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SPECIFIC LOCATIONS WITHIN UNITED STATES NATIONAL PARKS MAY ELICIT
SPECIFIC POSITIVE AFFECT

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ABSTRACT

Many studies have explored nature, broadly defined, and its role in improving health. Few, however, have focused on specific natural locations or features and their influence on emotional well-being. This study aims to identify specific locations and features within national parks that elicit positive emotional responses from visitors. Data were collected from two diverse parks: the historical-focused Gettysburg National Military Park in Pennsylvania, and the largely nature-based Catoctin Mountain Park of Maryland. 269 park visitors were surveyed in July and August 2016. Participants were predominantly white (92.6%), mean age=42.75 (range 18-74). Participants completed a brief introductory survey (e.g., reasons for visiting the park) followed by a concluding survey at the end of participant's visit, with an open-ended question asking them to list three positive emotions they experienced in the park, and the landscape or facility features that led to those emotions. This study uses responses on the concluding survey; responses were sorted first by participant's answers regarding the specific features that elicited positive emotions (e.g., Catoctin's Hog Rock scenic vista, etc.). These emotions were coded according to the circumplex model of affect, labeling each response as either high activation positive affect (HAPA; e.g., excited, joyful), or low activation positive affect (LAPA; e.g., relaxed, content), based on previously published identification of affect items circumplex locations. Affect associated with specific park features was then evaluated. Participants in both types of parks (historical and natural) experienced motivational HAPA emotions more often than restorative LAPA. Although the locations which elicited these emotional responses varied, features in both parks offering an elevated view of the surrounding area (e.g., viewing tower, vistas) were the most commonly listed as eliciting a HAPA response. Elicitation of LAPA was more nuanced,

associated with water features as well as elevated views. The association between specific park locations or landscape features, and positive emotional responses to them helps provide parks the ability to direct patrons towards healthy park experiences. These results also inform the promotion of the National Park Service Healthy Parks Healthy People Program and related initiatives, which encourages the use of parks as health resources, and enhance our understanding of how natural features and experiences influence affective states and health. It also suggests avenues of future research, including developing a better understanding of what components/aspects of park features/locations are related to mood.

TABLE OF CONTENTS

LIST OF FIGURES	iv
LIST OF TABLES	v
ACKNOWLEDGEMENTS	vi
Chapter 1	1
Introduction	1
Nature & Health	1
Nature & Health Theory	3
Mental Illness	6
Objectives	8
Chapter 2	9
Methods	9
Participants	9
Procedures	9
Gettysburg National Military Park	10
Catoctin Mountain Park	12
Survey Instruments	13
Data Cleaning & Coding	14
Chapter 3	16
Results	16
Analysis	16
Results	16
Chapter 4	21
Discussion	21
Limitations	23
Future Research	24
Conclusion	25
Appendix A Coding Guidelines	26
BIBLIOGRAPHY	29

LIST OF FIGURES

Figure 1: Circumplex Model of Affect 15

LIST OF TABLES

Table 1: Parks' Collective HAPA/LAPA Means	17
Table 2: Catoclin Participants Locational Response Frequency	18
Table 3: Catoclin Locations HAPA/LAPA Means	18
Table 4: Gettysburg Participants Locational Response Frequency	19
Table 5: Gettysburg Locations HAPA/LAPA Means	20

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Chapter 1

Introduction

Nature & Health

Nature surrounds us. It is the air we breathe, the weather we watch, and the plants and animals that we may notice throughout our day. Nature has been defined as “physical features and processes of nonhuman origin that people ordinarily can perceive” (Hartig, Mitchell, De Vries, & Frumkin, 2014). Although certain locations have less nature than others, as humans we all interact with and adapt to nature.

Nature influences many parts of our lives, but research has shown that it may also assist in the retention and/or promotion of human health. One path towards such research began with the creation of the biopsychosocial model by Dr. George Engel (Smith, 2002). Through this model, Engel proposed that health be viewed as a combination of biological, psychological, and social factors, each collectively playing a role in one’s well-being (Smith, 2002). This new perspective opened the field of health to professionals not traditionally associated with healthcare, such as those in parks and recreation management and environmental psychology (Hartig, *et al.*, 2014).

A new field of research offering promising improvement and innovation to health was soon established (Hartig *et al.*, 2014). Environmental psychologist Stephen Kaplan formed a theory proposing nature’s association with mental restoration (Kaplan, 1995). Architect Roger

Ulrich led groundbreaking research and discovered that views of nature were positively associated with physical and mental health (Marberry, 2010, Ulrich, 1983). These two seminal figures in the field of nature and health helped inspire research efforts seen today.

By way of example, recent research has found that living in a neighborhood with a presence of birds and high levels of vegetation is associated with higher levels of mental health (Cox, Shanahan, Hudson, Plummer, Siriwardena, Fuller, & Gaston, 2017). Neighborhoods in southern England were assessed based on their bird population and existing vegetation (Cox *et al.*, 2017). Residents of these neighborhoods completed a version of the depression, anxiety, and stress scale, and provided information on a large number of potentially confounding variables (Cox *et al.*, 2017). The study found that the neighborhoods with higher levels of vegetation and a presence of birds had significantly lower levels of depression, anxiety, and stress (Cox *et al.*, 2017). Within these neighborhoods residents who spent less time outside experienced higher levels of depression, stress, and anxiety (Cox *et al.*, 2017).

