacredness test was much more cognitively based.

3.4 Restoration Test

Once the slides were all evaluated, the scores were averaged, and the fifteen highest-scoring slides in both the sacred and preferred sets were culled to evaluate their restorative potential. Some of the highest-ranked "sacred" slides were among the top fifteen preferred slides. To avoid cross-contamination of the tests, these slides were removed from the preference group, and the next-highest rated non-sacred slide was substituted in its place. Thus, two independent sets of slides were collected to be tested for their restorative potential.

As Table 1 shows, the restoration test was divided into three groups. Two groups

Table 1 Research Diagram

Phase I: Informal Interviews

A	Expert Interviewees
B	Non-expert Interviewees

Generation of slide set to rate for sacredness and preference in Phase II

Phase II: Slide Ratings

A	Sacredness Ratings
B	Preference Ratings

Generation of sacred and non-sacred intervention in Phase III

Phase III: Restoration Test

	Period 1		Period 2		Period 3	
	Preliminary Information		Measure	Stressor	Measure	Intervention
A	Consent Form	Demographics	POMS	PASAT	POMS	Time
B	Consent Form	Demographics	POMS	PASAT	POMS	Sacred Slides
C	Consent Form	Demographics	POMS	PASAT	POMS	Non-sacred Slides

were shown slides during the intervention period, and one group, the control, was shown

only a blank screen for the same period. The restoration test was divided into three periods.

During the first period, participants were brought into the facility, the Landscape

Immersion Laboratory in the Forestry Services Centre on the University of British

Columbia Vancouver campus. A description of the facility follows in Section 3.4.1. The

participants were given a brief overview of the study, read and signed a written informed

consent form (Appendix 1) and filled out a simple demographics form with their age,

gender, ethnic background, level of education, native language, and hobbies (Appendix 1).

They were also informed that they could leave at any time during the study for any reason.

Participants were then required to evaluate their mood on the Profile of Mood States Short

Form (Appendix 1; Shacham 1983). More information on the Profile of Mood States Short

Form (POMS) is provided in Section 3.4.2.

For the second period, the subjects completed the computerized version of the

Paced Auditory Serial Addition Test (PASAT; Gronwall 1977), which taxes a person's

ability to concentrate and wears down the directed attention mechanism (see Section 3.3.3).

The PASAT was run 3 times, at increasing speeds each successive instance. The total time for the stressor was 4.8 minutes, after which the subjects again evaluated themselves according to the POMS Short Form.

Participants were then given one of three interventions: time looking at a blank screen, a slideshow of highly-rated sacred slides, or a slideshow of highly-rated preferred slides. The intervention period lasted exactly 5 minutes. All participants were directed to remain as quiet as possible during the intervention period. Those receiving the slideshows were directed to try to project themselves mentally into the scenes presented them. They were told to try to imagine themselves as if they were actually standing in the location where the photograph was taken, and to imagine any sights, sounds, smells, or other sensory stimuli that would be present at the scene. During the intervention period, the lights were dimmed to facilitate viewing the images. After the intervention, participants rated themselves again using the POMS Short Form, were paid, and left.

In all, 74 people participated in the restoration test in 14 different sessions (54% female, average age 20.5). Of these, 25 people viewed the sacred slideshow in 6 sessions, 24 people viewed the restorative slideshow in 4 sessions, and 25 people were in the control group in 4 sessions. Session participation ranged from 3 to 11 people in any given session. Participants were allowed to sign up for a session that worked best for their schedule, and each session was predetermined in terms of which intervention was administered, thus randomizing the participation. The restoration test was run over a period of three weeks in late January and early February, 2008. In the following sections, a description of each of the components of the restoration test is provided.

3.4.1 Landscape Immersion Laboratory

The Landscape Immersion Laboratory (LIL) is located in the Forestry Service Centre on the University of British Columbia's Vancouver campus. It is managed by the Collaborative for Advanced Landscape Planning (CALP), headed by Dr. Stephen Sheppard and Dr. Michael Meitner. The main feature of the LIL is an array of three large screens in one corner of the room. Each screen is roughly 2.3 metres (8 feet) tall and 4.5 metres (15 feet) wide. The screens are arrayed in such a manner as to present a panoramic view, if desired. Each screen is managed by a separate digital projector, which in turn are controlled by a central controller. The projectors can work in tandem or separately. The facilitator can use all three projectors in any combination or any projector separately. For the restoration test, only the centre screen was utilised, as some of the slides were in portrait layout, and others were landscape layout. The other two screens were blank.

Tables were arranged in the room to accommodate a maximum of 11 participants. Seats were arranged at the tables to ensure that all participants were able to see the screen with a minimum of distortion or physical manoeuvring, and so that each participant had ample room for writing. The facilitator was behind the participants with the computer. The speakers for the PASAT were also located behind the participants, and were turned up sufficiently that everyone could hear well.

3.4.2 Profile of Mood States, Short Form

The Profile of Mood States, Short Form (POMS; Shacham 1983) consists of 36 adjectives relating to 6 subcategories: vigour, anger, depression, confusion, tension, and fatigue. Participants are required to rate themselves on a scale of 1 to 5 (1 = feel not at all, 5 = feel extremely) according to these 36 adjectives. This rating system has been shown to be

effective in capturing the current emotional and mental state of participants, without running the risk of causing further mental fatigue or mood alteration due to a more lengthy measure (Shacham 1983). Participants were instructed to rate their mood “as of right now”. They were also invited to ask the facilitator for help if any of the adjectives was unclear. As stated before, the POMS Short Form was administered three times during the restoration test. The first administration was to determine a baseline mood state before the actual study began. The second time was after the stressor, to evaluate the effect of the PASAT, and a final time after the intervention period, to determine the effect of viewing the slides. Findings are discussed in Chapter 4.

