THE EFFECTS OF FASCINATION AND EXTENT ON JUDGMENTS OF TRANQUILITY

by

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ABSTRACT

Many contemporary work, school, and home environments produce attentional fatigue. One way to recover from such attentional fatigue is to place oneself in environments or settings that promote feelings of tranquility.

One way to begin systematic study of environment-tranquility relations is to frame research within Attention Restoration Theory (ART). This theory is based on environmental supports that allow one to shift from directed or focused attention to involuntary forms of attention, thus allowing fatigued attentional capacities to rest. ART proposes that four judgments of environmental configurations are important to creating restorative experiences. These are environments that afford disengaging from one's normal physical environment, cognitive tasks, or cares and concerns (called "being away"), fascination, extent, and goal compatibility. These same variables, although more refined and subtly manipulated, may also promote experiences of tranquility.

Two variables, within Attention Restoration Theory, that may be particularly associated with promoting experiences of tranquility are fascination and extent. Fascination can exist at different levels in a setting, and some levels may grab and hold attention in an undramatic way, leaving "cognitive space" for gentle contemplation and reflection. On the face, they seem like settings that should promote tranquil experiences.

Extent, the organized patterns in an environment that make it seem to "hang together," may interact with fascination to produce tranquil states. This is because

momentarily and unrelated fascinating stimuli will not hold the mind in a gently focused manner long enough for low activation, yet pleasantly valenced states associated with tranquility to accrue. Thus, fascination and extent should interact in such a way that environments judged as containing fascination and extent should promote the greatest states of tranquility.

Therefore, the purpose of this study was to examine the interactive effects of fascination and extent on judgments of tranquility associated with scenes of natural landscapes. Participants rated 12 photos of environments containing different levels of fascination and extent. The design was a repeated measures and hierarchal linear modeling using HLM, 6.0 was used to test the study's hypothesis. Results show that both fascination and extent were positively associated with tranquility.

For my mom, Julia Ann Splan.

You are the best mom in the world.

I love you.

TABLE OF CONTENTS

LIST OF TABLES

Table

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CHAPTER I

INTRODUCTION

Humans require fully functioning physical and cognitive capacities to perform at their best. Students find it difficult to concentrate when sleepy. Decision makers make errors in judgment when mentally fatigued. When these attentional capacities become depleted restoration is in order for enhanced performance. There are different types of restorative experiences that can help to restore different capacities. For example, sleeping restores physical exhaustion. Research has also delved into the different types of cognitive restoration, such as recovery from stress, shifts to more positive mood states, recovery from directed attentional fatigue, and reduced aggression. A type of restorative experience that has received very little attention in contemporary psychology is tranquility, or the affective state of freedom from disturbance. Tranquil experiences might mitigate the effects of directed attentional fatigue such as irritability, apathy, and proneness to making mistakes.

Folk-lore and intuitive reasoning tells us that retreating to nature is good for one's physical and mental health. Following in the tradition of the classical Greek and Roman Hellenistic philosophers, the earliest advocates for urban parks in America believed that natural parks were sources of tranquility – havens to escape the hectic pace, material orientation, and environmental degradation of modern urban settings (Knopf, 1987).

Schroeder (1991) sees the ability of trees, other vegetation, and bodies of water to function as 'natural tranquilizers' as one of the most significant benefits of preserving nature. Rachel Kaplan (1984) writes, "Natural settings are often proclaimed for their capacity to instill a sense of peace and serenity. They are not usually described as hectic or rushed. Somehow, tranquility is more readily achieved in the natural context" (p.190).

Since, in many cases, the basis for preserving natural environments was because of the profound impact experiencing them had on an individual's psyche, it would seem that theory supporting this notion would be well established. Instead, little research has explored this avenue, but what has been completed has been done under the literature rubric of restorative environments.

Attention Restoration Theory (Kaplan & Talbot, 1983) proposes that four environmental properties facilitate restorative experiences: being away, fascination, extent, and compatibility. Being away refers to physically and conceptually distancing oneself from everyday circumstances. These circumstances can range from placing oneself in a symbolically distant physical space to disengaging from one's normal goals, priorities, and inclinations. Fascination refers to the qualities of a setting that effortlessly hold one's attention such that one is using involuntary rather than voluntary attentional capacities. Such a shift allows directed attention to rest. Extent refers to settings that are easy to interpret and make sense of, also referred to as depth and scope. Environments lacking extent would present a stream of unrelated stimuli. Compatibility refers to properties of a setting that facilitate goal attainment.

ART proposes that fascination, because of its role in shifting one from using directed attention to involuntary attention, is the central component of restorative environments (Kaplan, 1995). However, there are many sources and types of fascination.

For example, fascination may come in the form of content or process, or along a "soft-hard" dimension and these different types may promote different types of restoration. Hard fascination totally engages or "fills up" the mind and while it involves involuntary attention, it may not lead to the sense of calm or peace often thought of as attributes of tranquility. Conversely, soft fascination, while engaging involuntary attention, does not "fill up" the mind but leaves "cognitive space" for gentle contemplation and reflection and thus may be more likely to facilitate experiences of tranquility.

Tranquility can be characterized as an affective state of low level arousal combined with pleasure (Russell, 1980). An effect of fascination on tranquility assumes that fascination can exist at moderate levels such as those that might be found in pastoral settings. However, some environments might be so fascinating that they move the viewer into such a high level of activation that tranquility is replaced with excitement (high activation, pleasure) or fear (high activation, displeasure). Such states have been theoretically associated with sublime environments (Burke, 1914). Further, some environments that are fascinating may not be pleasurable.

Making tranquility entirely dependent upon fascination could also pose a problem if fascination ends up working in tandem with another variable. To experience tranquility, the setting must effortlessly hold one's attention, but it also needs enough organization to engender a state of low activation. Such organization is called extent. So even if fascination is present at the right level, tranquility may also be dependent upon the extent of a setting. However, if a setting has a great deal of extent, it may be considered boring. Therefore, the purpose of this study is to examine the interactive effects of fascination and extent on judgments of tranquility associated with scenes of natural landscapes.

CHAPTER II

LITERATURE REVIEW

Restorative Environments

A restorative environment is one that facilitates rest and recovery from mental and physical exhaustion. Mental exhaustion comes from many sources, such as an emotional situation, a standardized test, a long day in the office, or from sitting in classes all day. In the ancestral environment, the ability to block out competing distractions had survival value. As predators, or as potential prey, humans had to be alert and vigilant in watching their surroundings. The common theme to these types of situations is that they all require an individual to focus on a specific task by blocking out competing distractions for an extended period of time. Unfortunately, the mechanism used to block out distractions, as critical as it is, can become fatigued. When this mechanism becomes fatigued a person can become cranky, irritable, and prone to mistakes. One way to restore attention is to place oneself in an environment that is supportive of one's goals and inclinations and allows the individual to disengage from a focused state of mind. Kaplan and Talbot (1983) call this type of setting a restorative environment.

Attention Restoration Theory

In this study restorative environments are framed within Attention Restoration Theory (ART) (R. Kaplan & S. Kaplan, 1989). According to this theory, prolonged mental effort leads to directed attention fatigue (DAF), and settings containing four characteristics (being away, fascination, extent, and compatibility) will promote restoration and recovery from DAF. Directed attention is the capacity to focus on a task or piece of information for a period of time by filtering out distraction, and is similar to a concept proposed by William James (1894) called "voluntary attention." James proposed that humans have two attentional capacities: voluntary and involuntary attention. Voluntary attention refers to the kind of attention to be employed when something does not attract attention, but was important to attend to nonetheless. Involuntary attention refers to the kind of attention that requires no effort.

James' voluntary attention and Kaplan's directed attention both refer to the same mechanism humans use to concentrate on a task by blocking or inhibiting distractions. It is the sustained use of directed attention that leads to DAF. The shift from directed or voluntary attention to involuntary attention allows directed attention to rest and recover from extensive use.

Although sleep is helpful, the magnitude of DAF often exceeds what sleep can correct, and it is then essential to rest while awake. Such recovery is likely to occur in a restorative environment.

Origins of Attention Restoration Theory

ART grew out of a wilderness backpacking program called Outdoor Challenge. One research aim of the Outdoor Challenge program was to study the psychological benefits of a wilderness experience (Kaplan & Talbot, 1983). Participants went on 9-11 day wilderness trips and were instructed to record their thoughts in a journal the researchers provided. The journals were analyzed for content and several common themes emerged on a similar time frame for the participants. In the beginning, people were nervous about the logistics of backpacking, and had other worries on their mind. Once comfortable in their surrounding, the cares they brought with them seemed to fall away as they adjusted their daily routines to the rhythms of nature. Around day 5, worries were replaced with a feeling of calmness and tranquility and participants became able to reflect deeply on their life's goals and priorities. By day 7 there was a strong inclination toward contemplation, and a feeling of relatedness to the surrounding environment that approached awe.

The researchers saw a pattern emerge in the participants' psychological reactions and they sought to explain what components of the environment were responsible for the effects. What they found was not a specific property of an environment, but four elements which, when present as a collective whole, provide psychological and attentional restoration.

Four Characteristics of a Restorative Environment

The first characteristic necessary in a restorative environment is being away. Being away means more than being a physical distance away from the ordinary; it also

means to be away from distracting thoughts, obligations, and everyday cares. In the recreation literature, escape has been a frequently studied construct and refers to physically distancing oneself from everyday life. However, a restorative setting is not limited to being a great distance away, and instead looking out a window can also provide a temporary escape from the stresses and strains of everyday living. Furthermore, a large amount of time is not required to be away, and a short interval of time spent in a restorative environment is also beneficial.

The second characteristic of a restorative environment is fascination. Fascination involves the qualities of an environment that one finds inherently interesting and engaging. Fascination can come from a specific content, or from a process. It also ranges on a continuum from hard to soft. Fascination has been viewed as the key mechanism to restoration because it engages the involuntary attention that allows the directed attention to rest.

The third characteristic of a restorative environment is extent. Extent refers to the coherence, depth and scope of an environment. Coherence refers to when the elements in a landscape "hang together" in such a way that the environment is easy to make sense of. The perceived elements must be connected in such a way that they constitute a portion of a larger whole. Random sequences of interesting objects are momentarily fascinating, but when unconnected they will not promote a restorative environment. A restorative environment must also be sufficient in depth and scope so that one can experience a sustained involvement. Involvements of too short a duration are insufficient to allow directed attention to rest.

Although an environment may offer a psychological distance from worries, be fascinating, and have the extent to hold one's attention, it may still not be restorative. In order for a setting to be restorative, it must also be compatible with the goals of the individual. Being a person-environment interaction, the setting must provide the information necessary to meet individual purposes and goals so that the person can carry out expected activities. An environment that is goal incompatible requires considerable mental effort to decipher, thus placing a demand on attention.

Propositions Derived From the Restorative Environments Literature

The restorative environments literature is relatively new. However, from this literature five key propositions can be derived. The first is that preference and perceived restoration co-vary such that as environments judged to be high in restorative potential also tend to be visually preferred. The second is that, on average, natural environments are more restorative than are built environments. The third is that nature in small doses (micro restorative experiences) is restorative. The fourth is that restorative environments reduce stress. The fifth is that restorative environments promote self-regulation.