Researchers in developing countries like China have also begun to complete similar research, studying the health effects of park use (Liu, Li, Li, & Zhang, 2017). In a case study of an urban park in Beijing, researchers found that those living within 500 meters of the studied park were more physically active than individuals living further away (Liu, Li, Li, & Zhang, 2017). They also found that park users were more active than non-users, and that those who used the park experienced mental health benefits from both physical activity and their exposure to nature (Liu, Li, Li, & Zhang, 2017).

A report by Natural England, the United Kingdom's environmental advisory program, found that activities done in natural settings can be therapeutic, especially for those with lower levels of wellbeing (Bragg, & Atkins, 2016). Reviews of nature based health programming found

horticultural therapy, and care farming, (a therapeutic use of agricultural practices) to have particularly well documented health benefits (Bragg, & Atkins, 2016). England is now making an effort to use nature as a health resource, emphasizing its mental health benefits (Bragg, & Atkins, 2016).

Health benefits are found in nature worldwide, but more research can be done. After reviewing the literature on nature and its use as a health resource, it is evident that there is a growing interest in the field.

Nature & Health Theory

The two most prominent theories surrounding the study of nature and its positive effects on health have also been supported through research (Bowler, Buyung-Ali, Knight, & Pullin, 2010). The first of these two theories is the attention restoration theory. Attention restoration theory proposes two types of attention exist, directed and involuntary (Kaplan, 1995). Directed attention is used for activities such as completing schoolwork, checking for cars when crossing the street, and listening to conversations (Kaplan, 1995). Directed attention is more mentally fatiguing as it requires focus, whereas involuntary attention is seen as uncontrollable, and done without thinking (Kaplan, 1995). The theory proposes that when in, or viewing, natural environments one uses greater amounts of involuntary attention, thus allowing the brain an opportunity to rest and recover (Kaplan, 1995).

The theory has been tested in both natural and laboratory settings (e.g., Berman, Jonides, & Kaplan, 2008). To do so, researchers from the University of Michigan had 38 participants complete the backwards digit span task, a memory task in which participants are shown a set of

numbers that quickly disappear (Berman, Jonides, & Kaplan, 2008). After each number is shown the participant must recall the number they saw and repeat it backwards (Berman, Jonides, & Kaplan, 2008).

Following this task the participants were taken on a 50-55 minute walk through either the Ann Arbor Arboretum, or downtown Ann Arbor (Berman, Jonides, & Kaplan, 2008). Once the walk was completed, all participants performed the memory task for a second time; participants also returned a week later to repeat the test under the opposite condition (Berman, Jonides, & Kaplan, 2008). The results of the study showed that after walking through the arboretum, participant's backwards digit span task score significantly improved, whereas walking through downtown Ann Arbor produced no significant effect on one's score (Berman, Jonides, & Kaplan, 2008).

This study was replicated in a lab setting in which participants viewed images of natural and urban locations rather than walking through them (Berman, Jonides, & Kaplan, 2008). The natural images were of Nova Scotia and the urban images of Chicago, Detroit, and Ann Arbor (Berman, Jonides, & Kaplan, 2008). The study produced the same results, after viewing natural images scores significantly improved, and after viewing urban images there was no significant change (Berman, Jonides, & Kaplan, 2008).

The psycho-evolutionary theory proposed by Roger Ulrich is the second theory which focuses on nature's impact on health (Ulrich, 1983). Ulrich argues that when one is exposed to certain natural spaces, particularly those that are open or contain water features, one experiences a positive emotional response (Ulrich, 1983). He poses that throughout history certain natural scenes were deemed evolutionarily beneficial and that one's body naturally experiences positive feelings when seeing them (Ulrich, 1983). Although the evolutionary principles of this theory are

difficult to test, several studies have found a significantly positive association between natural settings and improved mood (Bragg, & Atkins, 2016).

Affect is an inclusive term used to discuss emotion and mood and an important part of one's psychological wellbeing (Fredrickson, 2001). "Affect is a broader construct than emotion. Any valenced judgment or condition implicates affect, whereas emotions are more specific... 'affect' entails that all emotions are affective conditions, but not that all affective conditions are emotions" (Ortony, Clore, & Floss, 1987).

Affect can be usefully categorized according to its valence and activation level (Clark, Watson, & Leeka, 1989). Valence reflects whether the affect is positive or negative; positive affect is defined as "a level of pleasurable engagement with the environment" whereas negative affect is associated with subjective distress (Clark, Watson, & Leeka, 1989). Activation reflects the energy level of affect and is typically labeled as high (alert, awake) or low (fatigued, sluggish; Clark, Watson, & Leeka, 1989).

Positive affect has been associated with health in many ways. A 1998 study tested the impact of positive affect on cardiovascular recovery by exposing participants to a fear inducing film meant to raise cardiovascular activity (Fredrickson, & Levenson, 1998). It was found that the cardiovascular activity of participants who viewed films depicting contentment or amusement following the fear inducing film, returned to baseline more quickly than those who viewed a neutral or sad film (Fredrickson, & Levenson, 1998). In a similar study the cardiovascular activity of participants who smiled while watching a sad film returned to baseline more quickly than those who did not smile (Fredrickson, & Levenson, 1998).

A meta-analysis of 225 papers on positive affect describes positive affect as the hallmark of long-term happiness (Lyubomirsky, King, & Diener, 2005). The review concludes that

positive affect fosters sociability, activity, altruism, liking of self and others, strong bodies and immune systems, and effective conflict resolution (Lyubomirsky, King, & Diener, 2005).

Similarly, the broaden-and-build theory proposed by Barbara Fredrickson suggests that positive affect leads to flourishing (Fredrickson, 2001). Flourishing is a state in which one feels good and functions effectively; it has been considered “synonymous with a high level of mental well-being” (Huppert, & So, 2013).