3.4.3 Computerized version of the Paced Auditory Serial Addition Test

The Paced Auditory Serial Addition Test (PASAT; Gronwall 1977) consists of a series of numbers audibly presented at a certain rate. The numbers can be presented at 2.4, 2.0, 1.6, or 1.2 seconds apart. The original version was conveyed via audiocassette (Gronwall 1977). Recently, the audiocassette version of the test was converted into a computer program by the University of Victoria (BC) Department of Psychology. For the current research, the computerized version was used. The test features a neutral-sounding male voice clearly saying each number. The numbers range from 1 to 9 and 61 total numbers are presented, for a total of 60 sums. Participants are required to add the first number they hear to the next number presented. Instead of compounding the sums, the participant must forget the sum just made and add the second number to the third, the third to the fourth, and so on. Thus, if the numbers presented are “1, 2, 3, 4”, then the sums would be $1+2=3$, $2+3=5$, and $3+4=7$.

The participants are presented with a brief demonstration, and then are administered the actual test. The test is administered three times, first at 2.0 seconds, then 1.6 and finally at 1.2 seconds. Thus, the test takes 4.8 minutes to completely administer.

The PASAT is designed to be administered to one person at a time, and the participant is instructed to state their answer out loud to the facilitator. The facilitator records the scores on a record sheet, which can then be tabulated and analysed for the exact effect the test has on the participant. The PASAT is designed to evaluate the participant's ability to concentrate and perform mental tasks (Gronwall 1977). However, the PASAT has also been shown to produce a negative mood state during administration, especially during the faster test blocks (Mathias *et al* 2004; Holdwick and Wingenfeld 1999). For the purposes of the current study, the stress-inducing aspects of the PASAT were most desirable, rather than the induction of mental fatigue or loss of concentration. Participants' cognitive state was not measured, and thus the methods of administration were changed somewhat.

First, it was deemed impractical to administer the restoration test individually, due to the numbers of people participating in the study. Therefore, as groups of participants were run, orally giving the answers to the PASAT would have been impossible. It was determined, therefore, to require the subjects to write down their answers of separate pieces of paper, which were then collected. Subjects were given a blank piece of paper for each administration of the PASAT, with the instructions to write down their answers sequentially. This decision to write down the answers maintained the requirement to utilise two different cognitive processes to complete the exercise, but minimised the potential conflict that an oral administration would have engendered. The effectiveness of the

PASAT as an affective stressor is evident from the participants' mood ratings after the stressor period (see Chapter 4), as well as previous research findings (Lezak 1995; Roman *et al* 1991; Spreen and Strauss 1991).

3.4.4 Intervention Period

The final period in the restoration test was the intervention. The intervention period for Group A (see Table 1) consisted of a blank, black screen. The subjects in this group were required to sit quietly and look at the screen until instructed to complete the final POMS form.

Group B was shown a slideshow of 15 highly rated sacred slides. Each slide was displayed for 20 seconds. As stated in Section 3.3, the participants were instructed to imagine that they were standing at the vantage point at which the photograph was taken, and to imagine the experience of being there.

The intervention for Group C was the same as for Group B, except that instead of highly-rated sacred slides, these participants were exposed to 15 highly-rated preferred slides. Participants were again instructed to imagine the experience of being in the location suggested by the photograph, thus immersing themselves in the presented environment.

The intervention period for all participants lasted exactly five minutes, at the end of which participants were instructed to complete the final POMS Short Form. After this form had been completed, the participants were paid (5 Canadian dollars cash), invited to take a chocolate bar, and were free to leave.

3.4.5 Statistical Methods

The experimental design was a 3x1 within subject (repeated measures) Analysis of Variance. 74 subjects completed the experiment. The H_0 (null) hypothesis for this

experiment stated that the type of treatment would have no effect on stress levels, and that stress levels would remain the same between groups. The H_1 (alternate) hypothesis stated that the type of intervention would have an effect on stress levels, and that stress levels would vary between groups. The statistical test used to reject the H_0 hypothesis was a Fixed Effects (Model III) One Way Analysis of Variance (ANOVA) with repeated measures.

SPSS 12.0 was used to perform a General Linear Model (GLM) repeated measures test with a single within-subjects' dependent variable (STRESS) that contained three independent variables (GROUP), namely Control, Sacred, and Preference. A full factorial model with a Type 3 sum of squares was calculated. Estimates of Effect Size were also calculated.

The assumptions of equal sample sizes for each of the three data types were confirmed and the data was checked for empty cells or cells containing values of 0. The ratio of cases to independent variables was checked to ensure that at least 20 degrees of freedom for error existed.

A pair wise comparison with Bonferroni adjustment for multiple comparisons was performed on the three data types to determine which of the levels of the factor STRESS (if any) were significantly different from each other.

The above analysis was rerun to determine whether the demographic variables AGE, GENDER, EDUCATION LEVEL, and ETHNICITY co-varied with the variable STRESS.

Chapter 4: Findings, Discussion, and Conclusion

4.1 Findings

4.1.1 Slide Ratings

As stated in Chapter 3, 120 photos were rated for sacredness. The sacredness scores of the photos evaluated ranged from 4.00 to 8.67, with an overall average score of 6.08 (median=6.00). An additional 49 slides were added to the original set, and the total 169 slides were rated for preference or scenic beauty. The range of scores for these photos went from 4.57 to 8.90, with an average score of 6.66 (median 7.00).