Restorative Environments Tend To Be Visually Preferred

The restorative environments literature grew out of the environmental preference literature. The environmental preference literature is frequently premised on the assumption that early humans preferred certain environments for their survival potential. The covariation between environmental affordances and pleasure (aesthetic) responses became, in part, genetically encoded. Thus, some environmental preferences and

perceived restoration co-vary such that as environments tend to be visually preferred, they are also judged to be high in restorative potential. They have many of the same elements.

Humans evolved in environments where spatial information, in both content and process, was crucial to survival. It has been found that preferred natural environments include landscapes that are wide open, spatially defined, evenly textured, and provide an opportunity to explore and find new information (an element characterized as mystery). Today, people frequently prefer natural settings to be well-defined, extended, park-like spaces. A common theoretical explanation for this preference is that individuals can readily make sense of them, determine the ease of moving about, judge depth, and decide if they appear safe. All of these functions rely on processing environmental information. Conversely, natural environments with dense trees or vegetation that screen vision, or limit or block passages, are not preferred. This type of setting signals a threat to survival, because one cannot see who or what may be lurking in the enclosed area and they offer barriers to escape. Thus, openness, spatial definition, a unifying texture, and mystery constitute significant components of preference in natural environments.

Water signifies life and provides a critical survival need. It has been found that rivers, streams, and lakes are also preferred landscape features. However, some waterscapes, such as swamps and rushing water, are not preferred and an explanation for this discrepancy coincides with reasons of why different landscapes are preferred. Rivers, lakes and streams can be characterized as open, spacious, coherent and possessing elements of mystery whereas swamps and rushing water are low in spaciousness, turbulent, and offer barriers to movement.

The preference for a landscape that provides feelings of openness, spatial definition, and a unifying texture runs parallel to the "extent" concept proposed by Kaplan and Talbot (1983). Extent is necessary for a restorative experience because it is the element that ensures the environment "makes sense," "hangs together," and has sufficient scope and depth. Environments that possess extent allow individuals to quickly assess their surroundings and create a mental map because the unifying textures, repeated elements, and other factors such as spatial definition all help make a scene hang together. These types of environments have a sense of orderliness, where things seem in place, and by residing in an environment possessing extent individuals are able to reduce their cognitive expenditures.

Natural Environments Are More Restorative Than Built Environments

Questions surrounding the difference in restorative potential between natural and built environments emerged at the beginning of the restorative environments literature. ART proposed that environments that contain the four characteristics of being away, fascination, extent, and compatibility will be restorative; and although any setting can possess these qualities, natural environments tend to possess them in abundance.

First, natural environments allow individuals to restore their attentional capacities because they are generally away from one's daily routine, since people generally spend their everyday lives in built environments. Second, the contents or processes that occur in natural environments, such as rock formations, flowers, trees, rolling hills, falling snow, sunsets, and moving water are inherently fascinating, thereby engaging involuntary attention. However, some of the content or processes found in natural environments are

of such intense fascination that it does not enable restoration. This type of fascination is referred to as hard fascination and examples include lightning, waves crashing, and other dramatic features. Third, natural environments usually facilitate extent; they inherently "hang together" or "make sense" while possessing depth and scope. Finally, natural environments are compatible with one's fundamental goals. This can be seen in the Outdoor Challenge Data, where around day 5 the worries from daily life were finally shaken off and participants adjusted their goals to those that were truly necessary, such as finding food and shelter.

Several studies have specifically addressed the difference between natural and built environments on different types of restoration. Findings are consistent, and whether by reducing anger (Kuo & Sullivan, 2001), increasing attentional capacity (Hartig, Mang & Evans, 1991; Tennessen & Cimprich, 1995), or improving mood (Bodin & Hartig, 2001), natural environments were found to be more restorative than built environments.

Although the studies that compare natural and built environments indicate nature enhances restoration, there has also been some research undertaken to determine if preferred built environments may also be restorative. In one study, Kaplan, Bardwell, and Slakter (1993) considered the restorative potential of a museum. Their results indicated that the museum may indeed be restorative, but those who are already comfortable in a museum are more likely to receive this benefit. These results support ART's compatibility construct. More recently, Ouellette, R. Kaplan, and S. Kaplan (2005) explored the monastery as a restorative environment. A questionnaire was given to the people who used the monastery as a "retreat house" and their responses were factor analyzed. The results yielded a four factor solution of being away, compatibility, beauty,

and spirituality. Ouellette et al. interpreted the factor beauty as having parallels with extent and fascination. These results, although not identical, parallel the four characteristics associated with ART.

The underlying theme of the studies examining the restorative potential of built environments is the notion of compatibility. Extrapolating from this theme, perhaps the reason that natural environments tend to be restorative is because they are compatible with individuals' goals and inclinations. Specifically, it appears that natural settings are those in which individuals are likely to disengage their normal goals and priorities and re-align them with the demands of the setting.

Micro-Restorative Experiences

A restorative environment needs to provide extent, an opportunity for one to become engaged and stay engaged. This, however, does not imply that a restorative experience needs to take place over a long period of time, or in a geographically large area. There have been several studies addressing the ideas of special extent and time, examining the role of what has been termed a "micro-restorative" experience.

Tennessen and Cimprich (1995) questioned whether an attention-restoring experience could be as simple as looking at nature from a window. Views from 72 dormitory windows for undergraduate students were categorized into varying levels of naturalness. Researchers found that residents whose windows provided views of nature scored higher on attentional measures than did residents whose windows did not provide views of nature. To further investigate the view from window, R. Kaplan (2001) conducted a study at six low rise apartment communities and found that the view from

the window contributed substantially to residents' satisfaction with their neighborhood and diverse aspects of their sense of well-being. Although window viewing is generally for a brief moment of time and of a limited geographic area, these studies show that the view provides a micro-restorative experience.

Spatial extent (as distinct from ART's construct by the same name), although unnecessary for a restorative environment, is especially beneficial to those who have mobility challenges or those with other medical hardships. Cimprich (1993, 2003) conducted a series of studies on a restorative environment intervention to restore attention in cancer patients and in women with newly diagnosed breast cancer. To experience a restorative environment, she had participants engage in activities such as visiting a scenic spot (observing, sitting, strolling); sitting by a window with a natural view; watching birds or wildlife; listening to birds, sounds of nature; watching a beautiful sunset, clouds; tending plants or gardens. Results in both studies found significant improvement in attentional capacity for those who experienced micro-restorative interventions than did those in non-intervention conditions. Ottosson and Grahn (2005) found that elderly people were able to increase concentration after sitting for an hour outside in a garden. These studies all used environments with little spatial extent as the setting for the restorative experience and users still find them to be restorative.

Micro-restorative experiences are also beneficial to children and a growing amount of restorative environments literature is being focused on child development (Faber Taylor, Kuo, & Sullivan 2001; Wells, 2000; Wells & Evans, 2003). These studies have examined the role of nearby nature and have all found that children function better when they have exposure to nature. Faber Taylor, et al. (2001) focused their study on

children with attention deficit disorder and found that the "greener" the child's play area, the less severe the attention deficit symptoms. Wells (2000) examined the effects of green natural residential settings on children's cognitive functioning through a longitudinal study. This study found that children who moved to housing with more nature nearby tended to have higher levels of cognitive functioning than children who experienced less increase in the amount of nearby nature from premove to postmove. Finally, Wells and Evans (2003) studied children in rural areas and found that levels of nearby nature moderated the impact of stressful life events on their psychological well-being. These studies all used environments of limited space or of small duration and all found that the children experienced restorative benefits.

Restorative Environments Reduce Stress

Much early work on restorative environments focused on the ability of such environments to reduce stress. This research was conducted by stressing participants before they viewed either a natural or non-natural environment (Ulrich, 1979; 1981; 1983; Ulrich, Simons, Losito, Fiorito, Miles, & Zelson; 1991). Mood states of research participants were measured before and after viewing either nature or urban scenes by self reports on the Zuckerman Inventory of Personal Reactions (ZIPERS) (Zuckerman, 1977). The results of all studies found that viewing nature can contribute to reducing stress and to promoting positive moods and feelings. Ulrich (1984) also showed that viewing nature scenes can also facilitate recovery from illness.

Although Ulrich was interested in the restorative effects of exposure to natural environments, he was more concerned with the effects viewing nature has on reducing

stress versus nature as restoring attentional and psychological mechanisms. This is in part due to his affect and arousal view of human's response and evaluation of an environment, and he saw attentional fatigue as an aftereffect of stress.

Hartig, Evans, Jamner, Davis, and Garling (2003) revisited Ulrich's line of research and compared psychophysiological stress recovery and directed attention restoration. Results coincided with previous findings and illustrate how everyday settings can hinder or support these different forms of restoration. Taken together, these studies support the notion that exposure to natural environments reduce stress and provide restorative effects.

Restorative Environments Promote Self-Regulation

Another line of research situates restorative environments in a larger context of self-regulation (Korpela & Hartig, 1996; Korpela, Hartig, Kaiser, & Fuhrer, 2001; Korpela, Kytta, & Hartig, 2002). These studies assumed that emotional- and self-regulation are processes underlying the development of place identity, and that a person's favorite place is an example of an environment used in such regulation processes. The purpose of these studies was to evaluate favorite places in terms set out in restorative environments theory. Korpela et al. (1996, 2001) reported evidence bearing on the relations among restorative experiences, self-regulation, and place attachment as natural settings were overrepresented in the number of adult's favorite places and underrepresented in the number of places people reported to be unpleasant. However, Korpela et al. (2002) found contrasting results when examining the role of restorative experience and self-regulation in the formation of place preference in children.

Research into the effects of a restorative environment on regulating behavior of inner city residents has also been undertaken. Kuo (2001) looked into the effects of nearby nature and found that residents living near trees and grass enhanced their psychological resources for coping with poverty. Kuo and Sullivan (2001) compared levels of aggression for 145 urban public housing residents and found that those living in buildings in relatively barren surroundings reported more aggressive and violent behavior than did their counterparts living in buildings surrounded by nature. Further, levels of mental fatigue were higher for those living in barren buildings, and aggression accompanied mental fatigue.

These studies show that a restorative environment can help people regulate their behavior, whether it is emotional-regulation such as aggression and anger, or self-regulation, such as dealing with poverty.

Measuring a Restorative Environment

There have been several attempts to measure the four components of a restorative environment derived from Kaplan and Kaplan's (1989) theory. Hartig, Korpela, Evans, and Garling (1996, 1997) developed a perceived environmental restorativeness scale (PRS), but were unable to consistently confirm the four factor structure. Laumann, Garling, and Morten Stormark (2001) also tried to measure the four components of ART, but found that being away split into two factors tapping into being physically away versus being psychologically away. Herzog et al. (2003) attempted to assess the restorative components of environments too, but found that collinearity appeared among several sets of variables. A perceived restorative components scale has even been designed for

children (Bagot, 2004), which confirmed a five-factor model, similar to that of Laumann et al. (2001).

Summary of Restorative Environments

Restorative environments tend to be natural. They are places that help individuals regulate their moods, and they are preferred environments to be in. Further, it has been found that different types of restorative experiences can be had in different types of restorative environments. It stands to reason that as the four factors of ART vary, so will the level of restoration.