Mental Illness

Mental illness is estimated to affect one out of every five people on this planet (Steel, *et al.*, 2014). These illnesses vary in name and presentation, however mental illness can be generally defined as a health condition that impacts one’s mood, thinking, or behavior (General, 1999). Mental illness has been associated with an increased occurrence of chronic conditions such as diabetes, obesity, cardiovascular disease, and cancer (Reeves *et al.*, 2011). However, these conditions may go untreated, as there is an inverse relationship between mental health, medical care, and treatment adherence (Reeves *et al.*, 2011).

It is estimated that close to 50% of U.S. adults will develop mental illness in their lifetime (Reeves *et al.*, 2011). The number of people who are diagnosed and receive treatment however, is likely far less (Kohn, Saxena, Levav, & Saraceno, 2004). People often suffer from undiagnosed mental illnesses for many reasons. Barriers such as stigma, lack of knowledge, and distrust in treatment prevent individuals from seeking medical help (Kohn, *et al.*, 2004). These attitudinal barriers primarily affect those suffering from mild to moderate forms of mental illness, while structural barriers affect those experiencing more severe forms (Andrade, *et al.*,

2014). Structural barriers are barriers that physically separate an individual from treatment such as the availability, accessibility, and affordability of mental health resources (Kohn, *et al.*, 2004).

Subclinical mental illnesses are mild to moderate forms of mental illness that have not been diagnosed (Ji, 2012). Subclinical mental illnesses do not meet the full criteria of a major or severe diagnosis, but still cause symptoms (Ji, 2012). Without proper treatment subclinical mental illnesses like depression can progress to severe forms of the illness (Fils, *et al.*, 2010).

Depression is one of the world's most common mental illness and is the leading cause of disability worldwide (World Health Organization, 2017). The illness is characterized by feelings of pessimism, hopelessness, and guilt, and can lead to suicidal thoughts or actions (U.S. Department of Health and Human Services, 2015). In order for one to meet the diagnostic standards of depression, one must experience impairment from a newly present depressive mood, or loss of interest in normally pleasurable activities, for at least two weeks (Reeves, *et al.*, 2011). In addition to these direct effects, depression has been associated with an increased risk of heart disease and other mental illnesses (Center for Disease Control, 2016, Goodwin, 2006).

Without a diagnosis of major depression, some doctors and insurance companies cannot offer or cover treatment (Fils, *et al.*, 2010). The fourth edition of the Diagnostic and Statistical Manual (DSM-IV), the medical diagnostic manual for mental illnesses, proposes, but does not accept the condition called minor depression (Fils, *et al.*, 2010). Minor depression is defined by the manual as being the presence of at least two, but less than 5, depressive symptoms that one experiences throughout a two-week period (Fils, *et al.*, 2010).

It is important however, to recognize that depression at any stage can be treated (U.S. Department of Health and Human Services, 2015). Major depression is primarily addressed through two forms of treatment, medication and psychotherapy (U.S. Department of Health and

Human Services, 2015). Those suffering from minor depression are advised to make lifestyle changes and utilize psychotherapy before medication (Fils, *et al.*, 2010, National Institute for Health and Care Excellence, 2009). In both cases, the earlier treatment begins, the more effective it will be (U.S. Department of Health and Human Services, 2015).

Current research and theory associate nature with mental restoration, improved mood, and lower levels of mental illness (Bragg, & Atkins, 2016, Cox *et al.*, 2017, Kaplan, 1995). Although nature is most certainly not a treatment for serious mental illnesses, it has the potential to be utilized as a low cost, non-stigmatized form of mental health maintenance – particularly in cases of minor and/or transitory mood impairment or dysphoria.

Objectives

To further explore these relationships between natural locations and positive affect, research was conducted in two United States national parks. The methods used to conduct this research, and the study's resulting data, relevance, and limitations will be discussed throughout the remainder of this thesis. Preceding this study hypotheses were not made about the study results. The study was not designed to confirm specific *a priori* predictions, but rather to identify the relationship between specific locations and positive affect in an exploratory – hypothesis generating – fashion.

Chapter 2

Methods

Participants

A total of 269 individuals ranging between the ages of 18 and 74 were surveyed throughout July and August of 2016; all participants were visitors at either the Gettysburg National Military Park or the Catoctin Mountain Park. The mean age of participating visitors was 42.75 years old, and 47.6% of participants were female (52.4% male). Consistent with the areas population, 92.6% of those surveyed were White, 2.6% were Asian, and 1.5% were Black. Visitors were eligible to participate if they were above the age of 18, utilizing one of the two National Parks, and had not already participated in the study. Employees and volunteers of the National Park Service were ineligible as their data may be biased.

Procedures

The present study utilizes a subset of data collected from a large interdisciplinary research study of national parks and visitor health behaviors, called Healthy Parks, Healthy People. Several measures were used to collect data within this broader study, however, only methods used to collect data for the present study will be detailed below. Study procedures were approved by the institutional IRB.

Gettysburg National Military Park

Gettysburg National Military Park is a historically significant park located in Gettysburg, Pennsylvania. The park was established to remember the Battle of Gettysburg, which took place during the United States Civil War (Gettysburg National Military Park, 2017). The park is comprised of rolling fields, dotted with monuments to historically significant locations, and in memorial to the soldiers who fought there.