The average preference score for the sacred slide set used in the restoration test was 7.299, with individual slides rated between 5.52 and 8.57 (median score=7.43). The average preference score for the preferred slide set was 7.917, with individual scores ranging from 7.43 to 8.90 (median score=7.81).

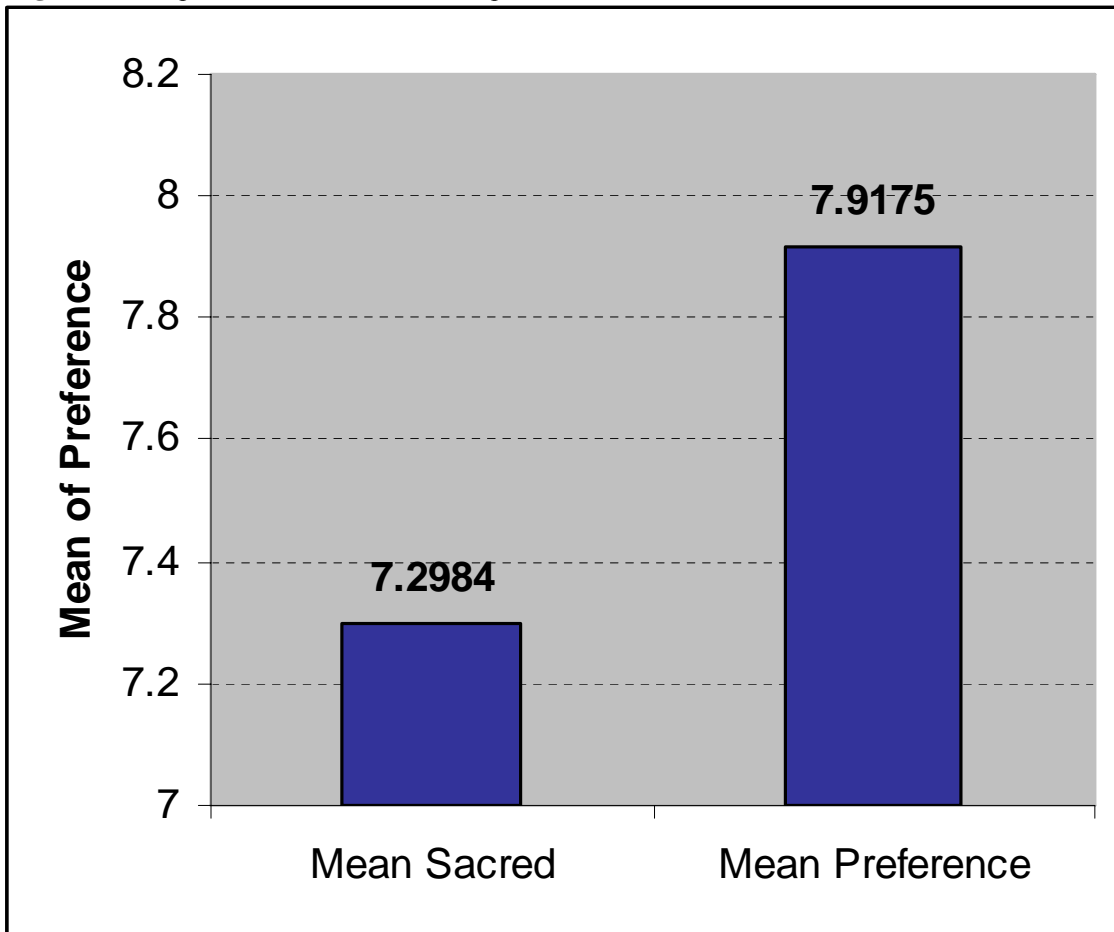
Initially, it would appear that this is a negligible difference in ratings; both sets were in the “7” range. However, a General Linear Model (GLM) repeated measures test revealed that this difference in preference ratings is significant (Table 2). The ANOVA showed that a significant main effect of measurement scale (PREFERENCE) was present, $F(1,628) =$

Table 2 GLM test of within- and between-subjects effects: Preference Ratings on Slide Sets

	<i>Type III sum of squares</i>	d.f.	Mean square	F	<i>P</i>
Between Groups	60.357	1	60.357	13.774	0.000
Within Groups	2751.803	628	4.382		
Total	2812.16	629			

13.774, $p = 0.000$. This indicates that the sacred slides shown in the restoration test were significantly less preferred than their preference counterparts (Figure 2). In fact, 1/3 of the sacred slides were below the average preference score of the group of 169 slides (6.66), and nearly half were below the median score (7.00). In the preference slide set, none of the

Figure 2 Mean preference scores: sacred vs. preference



slides were below either the average or median score of the overall group of 169 slides.

These slide sets (Figures 3-32) are shown side-by-side according to their preference rating; sacred on the left, preference on the right.