Tranquility in Recent Literature

Tranquility in the Restorative Environments Literature

Kaplan and Kaplan's Attention Restoration Theory (1989) distinguishes four different levels of restoration. The first level is referred to as "clearing the head." There are cognitive bits and pieces running around in one's head, and this residual clutter can interfere with new mental requirements. The least demanding role of the restorative experience allows these distracting fragments to run their course. A second level is to permit recovery of directed attention, which is vital to the many cognitive functions that rely on it. A third level depends upon the cognitive quiet to face cognitive residue of the preceding days, months, and even years. These are the matters on one's mind that often go unheard, and facing them is important because left alone, they can create clutter and internal noise. The final level of restorativeness is the most demanding of all in terms of

both the quality of the environment and the duration required, and includes reflecting on one's life, priorities and possibilities, actions and goals.

The first two levels of restoration involve more of a cognitive level of restoration whereas the final two levels are more affective types of restoration, reaching into deeply held emotions. Herzog, Black, Fountaine, and Knotts (1997) call these two different types of restoration attentional recovery and reflection, respectively. Limited, recent research has been conducted on the reflective level of restoration. However, one example of such work is Staats and Hartig (2004) who used the distinction set forth by Herzog et al. (1997) and had their participants rate environments on the likelihood of recovery, reflection, and social stimulation outcomes.

Another type of reflective restoration that has received some attention is tranquility. Tranquility is an idea that has been not studied deeply, but is frequently mentioned in the restorative environments literature, and has been a theme since the beginning. For example, in Rossman and Ulehla's (1977) study on psychological reward values associated with wilderness use, participants rated the importance of different reward items. For these participants, tranquility was highly valued and was strongly expected in natural environments. Although this study included the variable tranquility, it did not demonstrate a theoretical reason for including it in the list of reward items. Perhaps the authors felt the reward of tranquility was implicit in wilderness use.

Kaplan and Talbot (1983), in their study on the psychological benefits of a wilderness experience, found tranquility to be a dimension of a wilderness experience. From the Outdoor Challenge Data, tranquility was a topic of frequent mention in the participant's journals, appearing in 85% of the sample. In general, common themes

emerged on the same day for many of the participants and the feeling of tranquility was no exception. By the fifth day of a 9 to 11 day wilderness camping trip "…individuals expressed a deep sense of peacefulness and tranquility; they are 'free and happy and relaxed' in their surroundings" (p. 178). The days following build on the initial achievement of tranquility. "Individuals feel better acquainted with their own thoughts and feeling, and they feel "different" in some way—calmer, at peace with themselves, "more beautiful on the inside and unstifled" (p. 178). A solo trip occurs on days 9 through 11 of the trip, and after the initial jitters evolved into enjoyment participants felt a sense of increased understanding of the environment and one's relationship to their surroundings.

Seeing the impact of a wilderness experience, the researchers were interested in finding out how the participants felt once back in their normal daily lives. Forty-three "re-entry" journals were analyzed and three clusters emerged from the analysis, one being "Nature Tranquility." The Nature Tranquility cluster expressed positive feelings about the woods. People mentioned the stress of dealing with the demands of their everyday lives, and remember the wilderness as a peaceful, relaxed environment, and they made plans for future trips to natural areas.

Tranquility was a salient journal theme throughout the Outdoor Challenge data. Participants were able to get past the cognitive clutter and reach a point of mental calm. It took on average 5 days to reach this point, but the sense of peacefulness they achieved stayed with them after the trip was over. A sense of tranquility occurs on a deeper level and requires little external distraction and correspondingly, little internal "noise."

The Kaplans have conducted studies in garden settings (R. Kaplan, 1973; R. Kaplan & S. Kaplan, 1990). The purpose of these studies was to determine the psychological benefits of gardening. In the more recent study, R. Kaplan and S. Kaplan found that participants rated the tranquility items (peacefulness and quiet that gardening affords) as having the most importance to them as sources as satisfaction from gardening.

There have been a series of studies attempting to determine the qualities of a tranquil environment. Herzog and Bosley (1992) and Herzog and Barnes (1999) focused on distinguishing tranquility from preference, and had participants rate different types of environments (field/forest, deserts, and large waterscapes) on several variables (tranquility, preference, mystery, coherence, focus, unstructured opened, surface and calmness). Although tranquility and preference were substantially and positively correlated, it was possible to distinguish the two constructs. Herzog and Chernick (2000) set out to determine the relationship between tranquility and danger, which they found to be distinct, but not polar opposites.

Tranquility in the Environmental Preference Literature

One study found that there were two major dimensions that people use in their subjective assessments of natural scenery. The first was labeled natural scenic beauty; or the location of a scene along a dimension from beautiful to ugly. The second factor appeared to be a natural force-natural tranquility factor, meaning that some scenes are regarded as tranquil and others as powerful (Calvin, Dearinger, & Curtin, 1972). These results suggest that individuals, when assessing landscapes, take into consideration the

level of arousal present and rate it on a continuum ranging from tranquil to powerful. It is notable that tranquility was used to describe the low arousal level of a landscape.

Tranquility in the Exercise and Sports Science Literature

The exercise and sports science field has identified and included the idea of tranquility in their literature. It has been used to represent an affective or feeling state resulting from physical exercise. It has been measured with several scales, which were designed because popular self-report measurement tools such as the State-Trait Anxiety Inventory (Spielberger, Gorsuch, Luschene, Vagg, & Jacobs, 1983), Profile of Mood States (McNair & Courneya, 1981) and Positive Affect Negative Affect Schedule (Watson, Tellegen, & Tellegen, 1988) were not capable of accounting for the unique stimulus properties of exercise (e.g., physical work, bodily movements, and perceptions) (Lox, Jackson, Tuholski, Wasley, & Treasure, 2000).

The Exercise Induced Feeling Inventory (EFI) was designed to measure revitalization, tranquility, physical exhaustion, and positive engagement (Gauvin & Rejeski, 1993) and this scale has been used in several studies (Annesi & Westcott 2004; Dunn & McAuley, 2000; LaCaille, Masters, & Heath, 2006). However, this tool was subject to substantial criticism regarding theoretical and methodological rigor (Ekkekakis & Petruzzello, 2004), including not fully representing Russell's (1980) structure of affect.

To assess the full domain of affective states proposed by Russell's (1980) conceptualization of affect, the Physical Activity Affect Scale (PAAS) was developed (Lox et al., 2000). The PAAS measures four dimensions of affect: tranquility, positive affect, negative affect, and fatigue, and has been used in several studies (Butki,

Baumstark, & Driver, 2003, Driver, 2003, Mayer, 2005). In a study designed to provide evidence for the reliability and validity of the PAAS, Driver (2006) used it as a measure of exercise induced affect in adults with brain injury. Results were consistent with the original study and found the same four dimensions of affect, including tranquility.

Although tranquility has been included in scales that have had some use in exercise and sports science research, there has not been a theoretical basis for the inclusion of it as a factor. Despite the atheoretical nature of tranquility's use in the exercise literature, it is being used to represent an affective state that is of pleasure and low-arousal.

Summary of Tranquility in Restorative Environments Literature

Although tranquility appears as a psychological benefit in many studies and appears as a factor on several scales, it is not a construct that is well thought out theoretically in the literature. This lack of theorizing is not due to it being a new idea; but on the contrary, there is a vast history as tranquility is a concept that dates back to classical Greece, and variations of the idea can be seen today in different forms of meditation and relaxation, as well as the concept of serenity.

Classical View of Tranquility

Tranquility as the Ultimate Good

Tranquility is a concept that dates back to classical Greek philosophy, where it was considered to be the ultimate good by some. It can be traced to the pre-Socratic Democritus, a philosopher who, despite denying that the universe is teleological,

appeared to offer *euthymia* as the goal of life. *Euthymia* does not have a direct translation, but it is associated with a state in which the soul proceeds peacefully and is well settled, disturbed by no fear or superstition or other passions. *Euthymia* fits with Democritus' theory of atomism, which proposes that all things are material. By making the universe material, the soul becomes mortal and the Gods no longer exist and for Democritus, the basic route to *euthymia* is through removing fear of death and superstition.

Although Aristotle's *totum bonum*, or total good, is *eudaimonia*, which is associated with the classical idea of happiness and a total life lived well, it seems Democritus expresses a forerunner for the total good, which he called *euesto*. *Euesto* had been translated by Warren (2004) to mean completeness of goods, and a life free from worry. It appears that Democritus wraps his idea of a total good, *euesto,* around being free from disturbance, *euthymia*.

Aristotle's *eudaimonia* means happiness in the sense of well-being, a life of human flourishing. However, for Aristotle, *eudaimonia* was part virtue, or what one can control, and part fortune, or luck. Thus, for him and others who were philosophizing in a context of the Greek city-state, it was possible to attain *eudaimonia* as they were living in a time of moderately good fortune. However, for the philosophers to follow, known collectively as the Hellenistics, *eudaimonia* as defined by Aristotle was increasingly difficult to obtain as they were living in a time of misfortune due to the great social chaos resulting from the fall of the city-state and subsequent rise of the Macedonian Empire (Dare, Welton, & Coe, 1987).

The Hellenistics: Tranquility as Freedom from Disturbance

Among the Hellenistic philosophers were three major schools. These were the Epicureans, Stoics, and Skeptics. Important for the idea of tranquility was that they each replaced the ultimate *telos* of *eudaimonia* with *ataraxia*, where *ataraxia* meant to be free from disturbance. For the Hellenistics, desires were the cause of disturbance to the soul. To be free from disturbance, it was necessary to find to the root of the desires, or the belief system that desires rest on. Through the use of reason, beliefs could be undermined and desires would cease to exist, leaving a soul free from disturbance (Brunschwig & Sedley, 2003).

In the context of Hellenistic philosophy Nussabum (1994) calls this use of reason to undermine belief systems upon which desires are based "therapies of desire" and the outcome of such therapy is tranquility. The Latin translation of *ataraxia* is *tranquillitas* from which the English rendering is tranquility.

The Hellenistics therapy of desire is analogous to a medical model, where the philosopher is equated with a doctor and the patient being treated is sick in the soul. This is, in fact, the Hellenistic's first major premise: people are sick in their souls. And, because of this sickness, they are living *noneudaimon* lives. The source of the sickness is desire, and the philosopher gets rid of this sickness through reason.

The three major Hellenistic schools shared the same *telos* (goal of end state for humans), but they each espoused a different route to reach the *telos* of freedom from disturbance.

Epicurus

For Epicurus, the route to *ataraxia* was through maximizing pleasure and minimizing pain through cultivating a life of voluntary simplicity. He saw this as the most natural human desire. He viewed desires as being comprised in three different ways: natural/necessary, natural/unnecessary, and unnatural/unnecessary, and humans 'ought' to do what is natural and necessary. Desires that are unnatural or unnecessary detract from a life of simplicity and by pursuing these types of desires, an individual in unable to reach *ataraxia*.

Epicurus saw two major sources of disturbance. The first was anxiety over the fear of death. The second was fear of the gods and goddesses interfering in one's life. Borrowing from the atomism of Democritus, Epicurus claimed that the universe is entirely material and therefore fear of a painful afterlife (because such an afterlife did not exist) and/or fear of godly interferences should not cause disturbance. Happiness as *ataraxia* could then be found as a life of simple pleasures and avoidance of pains associated with striving for material wealth, status, or power (Hibler, 1984).