Of the participants surveyed in this park, 163 provided usable data. 35% of participants were female and 65% were male. 96.3% of these participants were White, while 0.6% were Asian, and 0.6% were Black. The mean age of participants was 45.69 years old with the oldest participant being 74 years old. 36.7% of participants had received a master's, doctoral, or professional degree, and 27.9% had graduated from college, or business/trade school. 42.3% of participants self-rated their health as being "very good", while 36.8% reported their health as "good".

Sampling took place at four locations within Gettysburg National Military Park between July 8th and July 29th, 2016. Data was collected between the hours of either 8:00 am - 3:00 pm or 11:00 am - 6:00 pm. Six research assistants were positioned throughout the park at the Culp's Hill National Park Service Entrance, Culp's Hill Middle School Entrance, Culp's Hill Observation Tower (CHOT), and the Virginia Memorial (VM). At both Culp's Hill entrances research assistants were instructed to approach park visitors entering on foot or bicycle. Research assistants at the CHOT and the VM were instructed not to approach visitors until they had entered designated areas surrounding each location. Once visitors had entered the park, or the designated area, research assistants politely asked visitors if they would be willing to participate

in a research study. If visitors responded with yes, verbal consent was confirmed and the visitor became a participant in the study. If visitors were uninterested in participating in the study, the visitor was asked a single follow up question (“What is the main benefit you anticipate gaining from visiting this park?”) and no further action was taken.

Participation in the study involved the completion of two surveys. At both Culp’s Hill entrances the initial pre-survey was administered before participants began utilizing the park. At CHOT and the VM the initial pre-survey was administered when visitors first entered a designated area. In both cases participants were provided a laminated copy of the survey so that they could read the questions themselves. Participants gave verbal response to each survey question, which research assistants recorded using the data collection application iSurvey® on an Apple iPad®. Date, weather, time of day, and the type of activity the participant was performing, were recorded on paper data entry sheets.

At the Culp’s Hill entrances follow-up post-surveys were administered at the same location, or the opposite entrance. Cell phones were used to communicate between research assistants which participants had completed the initial pre-surveys at which locations. At CHOT and the VM post-surveys were conducted when participants left the designated area. The post-survey was administered identically to the first. If participants returned after staff had departed for the day, no post-survey was collected.

Catoctin Mountain Park

Catoctin Mountain Park is a nature-based park located just north of Thurmont, Maryland. The park is a part of the Blue Ridge Province of the Appalachian Mountains and offers visitors access to several wooded trails and mountain top vistas (Catoctin Mountain Park, 2017). Of the participants surveyed in Catoctin Mountain Park 106 provided usable data. 67% of participants were female and 33% were male. 86.8% of these participants were White, while 5.7% were Asian, and 2.8% were Black. The mean age of participants was 38.25 years old with the oldest participant being 68 years of age. Of these participants, 38.1% had received a master's, doctoral, or professional degree, and 22.9% had graduated from college, or business/trade school. Regarding health, 46.7% of participants felt that their health was "very good", while 33.3% classified their health as "good".

Sampling took place at the Catoctin Mountain Park Visitor Center from July 31st until August 20th, 2016. Data was collected between the hours of either 8:00 am - 3:00 pm or 11:00 am - 6:00 pm. Two research assistants collected data at Catoctin Mountain Park, one positioned outside the front door of the visitor center, and the other monitoring the visitor center parking lot. The research assistants were instructed not to approach visitors until they had entered and exited the visitor center. Once visitors had exited the visitor center, research assistants politely asked if they would be utilizing Catoctin Mountain Park on the current day. If visitors responded with yes, a brief synopsis of the study was disclosed and the visitor was asked if they would be willing to take part in the research study. If visitors were not utilizing Catoctin Mountain Park on that day no further action was taken. If visitors were utilizing the park, but uninterested in

participating in the study, the visitor was asked a single follow up question (“What is the main benefit you anticipate gaining from visiting this park?”) and no further action was taken.

Participation in the study involved the completion of two surveys. The initial pre-survey was administered before participants began utilizing the park. All participants were provided a laminated copy of the survey so that they could read the questions themselves. Participants gave verbal responses to each survey question, which research assistants recorded using the data collection application iSurvey® on an Apple iPad®. Date, weather, time of day, park destination, and participant’s expected time of return were recorded on paper data entry sheets.

Participants were instructed to return to the visitor center before leaving the park for the day. Upon their return, participants were asked to complete the follow-up post-survey; this survey was administered as was the first. If participants returned after the research assistant’s day had ended no post-survey was administered.

Survey Instruments

The data used in this study was gathered from a survey designed for the larger Healthy Parks, Healthy People study. The majority of data used in the study was retrieved from an open-ended question on the post-survey. The question posed to participants was “Thinking back about your emotions during this visit, what are the top three positive emotions or feelings, (ranked in order) you experienced in [National Park], and what landscape and/or facility features (e.g., trees, trails, memorials, visitor center, bird song, etc.) of the park led to these emotions?”

Participants responded with a range of affective words and locations.

Demographic information was gathered through four questions: “What is your gender? Male, Female”, “What is your race? (Please check all that apply): American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian, Pacific Islander other than Native Hawaiian, White”, “In what year were you born?”, and “What is the highest level of formal education you have completed? (Select one): ‘Some high school’, ‘High school graduate or GED’, ‘Some college, business or trade school’, ‘College, business or trade school graduate’, ‘Some graduate school’, ‘Master’s, doctoral or professional degree’.” Information regarding participant’s health was retrieved by asking the question “In general, would you say your health is: Excellent, Very Good, Good, Fair, Poor.”