Figure 3 Sacred 1- 8.57 Pref. Rating



Figure 4 Preference 1- 8.90 Pref. Rating



Figure 5 Sacred 2- 8.43 Pref. Rating

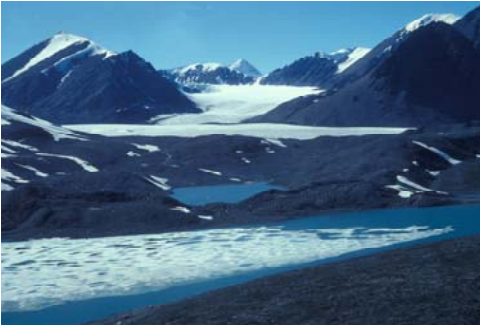


Figure 7 Sacred 3- 8.38 Pref. Rating



Figure 9 Sacred 4- 8.29 Pref. Rating



Figure 11 Sacred 5- 7.95 Pref. Rating



Figure 6 Preference 2- 8.57 Pref. Rating



Figure 8 Preference 3- 8.48 Pref. Rating



Figure 10 Preference 4- 8.33 Pref. Rating



Figure 12 Preference 5- 8.19 Pref. Rating



Figure 13 Sacred 6- 7.57 Pref. Rating



Figure 14 Preference 6- 8.19 Pref. Rating



Figure 15 Sacred 7- 7.43 Pref. Rating



Figure 16 Preference 7- 7.86 Pref. Rating



Figure 17 Sacred 8- 7.43 Pref. Rating



Figure 18 Preference 8- 7.81 Pref. Rating



Figure 19 Sacred 9- 6.90 Pref. Rating



Figure 20 Preference 9- 7.71 Pref. Rating



Figure 21 Sacred 10- 6.81 Pref. Rating



Figure 23 Sacred 11- 6.67 Pref. Rating



Figure 25 Sacred 12- 6.62 Pref. Rating



Figure 27 Sacred 13- 6.48 Pref. Rating



Figure 22 Preference 10- 7.62 Pref. Rating



Figure 24 Preference 11- 7.52 Pref. Rating



Figure 26 Preference 12- 7.43 Pref. Rating



Figure 28 Preference 13- 7.43 Pref. Rating



Figure 29 Sacred 14- 6.43 Pref. Rating



Figure 30 Preference 14- 7.43 Pref. Rating



Figure 31 Sacred 15- 5.52 Pref. Rating



Figure 32 Preference 15- 7.29 Pref. Rating



4.1.2 Restoration Test

Due to the difference in ratings and findings from other research, the expected result from the restoration test was that the group viewing the sacred slides (Group 1) would report a lower reduction in stress than the group viewing the preferred slides (Group 2). However, expectations were high that both groups would report greater improvements in stress levels than the control group (Group 3).

As mentioned in Section 3.4.2, the Profile of Mood States Short Form evaluates participants on 6 mood subscales. Of these, five are “negative” mood indicators: anger, confusion, depression, fatigue, and tension. The other subscale, vigour, is “positive”. In other words, when rating mood using the POMS, 1 = not at all, and 5 = extremely. Thus, if a person is feeling extremely tired, they would rate themselves at a “5”. Likewise, if a person is feeling extremely energetic, they would score a “5”. It is obvious, then, that the

hypothesis for the “vigour” subscale is inverted from the others. To correct this, we inverted the reported scores for the “vigour” subscale, so that 1=extremely and 5=not at all. In this way, a lower score is equivalent to a lower stress level for all six subscales.

Two repeated measures ANOVAs were performed on the collected data. The first consisted of data collected after the baseline and stressor periods, and the second, after the stressor and intervention periods. The first ANOVA (Tables 3 and 4) showed that a significant main effect of measurement scale (Stress) was present, $F(1,71) = 109.961$, $p = 0.000$, $\eta = 0.608$. This indicates that the stressor (PASAT) was effective in producing stress. The main effect of segment (Group ID) yielded an F ratio of $F(2,71) = 0.996$, $p = 0.374$, $\eta = 0.027$, indicating that there was no significant difference within groups during either baseline or stressor periods. The interaction effect of Stress x Group ID was also not significant, $F(2,71) = 0.964$, $p = 0.386$, $\eta = 0.026$, showing that the difference in stress

Table 3 GLM test of within-subjects effects: Baseline and Stressor Periods

<i>Within subjects effects</i>	<i>Type III sum of squares</i>	<i>d.f.</i>	<i>Mean square</i>	<i>F</i>	<i>P</i>	<i>Partial η^2</i>
Stress (linear)	12.022	1	12.022	109.961	0	0.608
Stress x Group ID (linear)	0.211	2	0.105	0.964	0.386	0.026
Error (Stress) (linear)	7.763	71	0.109			

Table 4 GLM test of between-subjects effects: Baseline and Stressor Periods

<i>Source</i>	<i>Type III sum of squares</i>	<i>d.f.</i>	<i>Mean square</i>	<i>F</i>	<i>P</i>	<i>Partial η^2</i>
Intercept	749.629	1	749.629	1906.021	0.000	0.964
Group ID	0.784	2	0.392	0.996	0.374	0.027
Error	27.924	71	0.393			

levels was not significantly different across groups.

The second ANOVA (Tables 5 and 6), analyzing reported stress after stressor and

Table 5 GLM test of within-subjects effects: Stressor and Intervention Periods

<i>Within subjects effects</i>	<i>Type III sum of squares</i>	<i>d.f.</i>	<i>Mean square</i>	<i>F</i>	<i>P</i>	<i>Partial η^2</i>
Stress (linear)	17.431	1	17.431	137.353	0	0.659
Stress x Group ID (linear)	1.323	2	0.662	5.213	0.008	0.128
Error (Stress) (linear)	9.01	71	0.127			

Table 6 GLM test of between-subjects effects: Stressor and Intervention Periods

<i>Source</i>	<i>Type III sum of squares</i>	<i>d.f.</i>	<i>Mean square</i>	<i>F</i>	<i>P</i>	<i>Partial η^2</i>
Intercept	711.378	1	711.378	2035.912	0.000	0.966
Group ID	3.940	2	1.970	5.637	0.005	0.137
Error	24.808	71	0.349			

intervention periods, showed somewhat different results. This ANOVA revealed that,

again, a significant main effect of measurement scale (Stress) was present, $F(1,71) =$

137.353, $p < 0.001$, $\eta = 0.659$. The main effect of segment (Group ID) showed a significant

effect as well, $F(2,71) = 5.637$, $p = 0.005$, $\eta = 0.137$. The interaction effect of Stress x

Group ID was also significant, $F(2,71) = 5.213$, $p = 0.008$, $\eta = 0.128$. This indicates that

Group ID is significant in predicting recovery from stress.