The Stoics

The Stoics believed that the universe was driven by natural laws, and that humans ought to be living according to those laws. The Stoics sought to live lives of virtue. For them, virtue was the only thing worth choosing, and tranquility was an outcome of virtuous living.

The Stoics saw emotions as the key source of disturbance and as having two movements. The first movement was a natural (hard-wired) reaction to an event. The

second movement was the response to the original innate or natural reaction. For example, jumping at the sight of a spider is a first movement. Experiencing fear of the spider because we have come to believe that spiders are creepy is a second movement. The Stoics recognize the first movement as natural, but fault the second movement because this response is based on culturally-learned passions. The second movement is controllable, and the Stoics control it by extirpating the passions through reason. Such an extirpation of desire by controlling beliefs through the use of reason led to states of tranquility (Hadas, 1961).

The Skeptics

The Skeptics route to a soul free from disturbance was to hold all beliefs in suspension. Holding a belief is to make a commitment, and this can cause anxiety when someone casts doubt on the belief. The Skeptics proposed that one should adopt an attitude of indifference to avoid anxieties, and not make judgments

Summary of the Classical View of Tranquility

The word "tranquility" is translated from the Latin *tranquillitas,* which derives from the Greek words *euesto* and *ataraxia.* To be tranquil, according the classical definition, one must be free from desires. Although different Hellenistic philosophical schools proposed different routes to tranquility the root idea of freedom from desire was common among them. Implications of Hellenistic thinking for restorative environments is that some landscapes may foster states where desires are held to a minimum and

measurement of tranquility in response to landscapes should incorporate some degree of freedom from desire as the root of the construct.

Contemporary Views of Tranquility

Although not directly studied, tranquility has been a variable in several studies in the psychology literature. It has been included in an extensive line of research used to "map" affect-laden terms in semantic space, and researchers have debated whether it is a mood or an emotion. In the relaxation field, tranquility is one of many desirable states to achieve. In the nursing and health sciences fields, "serenity" helps patients achieve health-related objectives.

Structure of Affect

Contemporary research that uses tranquility as a construct is nested in work characterized by attempts to "map" affect laden terms in semantic space. There are various dimensions and structures. Russell (1980) has interpreted affective space as a pleasure-activation model. The model is a circumplex with two bipolar axes he calls pleasure-displeasure and activation. Pleasure-displeasure is a dimension of experience that refers to hedonic tone whereas activation is a dimension of experience that refers to a sense of mobilization of energy. Larsen and Diener (1992) are similar to Russell by mapping semantic space through eight combinations of pleasantness and activation. Watson, Clark, and Tellegen (1985) defined affective structure in terms of two dimensions of valence, positive and negative affect. Both of these dimensions range along a continuum from low to high. Thayer's (1989) structure of tense and energetic

activation appears to describe the same space as Watson et al., just differently labeled and conceptualized.

Although a consensus has not been reached among the differences and, most notably, the similarities of these structures, what can be gained is a view of the overarching pattern of how emotion-state terms fall out into semantic space. For Russell, the terms calm, relaxed, satisfied, at ease, content, and serene all fall into the pleasure and low degree of arousal quadrant of his model. For Watson et al., the terms content, happy, kindly, pleased, satisfied, warmhearted, at rest, calm, placid, relaxed, quiescent, quiet and still appeared in the pleasantness/low negative affect/disengagement quadrant of their model

The terms calm, relaxed, satisfied, and content appear in the same semantic space in each of these studies. The semantic space appears to be one of pleasantness/low negative affect and disengagement/low degree of arousal. In a follow up study done by Russell, Ward, and Pratt (1981) they found the term tranquil to load on the same factor as peaceful, calm, placid, pleasant, relaxing, serene, restful, and content.

In *The Power of Full Engagement*, Loehr and Schwartz (2003) propose that managing energy, not time, is the key to enduring high performance as well as to health, happiness, and life balance. For Loehr and Schwartz, physical energy capacity is measured in terms of quantity (low to high) and emotional capacity in quality (negative to positive). Their structure of the dynamics of energy is similar to that of Russell, in that the quadrants are high energy/pleasant, low energy/pleasant, low energy/unpleasant, high energy/unpleasant. Also similar to Russell and Watson et al., are the terms Loehr and

Schwarz have associated with the low energy/pleasant quadrant, which are relaxed, mellow, peaceful, tranquil, and serene.

These studies have consistently placed tranquility in the quadrant of low activation and pleasantness. It seems clear that tranquility is an affective state. However, whether it is best to construct it as an emotion or a mood is an open question. Russell defined his terms as emotional states in his research into the semantic representation of affect, whereas Watson et al., were working toward a consensual structure of mood.

Ellsworth and Smith (1988) investigated the differentiation of pleasant emotional experiences and found that there was evidence of considerable differentiation among six pleasantly toned emotions: interest, hope/confidence, challenge, tranquility, playfulness, and love. Further, it was found that tranquility was associated with a very low level of effort and a sense of certainty about the situation. This finding coincides with Russell's circumplex model of affect.

Relaxation

Research on relaxation informs thinking about tranquility as a positively toned yet low activation form of affect. Among the more important theoretical approaches in this area is Smith's (1999) ABC Relaxation Theory. ABC Relaxation Theory defines relaxation as the act of sustaining passive simple focus. Although this is not easy to achieve, once achieved it can set in motion a cycle of healing and growth, the cycle of renewal. The three phases of the cycle of renewal are (1) withdrawal, (2) recovery from fatigue, effort, and tension as well as release from the constraints and burdens of adult, analytic, verbal thinking and ordinary everyday expectations; and (3) opening up to the

world, renewed and refreshed (Smith, 2001). Within each phase are specific conscious experiences that Smith has termed R-States, and these states can be organized along five levels or centering: (1) stress relief, (2) pleasure and joy, (3) selflessness, (4) spirituality, and (5) transcendence. Each level is characterized by increased sustained passive simple focus.

The R-States disengagement, at ease/ peace, mental quiet, and positive detachment (childlike innocence) appear to have some similar attributes with tranquility. In the withdrawal phase at the level 1, stress relief, "disengagement from and decreased awareness" of the world occurs. The Epicureans, in their route to *ataraxia*, disengaged themselves from society as society they believed was sick. In level 2, pleasure and joy, one enjoys feeling "at ease" and "peace" after recovery and release from tension and conflict. To be tranquil, one has to get rid of, or release desires, tension, and conflict. In level 3, selflessness, the R-States "mental quiet" and "positive detachment," which seem to be the most similar to tranquility, reflect reduced self-referent, analytic, and goal-directed thinking. Mental quiet involved withdrawing from the world into inner silence and quiet, whereas positive detachment involves a release from self-referent concerns and burdens. Each of these four R-States bears significant similarities to the classical conception of tranquility. The overarching theme of these R-States is that they all seem to be some derivative of letting go – which is the cornerstone of tranquility, the ability to be free from disturbance.

Serenity

In the nursing field there has been a lot of research on serenity, as patients are often facing harsh circumstances. Roberts and Aspy (1993) define serenity as a spiritual experience of inner peace that is independent of external events, and developed a serenity scale to evaluate the serenity status of patients. They have identified 10 critical attributes, several of which appear to have some similarities with tranquility.

The attribute of serenity which is most reflective of tranquility is the ability to detach from excessive desires and emotions. This idea of detachment is the cornerstone of *ataraxia* as the Hellenistics saw desires and emotions as causing disturbance of the soul. Another attribute of serenity is the ability to accept situations that cannot be changed. This is another very Hellenistic idea as they were the philosophers who privatized happiness because they realized that they could not change external situations and thus made it dependent on their own individual actions. The final attribute of serenity is having a sense of perspective of the importance of one's self and life events. A serene person views life from a long-range perspective and because of this perspective, moderation rather than excess tends to mark their approach to lifestyle, material goods, diet, and exercise. This attribute is very similar to the teachings of the Hellenistic philosopher Epicurus who emphasized the importance of moderation in our actions.

Fascination

Attention Restoration Theory (Kaplan & Talbot, 1983) proposes that fascination is the central component of a restorative experience, and it is what individuals experience when attention is effortless. Fascination is important to the restorative experience because

it allows people to function without having to call on their capacity for voluntary or effortful attention, therefore allowing it to rest.

There are many sources of fascination. Fascination may come in the form of process, such as the classic example of gambling. It may also come in content, such as interesting rocks, bugs, and other objects. Fascination can also be viewed as existing on a "hard-soft" dimension, which refers to the depth of engagement, and studies have shown (Herzog et al., 1997) that the level of fascination affects the type of restorative experience.

Hard Fascination

Hard fascination totally engages or "fills up" the mind and while it involves involuntary attention, it may not lead to the sense of calm or peace often thought of as attributes of tranquility. Instead, hard fascination is very intense, rivets one's attention and leaves little room for reflective thinking. Examples of hard fascination include watching auto racing (Kaplan, 1995), bowling, going to a nightclub or a crowded public swimming pool, playing basketball, tennis, or volleyball, an outdoor music court, parade, carnival, etc. (Herzog et al., 1997). These examples all are exciting and effortlessly capture an individual's attention, but do not leave one feeling calm or rested.

Nature is well-endowed with hard fascination, and "sublime" environments may be an example of hard fascination. The concept of sublime has been used in several different ways since its introduction in the first century. The classical Greek idea of sublime was more of a rhetorical style, it functioned first to awaken the audience and second, to persuade. The English translation of Greek writings on sublime, however,

interpreted it as a psychological response, the fine feelings of pleasure which required cultivation for full enjoyment. Recently, the idea of sublime has been transformed from a psychological experience into an object: landscape type. Sublime landscapes elicit psychological responses of awe, wonder, and fear and these environments may be too stimulating to allow rest and reflection.

Edmund Burke (1998/1757) discusses the physical attributes of sublime. For him, the psychological response of the sublime is one of astonishment. Astonishment is that state of the soul, in which all its motions are suspended, with some degree of awe. Vastness, infinity, succession and uniformity of parts, magnitude, difficulty, magnificence, and darkness in light and color are indicators of that which is sublime.

Soft Fascination

Soft fascination, while engaging involuntary attention, does not "fill up" the mind. Instead, it leaves "cognitive space" for gentle contemplation and reflection. Settings containing soft fascinating are thought to be more likely to facilitate experiences of tranquility, a level of cognitive restoration with opportunities for creativity, contemplation, and reflection on one's goals and priorities.

S. Kaplan (1995) sees soft fascination as providing opportunities for reflection, which can further enhance the benefits of recovering from directed attention fatigue. Natural qualities containing soft fascination include clouds, sunsets, snow patterns, and the motion of the leaves in the breeze. These readily hold the attention, but in an undramatic way. Attending to these patterns is effortless, and they leave ample opportunity for thinking about other things.

Building on S. Kaplan's idea of soft fascination, Herzog (1997) views it as having two components. First, its intensity is moderate, sufficient to hold attention effortlessly but not so intense as to preclude reflection. Second, settings that evoke soft fascination are aesthetically pleasing, which helps offset the pain that may accompany reflection on serious matters.