Data Cleaning & Coding

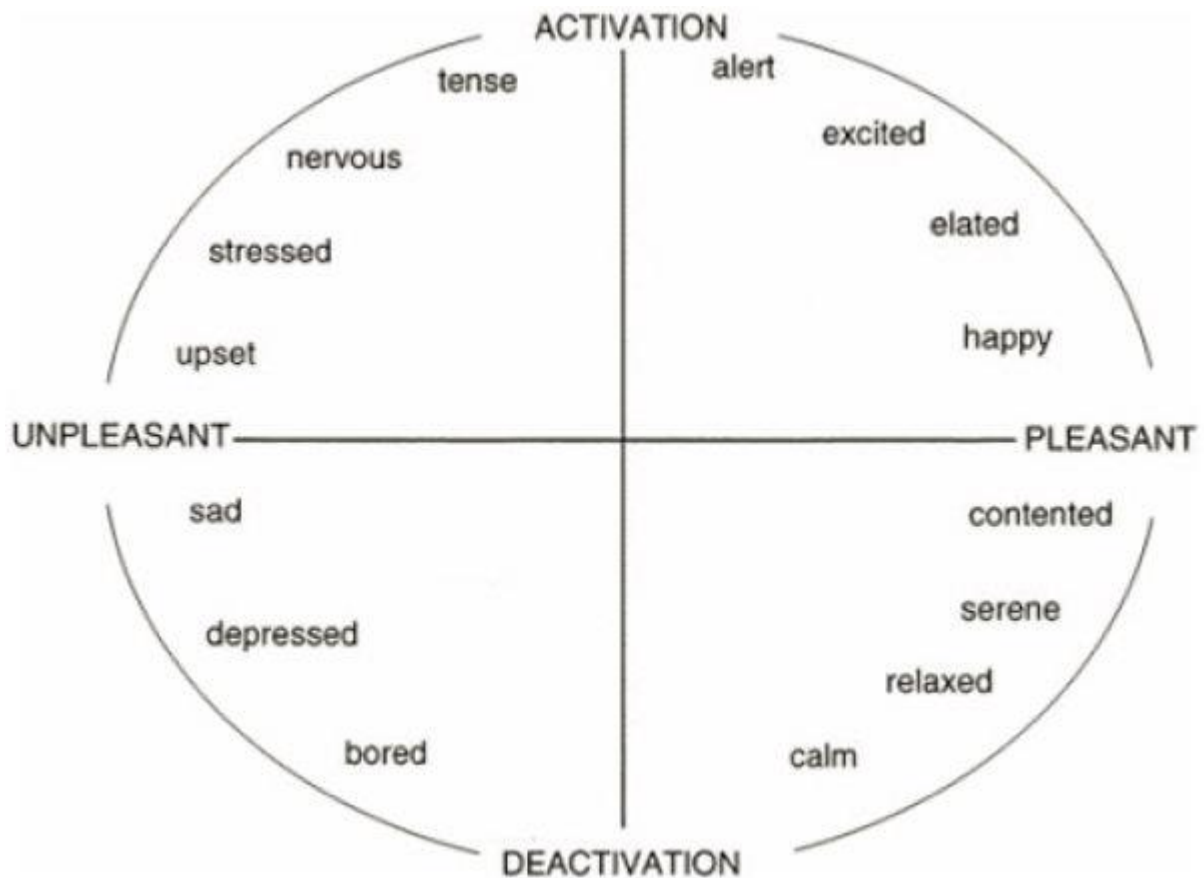
Upon the completion of data collection all affective and locational data was organized, cleaned and coded. Only responses containing a reference to a specific definable location were used within this study. Additionally, to be considered, more than one participant must have referenced the location. The usable locations provided by participants were organized and listed. The affective words expressed by participants at each of these specific locations were then organized by the location in which they were experienced.

The affective words were coded using the circumplex model of affect (Figure 1; taken from Russell, 1980). The circumplex model of affect was created by James Russell as a way to categorize affective words based on their valence, positive or negative, and their level of activation, high, or low (Russell, 1980). This model was used as it considers these two dimensions of affect to be interrelated (Russell, 1980). Rather than simply labeling affective

words as negative affect (NA)/positive affect (PA), or high activation (HA)/low activation (LA), this model assesses affect as high activation positive affect (HAPA), low activation positive affect (LAPA), etc. (Russell, 1980). As this study gathered only positive affective data from participants this model allowed for a deeper understanding of each positive affective response at specific park locations.

Using this Circumplex model, and a set of coding guidelines, two researchers coded participant's affective responses as being either high activation positive affect (HAPA) or low activation positive affect (LAPA) (See Appendix A Coding Guidelines). Inter-rater reliability was high as the two researchers reached consensus on the coding of all affective responses.

Figure 1: Circumplex Model of Affect



Chapter 3

Results

Analysis

After the completion of data coding, the average rate of HAPA and LAPA responses were determined for each National Park, and the specific locations within them. The frequency of each location as a response was also calculated. Statistical means and frequencies were used to analyze this data due to the exploratory nature of this study. The aim of this research was broad: identify specific locations within two national parks from which affect is elicited. Following the compilation of locational data the affective data was analyzed to provide potential insight into the type of affective state each location may elicit.

Results

From this analysis, it was found that participants at both parks reported experiencing a greater amount of HAPA than LAPA (Table 1). In Catoctin Mountain Park 58.33% of all affective words expressed by participants were coded as HAPA, whereas in Gettysburg 72.92% of affective words were coded as HAPA.