However, a post hoc analysis of Group ID (Table 7) indicated that results from

Groups 1 and 2 (Sacred and Preference, respectively) were not significantly different ($p =$

Table 7 Multiple comparisons using Bonferroni's test: Stressor and Intervention Periods

<i>(I) Group ID</i>	<i>(J) Group ID</i>	<i>Mean Difference (I - J)</i>	<i>S.E.</i>	<i>Significance</i>
1	2	-0.0165	0.11945	1.000
1	3	-0.3527*	0.11822	0.012
2	1	0.0165	0.11945	1.000
2	3	-0.3363*	0.11945	0.019
3	1	0.3527*	0.11822	0.012
3	2	0.3363*	0.11945	0.019

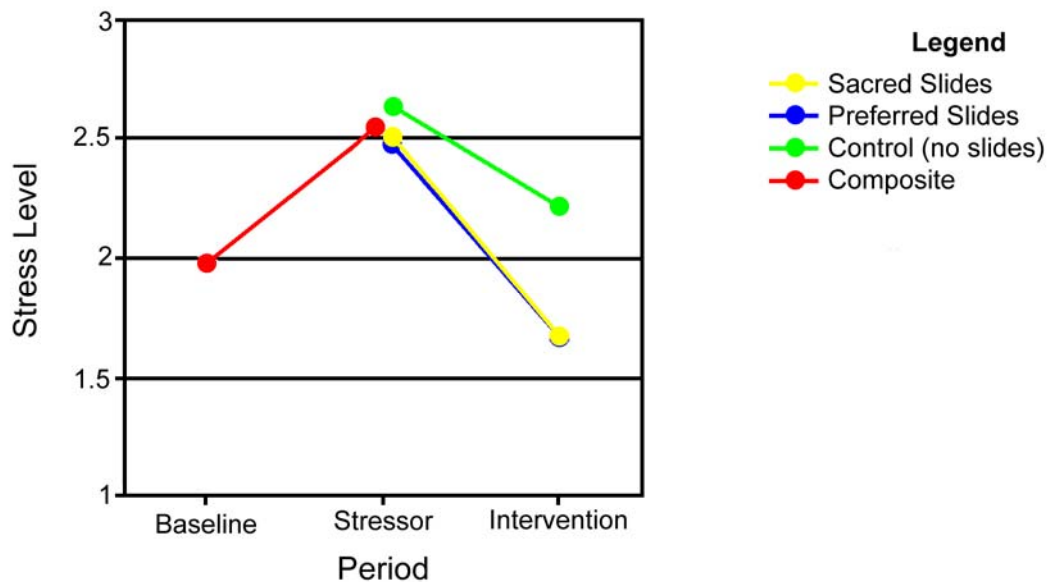
1.00), while Group 3 (control) was significantly different from both Groups 1 and 2 ($p =$

0.12 and 0.19, respectively). This finding suggests that the stress-reducing effect of

viewing either set of slides was equal, whereas seeing no slides netted a significantly lesser

effect. These results are depicted graphically in Figure 33.

Figure 33 Restoration Test Findings



4.2 Discussion

The above findings are both compelling and unexpected. The fact that the sacred slide set is equally effective at reducing stress as the preference slide set elicits a number of questions. First, is there a difference between a sacred landscape and a beautiful or preferred one? If so, is it significant? To help answer this, a content analysis of the sacred slides on the basis of preference criteria (legibility, coherence, complexity, mystery) was conducted. Previous studies using these criteria (Kaplan, Kaplan and Wendt 1972; Kaplan, Kaplan and Ryan 1998; Kaplan 1987) have shown that higher and balanced levels of all four categories result in higher preference ratings.

When the sacredness slides were analyzed, initial conclusions were that the slides are typically low in complexity, but high in coherence and legibility. In other words, the scenes presented typically have “good gestalt”, or “hang together” well (Kaplan 1987, 10), and hold a high expectancy value of continuing to do so as one explores the scene more, but they are generally simple. The scenes are mixed in terms of mystery, the “promise that

more information could be gained by moving deeper into the depicted setting” (Kaplan 1987, 8), with an equal number of slides rated high and low. This leads to the conclusion that sacred landscapes are high in prospect, to use Jay Appleton’s (1975) terminology, and are relatively legible, coherent, and lacking in complexity. Also, as noted in Chapter 3, the slides tend to have remarkable lighting or atmospheric conditions, such as cloud formations, sunsets, or light streaming through mist. The combination of these characteristics may serve to enlarge or give depth to the scene, providing a more appropriate setting for both having a sacred experience and reducing stress. A potential implication from this is that environmental preference alone may not be the only determinant of restoration. The instance of low complexity in the sacred set, coupled with high levels of understanding (coherence and legibility) and lighting conditions, leads to the hypothesis that these slides are high in “super-soft” fascination. Soft fascination is a characteristic that effortlessly engages the directed attention mechanism while at the same time being aesthetically pleasing (Kaplan 1995). Soft fascination is a central concept in restoration theory, and highly-preferred environments typically have high fascination capacity.