Settings containing soft fascination might be similar to pastoral landscapes. In classical Greek writings, one purpose of the pastoral ideal was to juxtapose it against the harshness of urban life and to offer it as an escape. The attitude toward a pastoral environment as a haven continued into Roman society and the Renaissance and many paintings and decorations during these times were of farmlands, vineyards, rivers, gardens, seashores, fountains, and other natural landscapes. However, contrary to the old world use of pastoral to represent as escape from reality to a simple life in the country, American pastoralism has come to represent equal opportunity and a future-oriented vision of unlimited possibilities.

Pastoralism is easily contrasted with sublime environments. Sublime environments are vast, with rugged and broken surfaces. A pastoral scene is smooth and polished. Sublime environments are dark and gloomy. Pastoral environments are cheerful and bright.

Fascination as Engagement

The psychological responses elicited by fascinating landscapes require attention, and in educational and cognitive psychology this state of emotional involvement can be described as engagement (Reeve, 2002). The engagement construct is complex and has at

least three components: (1) the behavior (actual time spent on a task), (2) the emotion component (i.e., the interest, curiosity and enjoyment level a person has) and (3) an orientation component (the perceptions or beliefs about opportunities that we experience).

The opposite of engagement is disaffection, and all people have moments of both engagement and disaffection. "Instances of engaging behavior would include effort and attention while disaffection would correspond with passivity and inattention. Interest and happiness would be sources of emotional engagement – anxiety and anger would be instances of disaffected emotion" (Wellbourne, 1992, p.36). Engagement can serve as an indicator of fascination.

Extent

Although fascination is the mechanism that allows the transition from directed to indirected attention, Extent plays a central role in the restorative experience as well. Extent is the degree to which a setting makes sense and is complex enough to engage the mind; it is present when the setting "hangs together," or is coherent, combined with depth and scope. Extent is important because it is the mechanism that allows for fascination to continue, versus being a momentary engagement. Unrelated bits of information, despite how fascinating they may be, will not hold an individual's attention for an extended period of time. Therefore, fascinating environments must facilitate extent in order to hold one's attention long enough to be restored.

However, extent in a setting is not limited to the physical environment, and instead exists on varying levels of concreteness. The perceptual level of extent includes

what we see and experience in the immediate future, the depth of a scene. The perceptual also refers to the patterns present, which enable greater predictability. The more conceptual level is commonly referred to as 'another world' and is "a place far removed from the pressures and problems of the day" (R. Kaplan, 1984, p.193).

The effect of fascination on tranquility may be dependent on extent. Fascinating environments will not sustain one's effortless attention if they are not part of a larger whole. Further, if something is fascinating but is contradictory to one's personal beliefs and what one holds as true, it will require effort to reconcile the difference. These examples of a lack of extent type of fascination at both the perceptual and conceptual level will do little to promote restoration, and will perhaps create even greater fatigue. In order to promote restoration, fascination must contain sufficient extent to sustain involuntary attention.

S. Kaplan and Talbot (1983) have theorized that it is the addition of extent to fascination that enables one to attain a tranquil disposition. Their Outdoor Challenge data results show that the three categories of benefits of being in a wilderness environment appear in succession. The first benefit, appearing around Day 3 and 4, is that participants are fascinated by the environments thus exhibit "less employment of effortful (i.e., voluntary) attention" (p. 192). The benefits appearing on Day five are those of noticeably deeper level:

> There is an increase in self-confidence and a sense of tranquility. Not only is there fascination, there is coherence as well. Things are starting to fit together at many levels. There is little external distraction and, correspondingly, little internal "noise." The self-confidence that now appears suggests that fears and uncertainties are not simply eliminated, but that they have been replaced by a sense that one can understand and deal with whatever challenges the environment offers. The accompanying tranquility not only constitutes a highly positive experience, it also acts as a significant landmark, for some a totally new

> experience. Participants give the impression of having discovered something of great importance that they hope will have a place in whatever they do after their trip is completed. (p.193)

By Day 7, the concern for priorities has deepened and there is a strong inclination toward contemplation. The progression of benefits parallels the thesis of R. Kaplan's (1984) essay, titled Impact of Urban Nature: A Theoretical Analysis. R. Kaplan proposes that when fascination and coherence occur together, restorative experiences are more likely. For her, a restorative situation must be engrossing and absorbing.

The fragment, "…fears and uncertainties are not simply eliminated, but that they have been replaced by a sense that one can understand and deal with whatever challenges the environment offers" (p. 193) is similar in meaning to the Hellenistic view of *ataraxia*. In this context, the worries stemmed from being in a wilderness environment versus the chaotic political environment of classical Greece, but regardless of the environment, a disposition of understanding is reached in order to deal with the fears and uncertainties.

Conclusion

The purpose of this study is to examine the relation between fascination, extent, and tranquility. The literature has suggested that tranquil experiences can be construed as a kind of restoration. Two landscape properties that should facilitate the experience of tranquility are fascination and extent.

Soft fascination may be most effective in facilitating experiences of tranquility. Soft fascination can be seen in pastoral landscapes. It is these types of quiet and peaceful natural settings that attract and hold an individual's attention without any effort.

Hard fascination may be too stimulating to play a role in tranquility. Hard fascination can be seen in sublime landscapes, which elicit feelings of fear, awe and wonder, and although they attract and hold an individual's attention, they may be too engaging to allow fatigued attention to rest.

Fascination's effect on tranquility may be is dependent on extent, which is the extent that a setting makes sense and is complex enough to engage the mind. What is fascinating does not necessarily contain extent, and unrelated or momentary stimuli will not keep attention effortlessly engaged.

The goal of tranquility is to allow individuals to be free from disturbances and to be able to reflect on one's goals and priorities in life. The level of fascination may vary in a restorative environment and what is fascinating may or may not contain extent. Therefore, the purpose of this study is to examine the effect of fascination and extent on judgments of tranquility associated with scenes of natural landscapes.

Hypotheses

The above literature review can warrant a number of hypotheses depending on the kind of scenes to be rated. Hard fascination scenes should yield a different set of hypotheses than soft fascination scenes. The scenes to be rated in this study are all of unthreatening, static, natural landscapes. There are no threatening water features, immediately dangerous cliffs, blizzards, lightening bolts, or dangerous predators. Although some of the high alpine scenes could be described as sublime, they still seem to allow cognitive space for reflection. As such, they may be dramatic, but most likely do not constitute hard fascination scenes. They reflect dramatic soft fascination scenes.

Other scenes are clearly pastoral and intuitively reflect soft fascination scenes. As such, the hypotheses for this study reflect this delimitation.

Regarding the role of fascination and extent on tranquility, the literature does not clearly favor either interaction or main effect hypotheses, at least not so in the context of soft fascination natural landscapes. It seems reasonable that the effect of fascination on tranquility could be dependent on levels of extent in the scene. Highly fascinating scenes could have their effect enhanced by high degrees of extent and have their effect mitigated by low extent scenes. As such, the first hypothesis for this study is an interaction hypothesis.

H1: There will be a significant interaction among fascination and extent on their effect of judgments of tranquility. The effect of fascination on tranquility will depend on the level of extent in a scene.

Should a nonsignificant interaction be found, main effect hypotheses will be tested. Significant main effects would imply that the effects of fascination and extent on tranquility are independent and additive.

H2: As judgments of fascination increase, judgments of tranquility will increase.

H3: As judgments of extent increase, judgments of tranquility will increase.

CHAPTER III

METHODS

The purpose of this study was to examine the effect of fascination and extent on judgments of tranquility elicited by natural landscape scenes. This chapter will describe the methods used to address the research hypotheses. Sections in this chapter provide methodological details including selection of the panel of judges who rated photographs for tranquility, fascination, and extent; measurement of tranquility, fascination, and extent; procedures for data collection and data analysis; and a description of the pilot work that led up to data collection.

Panel of Judges

University students were used as the judges in this study. Students are frequently used as judges in visual management research. Although samples are frequently non-random, seldom are inferences made from samples to populations. Rather, study results are generalized to relations among constructs. In the context of restorative environments research student panels are convenient, yet relevant. Student panels draw much of their relevance because student populations are especially prone to high levels of attentional fatigue. For this study, judges were students taking classes in the Department of Parks, Recreation, and Tourism at the University of Utah.

Photo Set

Photos for this study were obtained from an online photo collection subscription through www.shutterstock.com. The researcher chose the photos to ensure varying levels of fascination and extent. Attributes of fascination and extent derived from the landscape assessment literature such as vast, rugged, dark, gloomy, smooth, polished, bright, and cheerful, were specifically incorporated into the photos. The decision rules for initial photo selection were as follows:

1. Is this place fascinating?
2. Can I form a mental map of this place?
3. Is my interest captured?
4. Do I feel calm here?

From an original set of 134 photos, 18 were selected by a panel of four judges. Three of the judges were familiar with the restorative environments literature, and one judge was unfamiliar with restorative environments literature. A Q-sort method was used to determine the selection of photos.

To do this, approximately 35-8" x 11 ½" photos were spread out on a table. Each judge would then take his or her turn sorting the photos (judges did not sort the photos together, but did so singly) in a six-round selection process. First, each judge was asked to select from among the photos the scene that was, to him or her, the most tranquil. That selection was coded on the back of the photo. The second selection involved finding the scene that, to him or her, was the least tranquil. The third selection involved identifying the next three most tranquil scenes. The fourth involved identifying the next three least tranquil scenes. The fifth selection involved identifying the next five most tranquil

scenes. The final sorting involved identifying the five next least tranquil scenes. Composite scores across the judges enabled photos to be ordered into a normal distribution of scenes ranging from most to least tranquil among the photo set and ensured a range of tranquility scores upon subsequent scaling. A total of 18-photos were selected for pilot study by using the ends of the distribution created by the Q-sort.

Pilot Study

Prior to data collection, a pilot test was conducted as a dry run for the study's procedures. A total of 41 people participated in the pilot test. All were students in the Department of Parks, Recreation, and Tourism at the University of Utah. Frequencies and other descriptive statistics were examined for information that might suggest modifications to the study's design and or measurement. On this basis no changes were made to the study's overall design. However, changes were made to the photo set and measurement tool.

The pilot-participants viewed 18-photos and responded to a 19 item questionnaire for each photo (for a total of 342 responses). After administering the pilot study it became apparent that the raters would begin to experience fatigue after about 15 minutes, or around photo 12. To reduce the set of photos to a more manageable number, 6-photos were dropped for a final set of 12 photos to be used in the actual study.

In addition, some of the items' wording caused confusion among participants. The extent-item "The elements here constitute a larger whole" was reworded to "The landscape elements here hang together to make up a larger whole." Ultimately, this item was dropped from the final analysis because it depressed Cronbach's alpha reliability

coefficient. The fascination-item “I feel absorbed here” was reworded to “My attention is completely absorbed here.” The fascination-item “I feel fully immersed here” was dropped because there were 8 items representing fascination, and it was too abstract and participants had difficulty understanding what the item was asking.

Finally, to further reduce fatigue, the item order for the actual study was changed by grouping similar items by triplets. Thus, the final questionnaire contained 18-items in the following order: 3 fascination, 3 tranquility, 3 extent, 4 fascination, 3 tranquility, and 2 extent to be rated on 12 photos (for a total of 216 responses per judge).