Within Catoctin Mountain Park the re-created Whiskey Still elicited the highest rate of HAPA coded affective words with 100% of participant responses at this location coded as HAPA (Table 3). This location was, however, only referenced by participants 3 times (Table 2). The next highest HAPA eliciting location was Wolf Rock, referenced much more frequently by

participants (28 times). 67.90% of this location's affective words were HAPA. Conversely, Thurmont Vista was the highest rated LAPA location with 11 participant references and 72.70% of affective words labeled as LAPA.

In Gettysburg there were several locations with 100% HAPA responses (Table 5). These locations were the 20th Maine Volunteer Infantry Monument, McPherson Ridge, and Unity Park; each only received 2 references from participants (Table 4). Conversely, participants referenced the High Water Mark 3 times with 100% of responses coded as LAPA. The Auto Tour was referenced 4 times and received 50% LAPA responses, while Spangler's Spring was referenced 11 times with a rate of 45.50% LAPA responses.

The most commonly referenced locations within each park produced majority HAPA responses. Although located just outside of the Catoctin Mountain Park boundaries, Cunningham Falls was Catoctin's most referenced location with 50 responses. Affective responses at Cunningham Falls were 54% HAPA. Gettysburg's most referenced location was the Culp's Hill Observation Tower, which had 77.80% of affective responses labeled HAPA and 36 participant references. Based on this data, visitors of both Catoctin Mountain Park and Gettysburg National Military Park are more likely to experience emotions deemed HAPA than LAPA.

Table 1: Parks' Collective HAPA/LAPA Means

Park	% HAPA	% LAPA
Catoctin Mountain Park	58.33%	41.67%
Gettysburg National Military Park	72.92%	27.08%

Table 2: Catoctin Participants Locational Response Frequency

Catoctin Locations	Response Frequency
Whisky Still	3
Visitor Center	6
Blue Ridge	9
Thurmont Vista	11
Hog Rock	18
Wolf Rock	28
Chimney Rock	43
Cunningham Falls	50
Total	168

Table 3: Catoctin Locations HAPA/LAPA Means

Catoctin Locations	% HAPA	% LAPA
Blue Ridge	33.30%	66.70%
Cunningham Falls	54%	46%
Chimney Rock	65.10%	34.90%
Hog Rock	61.10%	38.90%
Thurmont Vista	27.30%	72.70%
Visitor Center	67%	33%
Wolf Rock	67.90%	32.10%
Whiskey Still	100%	0%

Table 4: Gettysburg Participants Locational Response Frequency

Gettysburg Locations	Response Frequency
123 rd New York Infantry Monument	2
20 th Maine Volunteer Infantry Monument	2
Auto Tour	2
Hospital	2
McPherson Ridge	2
Unity Park	2
The Angle	3
High Water Mark	3
Peace Light Tower	3
Big Round Top	4
Gettysburg Cyclorama	5
Culp's Hill Area	5
Devil's Den	5
Loop	6
Pennsylvania State Monument	6
Cemetery	7
Museum	7
Virginia Memorial	8
Visitors Center	9
Spangler's Spring	11
Culp's Hill	15
Little Round Top	22
Pickett's Charge	26
Culp's Hill Observation Tower	36
Total	192

Table 5: Gettysburg Locations HAPA/LAPA Means

Gettysburg Locations	% HAPA	% LAPA
123 rd New York Infantry Monument	50%	50%
20 th Maine Volunteer Infantry Monument	100%	0%
Auto Tour	50%	50%
The Angle	66.70%	33.30%
Big Round Top	75%	25%
Cemetery	85.70%	14.30%
Culp's Hill	60%	40%
Culp's Hill Observation Tower	77.80%	22.20%
Culp's Hill Area	80%	20%
Devil's Den	60%	40%
Gettysburg Cyclorama	80%	20%
High Water Mark	0%	100%
Hospital	50%	50%
Little Round Top	72.70%	27.30%
Loop	66.70%	33.30%
McPherson Ridge	100%	0%
Museum	85.70%	14.30%
Pennsylvania State Monument	83.30%	16.70%
Peace Light Tower	66.70%	33.30%
Pickett's Charge	80.80%	19.20%
Spangler's Spring	54.50%	45.50%
Virginia Memorial	75%	25%
Visitors Center	77.80%	22.20%
Unity Park	100%	0%

Chapter 4

Discussion

This exploratory study examined both nature-based and historically focused national parks aiming to identify specific locations within them where positive affect was experienced. Moreover, I examined the distribution of high activation versus low activation positive affect as a function of park and of park features. Within this discussion I will review the main findings of this study, and discuss their relevance in the context of similar research. I will also present the limitations of this study and provide suggestions for future research within this field.

The study identified the prevalence of specific positive affect at specific locations within the two parks and found that in both Catoctin Mountain Park and Gettysburg National Military Park participants experienced HAPA labeled affect at a greater rate than LAPA labeled affect. This information is important as it may help predict what type of experience future visitors of these two parks are likely to have. Due to the high rates of reported HAPA labeled affect, those looking for a high-energy experience will likely enjoy these parks and can be directed to specific locations within them where they are likely to have this type of experience. Due to the lower levels of reported LAPA labeled affect, park visitors looking for a lower energy experience may find that neither of these parks optimally suits their interests. However, data gathered through this study may help direct visitors to certain locations within each park where LAPA experiences are more likely to occur.