However, as stated previously, highly-preferred environments also tend to be equally balanced between the four preference qualities. The sacred slides, significantly less-preferred than the preference slides, were disproportionately heavy in coherence and legibility. Because they were as restorative as the preferred slides, this suggests that some characteristic made up for the lack in preference. It is possible that this characteristic is a high level of soft fascination present due to the ready comprehension of the scene and lighting effects that could overwhelm the senses. Perhaps fascination is more important

than was first suspected. A more comprehensive content analysis of the slides will have to be conducted to better understand the differences between the two sets of slides.

Furthermore, a way of testing the “super-soft” fascination concept should be devised.

It is important to note that many raters expressed difficulty in separating their preference for a particular scene from how sacred they thought it was. This lends credence to the idea that “sacred” is, at least in terms of rating slides, similar to preference, beauty, aesthetics, or other measures. In other words, when people are asked to evaluate landscapes using any of these terms (and perhaps others) they are possibly measuring the same thing. Perhaps, then, the difficulty lies in nomenclature, and not in content. Perhaps it is simply not possible to come up with a word that encompasses all of the different aesthetic and experiential qualities of landscape in a satisfactory way. When these different characteristics are quantified and compared individually, perhaps they each reveal another facet of this larger, indefinable concept. For whatever reason, sacred landscapes are restorative.

The theory that preferred landscapes (or more beautiful landscapes) are restorative was confirmed in this study. However, one failing of this study, and others like it, is that a cross-sectional test of natural environments has not been accomplished. A reading of the available literature reveals that most studies compare apples to oranges. That is, highly preferred natural landscapes are compared to urban environments, preferred or not (van den Berg et al. 2003; Herzog et al. 1997; Hartig et al. 1997; Hartig et al. 1991; Ulrich et al. 1991). This comparison is useful for determining that natural environments are more restorative than urban environments. However, it does not truly get to the heart of the central question: does preference directly correlate with restoration? This study has been a

step in the right direction, as it compared two natural landscape typologies, the sacred and the preferred.

However, to truly determine the relationship between preference and restoration, more testing must be conducted. This testing should include two, perhaps three, more groups of individuals. The first new group should view natural, non-preferred (i.e. ugly) landscapes, or the 1-3 range of preference. The second group should view landscapes that rank in the neutral (4-6) range of preference. The third group should view natural landscapes depicting scenes of natural destruction, such as landslides, avalanches, tsunamis, forest fires, volcanic eruptions, earthquakes, and other natural phenomena. These should also be rated for preference, and it is expected that these images would be on the low side of the scale. By testing these different aspects of the natural or near-natural environment, where the trace of human intervention is limited, a true determination of the relationship between preference and restoration can be made. Apples will be compared to apples, rather than to oranges, so to speak.

4.3 Conclusions

4.3.1 Summary of Findings

Sacred landscapes are as restorative as highly preferred landscapes, and viewing either type of landscape is more restorative than time alone. It is impossible to differentiate between sacred and preferred landscapes' restorative potential, as they yielded virtually identical results during the restoration test. However, while both sets of slides had very similar preference ratings, the sacred set was rated significantly lower in preference than the preferred set. Also, subjects involved in rating slides for sacredness indicated a difficulty in separating the beauty of the landscape from its sacred potential.

In terms of content, however, the sacred slides were generally less complex than their preference counterparts. They were also highly coherent and legible, leading to a greater immediate understanding of the presented scene while potentially limiting the desire or inclination to explore the scene further, therefore lacking mystery. Furthermore, the lighting in the sacred scenes was often remarkable, the photographs being taken at sunset or sunrise, in the aftermath or build-up of a storm, or other extra-ordinary atmospheric conditions. This combination of lighting, atmosphere and other content may be largely responsible for the affective response reported by participants in the sacred group.

4.3.2 Opportunities for Future Research

Exploration into the restorative potential of landscape must be both broadened and narrowed. Future research should concentrate on testing within typologies, rather than between them. This includes testing natural landscapes with varying degrees of preference against each other, and urban settings of varying beauty and preference against each other, to determine the relationship between preference and restoration.

Additionally, as mentioned in the discussion, the relationship between highly simple scenes and restoration should be pursued more in depth. The fact that these scenes were not as preferred as the well-balanced scenes, and yet performed equally well in restoring stress levels, indicates that perhaps something more than preference is responsible for the reduction of stress.

Furthermore, testing different landscape typologies, such as sacred, primitive, culturally significant, or ecologically productive or sensitive environments should be conducted to delve deeper into the relationship between collective memory, personal knowledge, and restoration.

Also, the long-term benefits of viewing landscape typologies versus other activities should be investigated further. For example, does a person who views beautiful landscapes every day for ten minutes exhibit lower stress, better performance on cognitive challenges and more energy than a person who looks at a blank wall for the same duration? Virtually all of the studies regarding the restorative effects of nature capture the acute benefits of such an intervention. Very few studies attempt to test long-term benefits. There are manifold reasons for such an academic aversion to a long-term test. First, the logistics of finding participants willing to participate in such a study and the administration of the test itself are daunting. Second, developing a sufficiently high degree of confidence in the results and control over variables inherent in such a test is incredibly difficult. The test would have to be administered at exactly the same time each day, with participants reporting relative levels of stress each day to chart the progressive influence of the interventions. Variables such as diet, physical activity, and occupation would have to be controlled as well.