Measurement

Participants responded to each of 12 photographs of natural landscapes. The photographs had varying levels of tranquility, fascination, and extent. Participants assessed each photograph for tranquility, fascination, and extent using each of the indexes described below. All items were placed on a 7-point Likert type scale with the following response categories: 1 = extremely disagree, 2 = somewhat disagree, 3 = slightly disagree, 4 = neutral, 5 = slightly agree, 6 = somewhat agree and 7 = extremely agree. Participants were asked to circle the number that most closely represented the experience they had when viewing the photo.

Tranquility Index

Tranquility was operationalized by having participants respond to 6-items designed to measure tranquility as an affective state, free from disturbance. The items were as follows:

1. I feel calm here.
2. I feel relaxed here.
3. I feel restful here.
4. I feel peaceful here.
5. I feel serene here.
6. I feel at ease here.

The items used to represent tranquility were derived from several sources. Russell (1980, 1981) in mapping affective states found all six terms to fall in the pleasant-low activation quadrant of his circumplex model of affect. In the Physical Activity Affect scale designed by Lox et al., (2000) the terms calm, relaxed, and peaceful loaded on a factor they defined as tranquility.

For the tranquility index, Cronbach's alpha scores ranged from 0.936 to 0.979 across the 12 photos (Table 1).

Table 1

Cronbach's Alpha Coefficients of Tranquility Index Within Each Photo

Photo	Cronbach's Alpha
Photo 1	.936
Photo 2	.968
Photo 3	.957
Photo 4	.970
Photo 5	.978
Photo 6	.960
Photo 7	.954
Photo 8	.965
Photo 9	.962
Photo 10	.963
Photo 11	.979
Photo 12	.974

Fascination Index and Reliability

Fascination was operationalized by having participants respond to 6-items designed to measure fascination as a level of engagement. In the educational and cognitive psychology literatures, engagement is constructed as a state of emotional involvement requiring effort and attention (Reeve, 2002). This is very similar to the idea of fascination. There have been several scales designed to measure fascination and engagement. The following items derive from these several sources:

1. I feel very focused here.
2. My curiosity has been aroused here.
3. I feel very involved here.
4. My interest has been captured here.
5. My attention is completely absorbed here.
6. My attention is deeply engaged here.

Items 1, 2, and 3 are modified items taken from an engagement scale (Douglas, 2007). Item 4 was created by the researcher. Items 5 and 6 were taken from the PRS (Hartig, 1996, 1997).

For the fascination index, Cronbach's alphas ranged from between 0.905 to 0.952 across the 12 photos (Table 2).

Extent Index and Reliability

Extent was operationalized by having participants respond to 4-items designed to measure extent as the connectedness among landscape elements within a scene. The items were as follows:

Table 2

Cronbach's Alpha Coefficients of Fascination Index Within Each Photo

Photo	Cronbach's Alpha
Photo 1	.915
Photo 2	.944
Photo 3	.905
Photo 4	.947
Photo 5	.952
Photo 6	.943
Photo 7	.933
Photo 8	.919
Photo 9	.918
Photo 10	.949
Photo 11	.932
Photo 12	.920

1. It would be easy to find my way around here.
2. For me, it is easy to see how things are organized here.
3. This place has landmarks that would help me get around.
4. I could easily form a mental map of this place.

Each of these four items was taken from the PRS (Hartig, 1996, 1997).

For the Extent Index, Cronbach's alpha scores ranged from 0.782 to 0.927 across the 12 photos (Table 3).

Procedures

On the day of the study the researcher arrived at the start of class and was introduced by the instructor. The researcher then distributed to each student (1) a questionnaire cover letter, (2) 12 copies of the 18 item questionnaire, and (3) a 5" x 7" booklet containing color copies of the 12 photos. Students were then asked to read the questionnaire cover letter that explained the following: (1) the purpose of the study, (2)

Table 3

Cronbach's Alpha Coefficients of Extent Index within Each Photo

Photo	Cronbach's Alpha
Photo 1	.782
Photo 2	.861
Photo 3	.915
Photo 4	.872
Photo 5	.877
Photo 6	.923
Photo 7	.801
Photo 8	.914
Photo 9	.906
Photo 10	.908
Photo 11	.874
Photo 12	.927

why this study is investigating restorative environments, (3) how confidentiality is protected, (4) what a student does if they would not like to answer a certain question, (5) how long it will take to fill out the questionnaire, and (6) information on how to contact the researcher with any questions they may have. The researcher also read the above aloud and concluded by asking if anyone had any questions about the study. The 12 photos the participants responded to varied in levels of tranquility, fascination, and extent. The questionnaire contained tranquility, engagement (fascination), and extent items. Photo order was counterbalanced across rating sessions to control for order effects.

Data Analysis

Data were entered into SPSS and cleaned. Because the design was a repeated measures design with a high likelihood of a substantial intraclass correlation, hierarchal linear modeling using HLM, 6.0 (Raudenbusch, Byrk, Cheong, Congdon, and du Toit, 2004) was used to test the study's hypothesis. Observations represented level 1 variables

and person characteristics represented level 2. HLM 6.0 does not allow for missing values in the data matrix. For this study mean substitutions were made for missing values.

CHAPTER IV

RESULTS

This study examined the effects of fascination and extent on judgments of the degree of tranquility present in a set of natural landscape scenes. This chapter provides results of the data analysis which includes a summary of the descriptive statistics, a description of the panel of judges, and results of hypothesis tests.

Characteristics of the Sample

Of the research participants 35.4%, were female and 64.5% were male. The average age was 25, with a range from 19 to 45 years of age. The typical student was a junior in class-standing. All of the participants were students in the Department of Parks, Recreation, and Tourism at the University of Utah.

Descriptive Statistics

Central tendency statistics suggest that most scenes were rated as moderately high in tranquility, fascination, and extent. Judges tended to use the upper mid-range of the scales and did not avail themselves to the extremes. The range of mean scores for tranquility was 3.629 to 5.507 (Table 4). The range of mean scores for fascination was 4.171 to 5.532 (Table 5). The range of mean scores for extent was 3.029 to 5.198 (Table

Table 4

Tranquility Descriptive Statistics

Photo	Mean	SD	Skewness	Kurtosis
8	5.507	1.09	-0.614	0.049
7	5.425	1.166	-0.526	-0.283
3	5.368	1.11	-1.42	3.216
1	5.331	1.028	-0.287	0.121
4	5.263	1.222	-0.819	1.299
11	5.198	1.289	-0.581	-0.238
9	4.741	1.215	-0.552	0.148
6	4.575	1.523	-0.642	-0.131
5	4.569	1.564	-0.249	-0.579
2	4.263	1.623	-0.128	-0.853
12	3.965	1.585	0.035	-0.835
10	3.629	1.455	0.279	-0.104

Table 5

Fascination Descriptive Statistics

Photo	Mean	SD	Skewness	Kurtosis
3	5.532	0.947	-0.654	0.619
6	5.39	1.303	-1.241	1.635
8	5.313	1.014	-0.359	-0.03
2	5.072	1.319	-0.398	-0.438
12	4.915	1.271	-0.484	-0.252
7	4.82	1.245	-0.19	-0.512
10	4.639	1.452	-0.111	-0.909
11	4.583	1.202	-0.026	-0.453
4	4.465	1.319	-0.055	-0.149
1	4.355	1.182	0.189	0.04
9	4.338	1.188	0.138	0.104
5	4.171	1.385	0.072	-0.304

Table 6

Extent Descriptive Statistics

Photo	Mean	SD	Skewness	Kurtosis
3	5.198	1.28579	-.967	1.867
8	5.043	1.303	-.666	.190
1	4.891	1.014	-.385	-.151
6	4.738	1.319	-.648	-.170
4	4.727	1.271	-.425	-.049
2	4.697	1.245	-.218	-.738
11	4.353	1.452	-.077	.097
5	4.312	1.202	-.063	-.442
10	4.141	1.319	.219	-.434
9	3.880	1.182	.031	-.174
7	3.653	1.188	-.075	-.442
12	3.029	1.385	.688	-.170

6). Skewness and kertosis statistics indicate fairly normal distributions across the photos within the range of scores. Photos 8 and 3 were consistently rated with the highest scores across all three targeted variables. Each was a far-view scene from mountain peaks. Lowest rated photos were less consistent in landscape character but could be described as of more near-view and less rugged terrain than were the more highly rated scenes.

Hypothesis Tests

Hypothesis tests were conducted using HLM 6.0, a multilevel modeling program. HLM uses maximum likelihood regression procedures and models variables at multiple levels. In this study, level 1 variables were taken at the observation (judgments on each item on each photo). Level 2 variables represented person effects such as the respondent's age or year in school. When conducting hypothesis tests using multilevel modeling procedures, a null model containing only the intercept term and no variables is run. This model provides initial variance components for calculating the intra-class correlation coefficient and subsequent R^2_{PRE} statistics. The intraclass correlation coefficient is a measure of nonindependence of observations. Large intraclass correlations substantially bias parameter estimates upward and can result in type I errors. HLM makes adjustments for such bias and gives more accurate regression results. The R^2_{PRE} is an indicator of effect size. The variance components, intraclass correlation, and Model Chi-Square statistic for the null model are presented in (Table 7). The large and significant chi-square statistic indicates that the null model is not an adequate fit to the data and further variables need to be added. The large intraclass correlation (ICC = 0.24) indicates substantial nonindependence of observation and in the case of this study, a large person effect.

Table 7

Variance Components for Null Model

Random Effect Level		SD	Variance Component	Df	Chi-square	p-value
Intercept 1	u_o	0.71612	0.51283	66	316.20759	<0.001
Level-1	R	1.27409	1.62330			

Intra-class correlation = .24

The first non-null, level 1 model in this study was a direct test of the study's hypotheses. This model examined the effect of fascination, extent, and the fascination by extent interaction on tranquility. The interaction vector was created by first centering the fascination and extent scores and multiplying the centered product vectors. Results are summarized in Tables 8 and 9. Table 8 present the variance components and overall model fit. The large and significant chi square indicates substantial error variance remains and the model could be improved with the addition of new variables. Table 9 shows that both fascination and extent have a positive effect on tranquility scores. The interaction term was not significant. Thus, hypotheses 2 and 3 were supported, whereas hypothesis 1 was not. The effects of fascination and extent on tranquility seem to be independent.

A second, and perhaps more stringent test of the study's hypotheses, is presented in the second non-null, level 1 model. In this model the effects of fascination and extent on tranquility are tested over and above the characteristics of the individual photos. Thus, in this model fascination and extent scores must account for variance in tranquility scores beyond that accounted for by the individual photos. Results, summarized in Tables 10 and 11, show that both fascination and extent were positively associated with tranquility.

Coefficients for the eleven photos in Table 9 indicate whether or not that individual photo was judged as more tranquil than a reference photo, photo 12. Positive signs on significant coefficients indicate that the photo was judged as being more tranquil than the reference photo. Negative signs on significant coefficients indicate that the photo was judged as being less tranquil than the reference photo.

A summary of effect sizes is presented in Table 12. The presence of fascination and extent alone account for over one-third (37.08%) of the variance in tranquility scores. The addition of individual photo variance raises the amount of explained variance to 51.55%.

Two level 2 variables, age and year in school represented person-level effects. These were nonsignificant and dropped from the final model.