Previous research has studied park features in a more general way, and examined their relationship to visitor health behavior (Kaczynski, Potwarka, & Saelens, 2008). Research on 33 parks aimed to determine whether size, location, or features determined visitor's usage of a park

for physical activity (Kaczynski, Potwarka, & Saelens, 2008). The study found that trails and wooded areas were associated with a greater use of parks for physical activity (Kaczynski, Potwarka, & Saelens, 2008). However, recommendations for future research include behavioral information and data collected through interview to gain a better understanding of visitor's park usage (Kaczynski, Potwarka, & Saelens, 2008).

The research presented in this thesis builds off these results to help further identify the role specific park locations play in visitor experiences. The findings may be particularly useful for organizations such as the National Park Service and their Healthy Parks, Healthy People (HPPH) program. HPPH is an international initiative with beginnings in Australia (Parks Victoria, 2017). The United States National Parks Service adopted the initiative in 2011 and works to inspire Americans to improve their health while experiencing and maintaining this nation's public lands (National Park Service, 2014).

In order to improve upon these ideas and their initiatives, HPPH has published a Science Plan to ensure the future success of their organization (National Park Service, 2013). Within the plan, the National Park Service expresses the need for ways to identify, categorize, and evaluate park elements as health resources (National Park Service, 2013). Through this plan, the National Park Service hopes to answer these following questions among others: "Which park resources and activities promote mental health and well-being?", "What park resources are most conducive to physical and mental health?", and "Where are the resources located?" (National Park Service, 2013). Positive affect has been associated with improved states of physical and mental well-being; by identifying specific locations within two national parks where visitors have experienced positive affect this study has begun to answer some of these questions.

The results of this study may also be of use to park prescription programs. Park prescription programs train physicians, public health professionals, and health related organizations about the health benefits offered by nature (Institute at the Golden Gate, 2010). Once trained, professionals can ‘prescribe’, inform, or advocate for the use of outdoor activity as a health resource (Institute at the Golden Gate, 2010). These programs and partnerships are currently being piloted and put to use in California, Washington D.C., North Carolina, New Mexico, and Georgia (Institute at the Golden Gate, 2010).

When presenting a park prescription or advocating for outdoor recreation it is important to offer a location where these activities can take place (Institute at the Golden Gate, 2010). Professionals within traveling distance of Catoctin Mountain Park or Gettysburg National Military Park may find the results of this study to be helpful when providing locational recommendations for outdoor activity. Specific locations within each of these parks are associated with positive affect, which has been associated with improved mental and physical health.

Limitations

The data used in this study was collected as one part of a larger study and, as a result (e.g., time and question limits to minimize respondent burden), there are several notable limitations of this work. The main limitation to this study can be found in its data-gathering question. The question posed to participants asks them to offer only the positive emotions they experienced while in the park. Without asking for emotions in general, the negative emotions from participant’s experiences were excluded, and a complete picture of a participant’s visit was

obscured. Additional limitations to the study are due to the process of gathering information. The data collection process required participants to answer each survey question aloud while a research assistant recorded their responses. Participants may fear social evaluation, and this collection process creates the potential for response bias. Recall bias is created by an inaccurate recollection of experiences by participants, and is another limitation of this study. Participants of this study were surveyed at the end of their visit and required to recall specific feelings from the past. Due to the passing of time, participant responses may not have been fully accurate, creating the potential for recall bias in participant responses.

Future Research

In the future research can avoid these shortcomings and build upon the results of this study. Future research could equip participants with ecological momentary assessment (EMA) technology. EMA collects data from participants in real world settings and in real time (Shiffman, Stone, & Hufford, 2008). Additionally, EMA is a useful tool for measuring affect and behavior (Shiffman, Stone, & Hufford, 2008). Future research could utilize this assessment method by providing participants with EMA devices and sending prompts to participants while they are in a park.

Studies utilizing this technology could also better assess the impact of specific locations on participants. The use of EMA reduces recall bias, and allows data to be collected naturally at specific locations. Such work would better allow future work to evaluate what features or characteristics of park locations were related to positive (and/or other) affect; this may help form a generalizable theory and system for the mood influencing aspects of experiencing nature and

natural scenes. Being that the environment is a key component of this research, this type of assessment would be useful for future studies.

Conclusion

Nature has been consistently associated with improvement to physical and mental health. Studying two different types of national parks, one based in nature and one focused on history and culture, specific locations were identified as being associated with visitors experiencing positive affect. This positive affect was categorized according to its activation level and it was found that the majority of visitors at both parks experienced high activation positive affect. Like nature, positive affect has been associated with improved health. This study provides exploratory data on two specific parks, specific locations within them, and their relationship with positive affect. Using this data and the data of future studies, there exists a possibility that people could be directed to specific natural locations where they may experience specific types of positive affect in order to enhance health and well-being.

Appendix A Coding Guidelines

What: A set of affective words will be coded.

Background: “Affect is a broader construct than emotion. Any valenced judgment or condition implicates affect, whereas emotions are more specific. Consequently, our use of the word “affect” entails that all emotions are affective conditions, but not that all affective conditions are emotions” (Ortony, Clore, & Floss, 1987). The Circumplex Model of Affect was created by James Russell as a way to categorize affective words based on their valence, positive or negative, and their level of activation or arousal, high activation, or low activation (Posner, Russell, & Peterson, 2005). For the purpose of this study affective words will be coded as either High Activation Positive Affect (HAPA) or Low Activation Positive Affect (LAPA).