Finally, a greater understanding and more rigorous investigation of the nature of sacred landscapes should be undertaken. To accomplish this, additional informal and/or formal polling of the general population should occur to determine both the importance and the location of sacred experiences for the average person. For instance, notably absent from the present research were groves of trees, rivers, or other landscape typologies. This limitation was due to the fact that the subjects interviewed did not mention these typologies as likely locations for a sacred experience. However, if more people were interviewed, there is an increased probability of these typologies' inclusion in the final test.

Cultural and geographic considerations regarding sacred landscapes and experiences should also be investigated more thoroughly. One potential weakness of the present research is that the slides selected for rating primarily represented landscapes from the western United States and Canada. This fairly limited selection did not incorporate the full range of landscapes present in our varied and multi-faceted planet. Slides from other regions of the world should also be tested for their sacredness and restorative potential.

4.3.3 Implications

The greatest implication of the present research is that we do not fully understand our surroundings. However, we are everyday increasing our understanding of the impacts of the environment, both manmade and natural, on people. Thus, there is a greater demand to conduct research into this field, so that designers and decision-makers can better understand the impacts of their actions and interventions.

For landscape architects and other professionals directly responsible for the form our surroundings take, the implications of the research are to be ever more aware of the reasons for which design moves are made. An understanding that each design decision translates into an affective and behavioural response on the part of those viewing and interacting with the environment leads to a greater level of personal and professional responsibility in making those decisions. Design must be examined through the lens of human behaviour in addition to aesthetics, ecological function, and other aspects of sustainability.

There is a pressing need for designers and planners to be more persuasive and adamant about the quality and quantity of parks systems in our cities. Given the great restorative potential of these places, master plans for parks and parks systems must be

conducted at as ambitious a level as possible. By elevating the standards for park provision and design, designers and planners may be the means of reducing stress levels city-wide.

There is also a demand to humanize our urban surroundings. Study after study has shown that natural environments are preferred over urban, and that natural environments are more restorative than their urban counterparts (van den Berg et al. 2003). Cities and other manmade places are often stress-inducing, rather than stress-reducing. Thus, the infusion of a larger amount of high-quality green and natural space into the city is needed to counter the negative impacts of the urban context. This has implications not only for human behaviour and restoration, but human and environmental health, public health, and sustainability at large. Greener cities are more economically attractive, healthy, active, and, ultimately, sustainable. Decision-makers, developers, city governments, and taxpayers need to understand the need for greener streets, infrastructure, and parks, and that the long-term benefits of these decisions outweigh the short-term costs. We are investing in our future when we invest in natural open space and parks at all levels.

For the public at large, the mandate is clear: when stressed, seek out natural places. The more a person interacts with their natural surroundings, the more that person stands to benefit from it. More importantly, a nearby neighbourhood park may be just as restorative as a visit to the Rockies or the Oregon coast. Thus, the attainability of the restorative benefits may literally be just around the corner.

In conclusion, I refer to the immortal words of Henry David Thoreau: “Nature is but another word for Health” (Thoreau 1906, 395). By seeking out and enhancing the natural places on earth, we not only benefit our own health, but the health of the entire planet. Sustainability is not just about eco-density, global climate change, and indicator species.

Sustainability encompasses the entire realm of human-environment and human-human interactions, and is all about providing an acceptable standard of living for all organisms on the planet, humans included. To accomplish sustainability, we must eliminate poverty, war, destruction of the natural *and* human environment, and live within our means. To be sustainable, everyone must have access to enough food and water to live. Sustainability does not equate to subsistence. Life, liberty, and the pursuit of happiness are as unalienable today as they were in 1789.

By understanding the relationship between our environment and our behaviour, mood, and mental capacity and function, we can better understand the responsibility we individually and collectively have to protect and preserve our precious natural resources before they are completely exhausted and can no longer offer us any benefit. Perhaps we could all profit from these parting words from Thoreau:

“I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, to discover that I had not lived. I did not wish to live what was not life, living is so dear; nor did I wish to practice resignation, unless it was quite necessary. I wanted to live deep and suck out all the marrow of life, to live so sturdily and Spartan-like as to put to rout all that was not life, to cut a broad swath and shave close, to drive life into a corner, and reduce it to its lowest terms, and, if it proved to be mean, why then to get the whole and genuine meanness of it, and publish its meanness to the world; or if it were sublime, to know it by experience, and to be able to give a true account of it in my next excursion” (Thoreau 1975, 90).

Perhaps this is the essence of the sacred.

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Appendix 1: Restoration Test Forms



Benefits of Viewing Sacred versus Restorative Landscapes Informed Written Consent Form

Principal Investigator: Patrick Mooney, Associate Professor, Landscape Architecture, University of British Columbia (UBC).

Co-Investigators:

Mr. Don Burger, Master's Candidate, Adv. Studies in Landscape Architecture, UBC

Dr. Mike Meitner, Assistant Professor, Forestry, UBC

Professor Douglas Paterson, Professor, Landscape Architecture, UBC

Use of the Information: This research is being undertaken towards the completion of Mr. Burger's master's thesis at the University of British Columbia. The information learned during the session may also be used in support of writing articles and other materials.

Research Purpose: The purpose of this research is to discover how viewing different types of landscapes affect people's emotions. Some landscapes are generally known to be restorative, that is, they help people recover from stress. This study is an attempt to measure the effects of "sacred landscapes" versus other, known restorative, landscapes.

Study Procedures: Your role this research consists of participating in a psychological study to last approximately 30 minutes. You will be asked to rate your mood throughout the study using a questionnaire. During the study you will be asked to mentally complete a series of simple mathematical equations, and view a slideshow of landscape photos. The mathematical exercise lasts about 3-5 minutes, and includes an audio soundtrack. You are free to leave at any time during the study, if necessary.