Table 8

Variance Components for Level 1 Model (fascination, extent, and fascination by extent interaction)

Random Effect Level		SD	Variance Component	Df	Chi-square	p-value
Intercept 1	u_o	0.48895	0.23907	66	236.18578	<0.001
Level-1	R	1.05120	1.10502			

Table 9

Parameter Estimates for Level 1 Model (fascination, extent, and fascination by extent interaction)

Fixed Effect	Coefficient	SE	t	df	p-value
For intercept, λ_{00}					
Intcpt $_{00}$	4.820	0.070	68.558	66	<0.001*
For Fascination, λ_1					
Intcpt $_{10}$	0.332	0.374	8.883	800	<0.001*
For extent, λ_2					
Intcpt $_{20}$	0.396	0.033	12.137	800	<0.001*
For facination by extent interaction, λ_3					
Intcpt $_{30}$	-0.016	0.019	-0.852	800	0.395

*significant at p< = 0.001

Table 10

Variance Components for Level 1 Model + Photos

Random Effect Level		SD	Variance Component	Df	Chi-square	p-value
Intercept 1	u_o	0.50694	0.25698	66	326.17822	<0.001
Level-1	R	0.88203	0.77798			

Table 11

Parameter Estimates for Level 1 Model + Photos

Fixed Effect	Coefficient	SE	T	df	p-value
For intercept, λ_{00}					
Intcpt $_{00}$	4.820	0.069	69.548	66	<0.001*
Intcpt $_{01}$ (photo 1)	0.941	0.168	5.592	789	<0.001*
Intcpt $_{02}$ (photo 2)	-0.361	0.161	-2.241	789	0.025
Intcpt $_{03}$ (photo 3)	0.370	0.166	2.235	789	0.026
Intcpt $_{04}$ (photo 4)	0.885	0.165	5.353	789	<0.001*
Intcpt $_{05}$ (photo 5)	0.461	0.163	2.821	789	0.005
Intcpt $_{06}$ (photo 6)	-0.200	0.161	-1.246	789	0.213
Intcpt $_{07}$ (photo 7)	1.278	0.154	8.298	789	<0.001*
Intcpt $_{09}$ (photo 8)	0.657	0.164	4.004	789	<0.001*
Intcpt $_{10}$ (photo 9)	0.716	0.158	4.523	789	<0.001*
Intcpt $_{11}$ (photo 10)	-0.616	0.158	-3.890	789	<0.001*
Intcpt $_{12}$ (photo 11)	0.903	0.160	5.636	789	<0.001*
For fascination, λ_1					
Intcpt $_{10}$	0.423	0.035	11.976	789	<0.001*
For extent, λ_2					
Intcpt $_{20}$	0.355	0.032	11.005	789	<0.001*
For fascination by extent interaction, λ_3					
Intcpt $_{20}$	0.002	0.019	0.117	789	0.907

*significant at p = <0.001

Table 12

Summary Table

	R^2_{PRE}	Δ
Null	0	0
Model	0.3708	0.3708*
Model + Photos	0.5155	0.1447*

*significant at p<0.001

CHAPTER V

DISCUSSION

This chapter provides a discussion of the results of the study. The first section provides a summary of the purpose and results of the study. The second section integrates the results of this study with previous research. The third section addresses the challenges and limitations of the study and the fourth section concludes with suggestions for future research and practice.

Summary of Purpose and Results

The purpose of this study was to examine effects of fascination and extent on judgments of tranquility of natural landscape scenes. This study was situated within the theoretical framework of Attention Restoration Theory (R. Kaplan & S. Kaplan, 1989)

Based on the theoretical underpinnings and review of the literature, one interaction hypothesis was tested which stated that that the effect of fascination on tranquility will depend on the level of extent present in a landscape scene. This hypothesis was not supported. Examination of main effects showed that both fascination and extent were positively associated with tranquility scores. Further, they did so over-and-above the effects of the individual photos. No significant person-level effects were identified.

Integration with Previous Research

The finding that fascination and extent within a landscape scene increases tranquility is consistent with current propositions in the restorative environments literature. Fascination, by shifting one's attention from voluntary to involuntary, is viewed as the key mechanism of a restorative experience (Kaplan, 1995), and to find that it acts independently of extent may be reasonable. Kaplan and Talbot (1983) and R. Kaplan (1984) speculated that the combination of both fascination and extent (along with being away and compatibility) enable a restorative experience. For these authors, extent acts to sustain fascination over time, thus enhancing restorative effect. Such descriptions are open to interpretation and it remains unclear as to whether extent moderates (thus, an interaction term) the effect of fascination or whether the effects act in combination, but independently. Results of this study suggest the latter for nonthreatening, soft-fascination natural landscape scenes.

Tranquility, as a kind of restorative experience, is an affective type of restoration that depends on what R. Kaplan and S. Kaplan might call "cognitive quiet" (1989). To reach a point of cognitive quiet an individual must get rid of cognitive clutter and permit recovery of directed attention that many cognitive functions rely on. When these cognitive faculties are rested an individual may move on to restoring deeper, affective faculties. Fascination plays a role in reducing cognitive clutter by capturing attention. Yet, fascination may often be short lived. To reach a deeper level of restoration, extent plays an important role. Extent may play an important role in sustaining fascination and involuntary attention. For example, in Kaplan and Talbot's (1983) outdoor challenge data it was not until days 5 to 7 that participants wrote about experiences of tranquility. It was

also at this point in the trip that they were making sense of the environment, and realigning their priorities and place in life; or stated another way, experiencing high extent.

Limitations

The panel of judges that rated the photos for this study was comprised of students in the Department of Parks, Recreation, and Toursim at the University of Utah. The panel represents a convenience sample and thus generalizing from the sample to a larger population, even of college students, must be made with caution. Such panels are common in environmental psychology and restorative environments research where the aim is to generalize from study results to relations among constructs and less so in generalizing from samples to populations. For a review of the distinction between such descriptive versus formal approaches see Martin and Sell (1985).

The photo sample selected for this study limited the kinds of hypotheses that could be tested and inferences that can be made to various landscapes. The photo set represented nonthreatening, static, natural landscape scenes. All could be classified as depicting scenes of soft fascination. Soft fascination is a kind of fascination that, while engaging attention, leaves cognitive space for quiet contemplation. Conversely, hard fascination, while engaging attention, is completely riveting and leaves no room left over for quiet contemplation. To the degree that tranquility might be best associated with soft fascination, the finding that as fascination increases, tranquility increases, must be limited to soft fascination scenes.

An additional limitation of the photo set may be indicated by the idiosyncratic effect of the photos themselves on tranquility. In this study the photos themselves accounted for an additional 15% of explained variance in tranquility scores over and above fascination and extent. The photos were chosen to be of nonthreatening, static, natural landscape scenes. They were chosen to capture a range of moods from the pastoral to the sublime. Yet, they contained no features such as water, lightening, snow, or predatory animals. The intent was to provide enough homogeneity within the photo set to eliminate nuisance variance. Despite measures taken to choose pictures without these and other nuisance factors, results showed substantial photo effects. Among factors that may have accounted for such variance may be color tone of the scene, ground texture, and visual penetration. Brown colors are associated with dryness and a threat to survival in the context of psychoevolutionary theories of landscape preference (Ulrich, 1983). Scenes with brown versus green tones could have accounted for some variance in tranquility scores. Ulrich (1983) has also shown that uneven ground textures are associated with preference scores. Again, following from the same psychoevolutionary theories, the surface texture of the ground is a determinant in preference as ground that is uneven and rough does not lend to mobility, whereas a smooth, even texture allows for easy movement. Scenes in the photo set depicted varying levels of ground texture and also may have accounted for some variance in tranquility scores. Finally, Ruddell, Gramann, Rudis, and Westphal (1989) showed that as visual penetration into near-view forest scenes increased, preference scores increased. Visual screening decreases preference for a scene. Much of this may be due to the reduced information gathering capacity that screening causes. Reduced information gathering capacities can be

associated with negative affective states and thus, reduce feelings of tranquility. Some of the variance in tranquility scores captured by the individual photo effects could have been associated with visual screening. In sum, variance among photo content captured a substantial portion of variance in tranquility scores. While this does not pose a threat to inferences that fascination and extent are associated with tranquility, such variance may mask the effect size associated with these variables that might have been found in a more homogenous photo set.

Research Implications

This study was delimited to soft fascination scenes. Kaplan (1995) introduces the idea of soft and hard dimensions of fascination. However, in his paper, as well as a follow up paper by Herzog et al. (1997), hard fascination is described only by urban settings such as watching a car race, bowling, and playing other sports. Although most examples of hard fascination were derived from urban settings, soft fascination is generally described as occurring in ordinary natural settings. In that light, these studies may not have adequately distinguished between hard and soft fascination other than in the well-studied difference between natural and non-natural settings.

This raises an important methodological issue. Can hard fascination be captured in natural settings without bringing into the scene unwanted nuisance factors? How does one know whether one has a hard fascination scene? Future research might be directed toward designing a protocol for generating hard fascination scenes of nature and for validating that those scenes are, in fact, hard fascination. Such validation would need to

show that the scene is fully capturing one's attention and not leaving room for contemplation beyond the scene itself.

Should such methodological issues be overcome, a next line of research might be to examine the effect of hard versus soft fascination on tranquility. It seems reasonable that as fascination increases, tranquility should increase under conditions that allow for quiet contemplation. However, under conditions of hard fascination the opposite effect might occur.

Future research might also be directed toward examining the effect of other variables in the ART paradigm. For example, mountain top scenes may elicit experiences of being away to a greater extent than pastoral scenes. In this study, mountain top scenes exhibited the highest tranquility scores. Future research might explore the role of experiences of being away and tranquility. The degree to which an environment either supports or inhibits one's goals (compatibility) should also be associated with tranquility. It seems intuitive that those environments that frustrate the achieving of one's goals and inclinations should be frustrating, not tranquil. Future research could be directed toward testing these ideas.

Finally, future research might be directed toward exploring other restorative affective experiences under the rubric of ART. ART's original dependent construct was attention restoration. However, the restorative environments literature suggests that there can be many other kinds of restoration that are associated with varying environments. Affect and cognition are not necessarily decoupled. How attentional states and affective states affect each other under the context of ART's elements of being away, fascination,

extent, and compatibility would add greater understanding of the subtleties of how environment affects restorative states.

Implications for Practice

The practical applications of this study can be framed around how to design and choose more tranquil environments for their restorative benefits. Examples might include designing a trail or backyard garden, choosing a place for rest and retreat, or to simply daydream about. This study suggests that such environments should have high levels of soft fascination and yet should also have high levels of extent so that one's attention and thoughts are not distracted by trying to make sense of the landscape. This can be a difficult trade off because too much extent could prove boring, but too much fascination could prove unrestorative.

Japanese Zen gardens are an excellent example of environments that contain a good balance of fascination and extent. Their use of a bridge going over a stream or pond provokes the imagination as the view crests with the highest point of the bridge, leaving the other side a mystery. This is similar to winding paths found throughout Zen gardens. The way a path curves behind a bend, disappearing out of site is extremely fascinating, creating a sense of unknown and a promise of new information. With Zen gardens, what is fascinating is also coherent. Zen gardens are designed around tranquil meditative themes. These themes unite landscape elements into a larger whole. A quiet pool can thematically represent the tranquil meditative state of a calm mind. Winding paths can thematically represent the need for effortless, quiet contemplation that leads to states of a calm mind. Lush green textures complement the sense of ease and slowing down from

life's hectic pace. Thus, extent is accomplished by thematically uniting landscape elements.

In other garden settings following a path as it winds and meanders throughout can be fascinating. Fascination is created by the hidden scenes that may lie ahead and the uncertainty of where one might end up. Such garden meanders, at the same time, can be coherent on several levels. The path provides a basis of bearing in establishing a mental map. It also provides the extent to remain in a fascinated state. Finally, the path, in its most basic definition, helps one find his or her way around.

Incorporating fascination and extent into park and trail design could help users obtain experiences of tranquility. For example, instead of routes designed with the purpose of efficiency, routes could be designed to engage the user throughout the journey and to be restorative through the use of fascination (trees, meadows, water, flowers, mountain peaks) and extent (landscape views, ridgeline trails).

Knowing what landscape elements increase tranquility is beneficial when choosing a place to rest, or any other spot where one will spend much time. For example, when taking a lunch break at work, instead of sitting in a crowed and noisy café (typically an incoherent environment), choosing a spot under a tree, on a park bench, or in a booth gazing out a window into a parklike setting will provide a more restorative experience.

Knowing what settings promote an experience of tranquility is especially beneficial during emotionally turbulent times. Retreating to a setting that is fascinating should distract one from everyday cares. It should also provide attentional focus rather than the unpleasant state of thoughts "running around in one's head." Thematic extent

should help sustain such states of fascination. Sometimes the only way to move past a difficult situation is to be distracted, and that which is fascinating and coherent will provide the needed diversion.

APPENDIX A

QUESTIONNAIRE

Please circle the number that most closesly respresents the experience you have when viewing the photo.

1	2	3	4	5	6	7
Extremely Disagree	Somewhat Disagree	Slightly Disagree	Neutral	Slightly Agree	Somewhat Agree	Extremely Agree

1. May attention is completely absorbed here.
   1 2 3 4 5 6 7

2. My curiosity has been aroused here.
   1 2 3 4 5 6 7

3. My attention is deeply engaged here.
   1 2 3 4 5 6 7

4. I feel relaxed here.
   1 2 3 4 5 6 7

5. I feel at ease here.
   1 2 3 4 5 6 7

6. I feel at peace here.
   1 2 3 4 5 6 7

7. I feel a sense of fascination here.
   1 2 3 4 5 6 7

8. It would be easy to find my way around here.
   1 2 3 4 5 6 7

9. I could easily form a mental map of this place.
   1 2 3 4 5 6 7

10. This place has landmarks that would help me get around.
    1 2 3 4 5 6 7

11. I feel very focused here.
    1 2 3 4 5 6 7

12. I feel very involved here.
    1 2 3 4 5 6 7

13. My interest has been captured here.

1	2	3	4	5	6	7

14. I feel at rest here.

1	2	3	4	5	6	7

15. I feel calm here.

1	2	3	4	5	6	7

16. I feel serene here.

1	2	3	4	5	6	7

17. For me, it is easy to see how things are organized here.

1	2	3	4	5	6	7

18. The landscape elements here hang together to make up a larger whole.

1	2	3	4	5	6	7

APPENDIX B

PHOTO SET

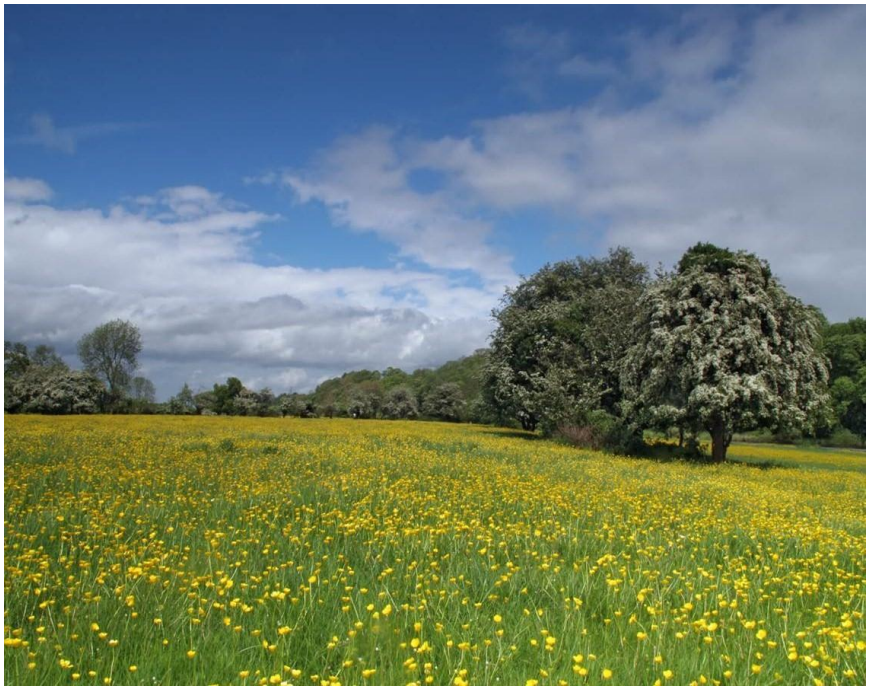

Photo 1

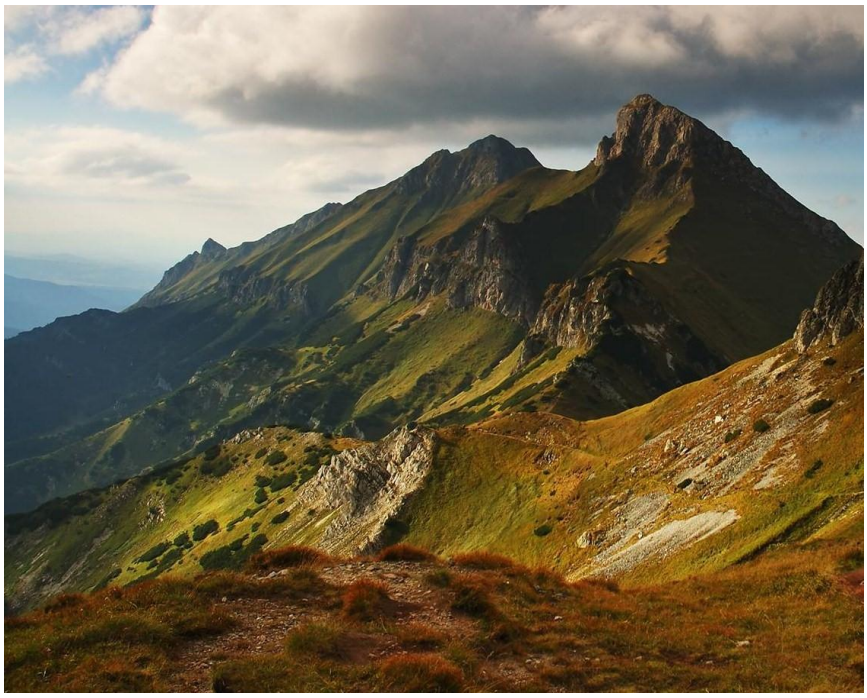

Photo 2

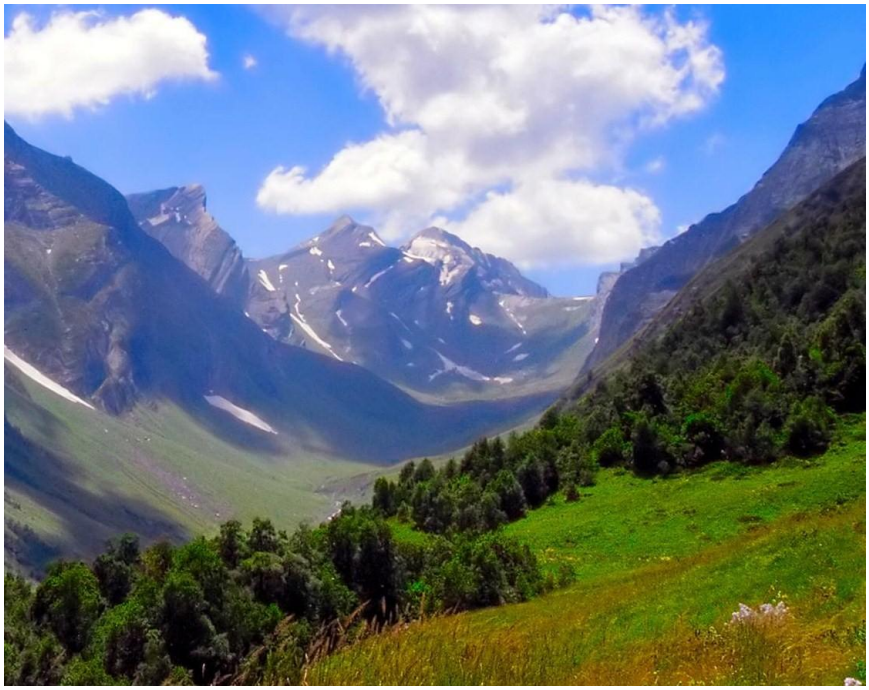

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

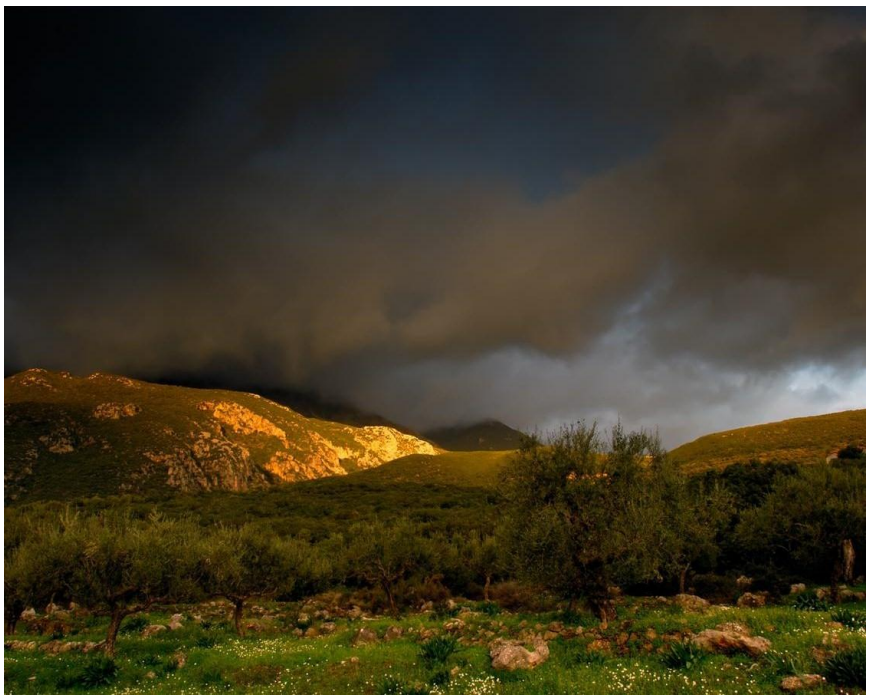

Photo 10

Photo 11

Photo 12

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