Risks and Benefits of Participation: You are free to opt out of the study at any time. An incomplete study result in no way eliminates your eligibility for the \$5 honorarium and the candy bar. We hope that the results of the research will help generate a better understanding of the role that different types of landscapes play in helping to relieve stress and improve cognitive function.

Confidentiality: Please be assured that your identity will be kept strictly confidential. All information gathered from the study will be identified only by code number, and all study materials will be stored in a locked filing cabinet. Computer files containing subject data will be password protected and not exchanged via email. Only the investigators listed above will have access to the data.

Participants will not be identified in any reports of the completed study.

Contact Information about the Study: If you have any questions or would like more information about this study and its procedures, you may contact the Principal Investigator, or the primary researcher.

Contact for concerns about the rights of research subjects: If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services.

Consent: Your participation in this study is entirely voluntary. You may refuse to participate in the study, and you may withdraw from the study at any time without any consequences.

Your signature below indicates that you have received a copy of this consent form for your own records. Your signature also confirms that you are of legal age, and therefore eligible to participate in this study (19 years of age in British Columbia).

Your signature indicates that you consent to participate in this study.

Participant's Signature

Date

Printed Name of Participant

Demographic Information Form

Subject's Initials _____
Birth Date _____
Date _____
Subject Code Number _____

Please provide the following information. This information will be used only to assist in the statistical analysis of the data you will provide during the study. It will not be used for any other purpose, and will not be shared with anyone outside of the

Age: _____

Gender: _____

Ethnic Background: _____

Years lived in Canada: _____

Level of Education attained: _____

Native Language (if not English): _____

Hobbies or favorite pasttimes: _____

Profile of Mood States, Short Form

Subject's initials _____

Birth Date _____

Date _____

Subject Code Number _____

Directions: Describe HOW YOU FEEL RIGHT NOW by circling the appropriate number beside each of the words listed below.

FEELING	Not at all	A little	Moderate	Quite a bit	Extremely
tense	1	2	3	4	5
angry	1	2	3	4	5
worn out	1	2	3	4	5
unhappy	1	2	3	4	5
lively	1	2	3	4	5
confused	1	2	3	4	5
peevied	1	2	3	4	5
sad	1	2	3	4	5
active	1	2	3	4	5
on edge	1	2	3	4	5
grouchy	1	2	3	4	5
blue	1	2	3	4	5
energetic	1	2	3	4	5
hopeless	1	2	3	4	5
uneasy	1	2	3	4	5
restless	1	2	3	4	5
unable to concentrate	1	2	3	4	5
fatigued	1	2	3	4	5
annoyed	1	2	3	4	5
discouraged	1	2	3	4	5
resentful	1	2	3	4	5
nervous	1	2	3	4	5
miserable	1	2	3	4	5
bitter	1	2	3	4	5
exhausted	1	2	3	4	5
anxious	1	2	3	4	5
helpless	1	2	3	4	5
weary	1	2	3	4	5
bewildered	1	2	3	4	5
furious	1	2	3	4	5
full of pep	1	2	3	4	5
worthless	1	2	3	4	5
forgetful	1	2	3	4	5
vigorous	1	2	3	4	5
uncertain about things	1	2	3	4	5
bushed	1	2	3	4	5

Appendix 2: References on Affect and Cognition

While outside the primary scope of this thesis, the argument on affect and cognition is, to say the least, very interesting. The emotions stirred up, the professional and scholarly thrust and parry, evidenced in several articles written over the course of nearly 10 years, indicate that this issue goes much deeper than would be originally supposed. Following are several references, in chronological order, surrounding the debate on the primacy of affect or cognition.

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Appendix 3: BREB Certificate of Approval



The University of British Columbia
Office of Research Services
Behavioural Research Ethics Board
Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

CERTIFICATE OF APPROVAL - FULL BOARD

PRINCIPAL INVESTIGATOR: Patrick F. Mooney		INSTITUTION / DEPARTMENT: UBC/Applied Science/School of Architecture and Landscape Architecture	UBC BREB NUMBER: H07-02398
INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:			
Institution UBC Other locations where the research will be conducted: N/A		Site Vancouver (excludes UBC Hospital)	
CO-INVESTIGATOR(S): Michael Meitner Douglas D. Paterson Donald A. Burger			
SPONSORING AGENCIES: N/A			
PROJECT TITLE: Benefits of Viewing Sacred versus Restorative Landscapes			
REB MEETING DATE: November 8, 2007		CERTIFICATE EXPIRY DATE: November 8, 2008	
DOCUMENTS INCLUDED IN THIS APPROVAL:		DATE APPROVED: November 9, 2007	
Document Name	Version	Date	
<u>Protocol:</u>			
Research Proposal	2	October 19, 2007	
<u>Consent Forms:</u>			
Written Informed Consent Form	2	October 19, 2007	
<u>Advertisements:</u>			
Recruitment Flier	2	October 19, 2007	
<u>Questionnaire, Questionnaire Cover Letter, Tests:</u>			
Profile of Mood States, Short Form	N/A	September 26, 2007	
Demographic Form	N/A	September 26, 2007	
<u>Other Documents:</u>			
Indicative Images	N/A	September 26, 2007	
The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.			
Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following: <div style="text-align: right;">_____ Dr. M. Judith Lynam, Chair Dr. Jim Rupert, Associate Chair Dr. Laurie Ford, Associate Chair</div>			