Coding Guidelines:

1. Read the affective word.
2. Assess the words valence. Does the word seem like it would be pleasant or unpleasant to experience? Pleasant = positive valence (ex. Happy), unpleasant = negative valence (ex. Sad).
 - All affective words in this data set should have a positive valence. If you assess an affective word as negative, highlight the word yellow and do not type a code.
3. Assess the words activation level.
 - Words that imply a state of high energy, physical action, or movement should be coded as HAPA (ex. Excited).
 - Words that imply a state of low energy, or a nonmoving state should be coded as LAPA (ex. Relaxed).
4. If unsure of where to place an affective word please highlight the word yellow and do not type a code. This word will be reviewed at a later time or discarded from the study.

- One should not spend an extended period of time on each word. When coding trust your first instinct and move to the next word. Coding all affective words should take no more than 2 hours.

General Reference Key

HAPA = Affective words that imply a positive disposition and high level of activation or energy.

LAPA = Affective words that imply a positive disposition and low level of activation or energy.

Coding Instructions

- Begin by re-reading the Thesis Coding Sheet's coding guidelines (located on page 1).
- Please keep the provided copy of the Circumplex Model of Affect, and the words used within it next to you as a reference sheet throughout the coding process.
- Begin by opening the Excel file "CATO HAPA-LAPA Coding".
- Within this file affective words will be organized by the location where they were experienced. The general location will be highlighted in green at the top of the file (see fig. 1). Each participant's locational response will appear in a column to the left of the file, and will be highlighted in orange (see fig. 1). To the right of this column lies the affective words column, which will have no highlighted color (see fig. 1). One will then type their code into the adjacent coding column (see fig. 1).

General Location		Participant's Locational Response Column		Affective Words Column	Coding Column
F	G	H	I	J	
Blue Ridge		Location	Affect	Code	
	Blue Ridge overlook		Inspired		
	Blue Ridge Overlook Trail		Solitude		
	Blue Ridge Overlook Trail		Peace		
	Blue Ridge Overlook Trail		Peaceful		
	Blue Ridge Overlook Trail		Relaxed		
	Blue Ridge Summit		Awe		
	Blue Ridge Summit		Happy		
	Blue Ridge Vista		Perspective		
	Blue Ridge Vista		Pleasant		

Figure 1

5. Begin coding from the left of the Excel file to the right, reading affective words from top to bottom. Remember to save your progress every 5 minutes.
6. Using the coding guidelines, and your first instinct, code each affective word as either HAPA (High Activation Positive Affect) or LAPA (Low Activation Positive Affect). (See coding guidelines on page 1).
7. Color code these HAPA and LAPA boxes: light pink for words you deem to be HAPA (see fig.2), and blue for words you deem to be LAPA (see fig. 2). If you encounter a word you are unable to place as either HAPA or LAPA please highlight the word yellow and leave the box to its right empty (see fig.2).

	F	G	H	I	J
	Blue Ridge				
Location				Affect	Code
Blue Ridge overlook				Inspired	HAPA
Blue Ridge Overlook Trail				Solitude	LAPA
Blue Ridge Overlook Trail				Peace	LAPA
Blue Ridge Overlook Trail				Peaceful	
Blue Ridge Overlook Trail				Relaxed	
Blue Ridge Summit				Awe	
Blue Ridge Summit				Happy	
Blue Ridge Vista				Perspective	
Blue Ridge Vista				Pleasant	

HAPA = Light Pink
LAPA = Blue Color
Highlight Words You Are
Unsure How to Code Yellow

Figure 2

8. Once you have completed this process for all affective words in Excel file “CATO HAPA-LAPA Coding” open Excel file “GETT HAPA-LAPA Coding” and refer back to step 2 of the Coding Instructions.

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Academic Vita

Steven Hanna

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Objective:

Secure a job in the field of public health to promote health & wellbeing, and improve the lives of others and their communities.

Education:

Pennsylvania State University, University Park, PA

Schreyer Honors College, University Park, PA

BS: Biobehavioral Health, Minor: Global Health

Honors Thesis: "Specific Locations within United States National Parks May Elicit Specific Positive Affect"

Research Presented at: 2018 National Environment and Recreation Research Symposium

Study Abroad: Institute for the International Education of Students, Health Practice & Policy Program,

London, England & Kingston, Jamaica

Completed, January-April 2016

Course work at the University of Oxford & University of the West Indies, Mona

Work Experience:

Research Assistant (September, 2016-May, 2018)

- *Stress Health and Daily Experiences (SHADE) Laboratory:* Completed literature searches and summaries focused on stress, health interventions, and the role of nature in stress reduction. Performed data entry and analysis using SPSS, wrote literature reviews and methods sections, and compiled a project book.

Trip Leader (May-December, 2017)

- *Penn State Alternative Breaks:* Planned and led students on a service trip to Selma, AL with a focus on race relations and community development. Organized service activities with our partner organization, led group reflections, and ensured the success of the trip logistically.

Student Intern (June, 2017)

- *White Earth Land Recovery Project:* Created a public health brochure aimed at educating the White Earth community about pesticide drift, its health impacts, and tips for avoiding and reporting it. Worked collaboratively to create a presentation that explored the health impacts of the Enbridge Line 3 Pipeline on the Ojibwe people of the White Earth Reservation.

Data Entry Assistant (September, 2016)

- *Pennsylvania State University Recreation, Park, and Tourism Management Department:* Coded data that examined conservation behavior in adolescents.

Field Research Assistant (August, 2016)

- *Pennsylvania State University Biobehavioral Health Department & Recreation, Park, and Tourism Management Department:*

Implemented a field intervention and collected data from Catoctin Mountain Park visitors through field surveys.

Volunteer Experience:

Volunteer Captain (October-November, 2016)

- *NextGen Climate:* Recruited and organized volunteers. Educated volunteers on phone banking, clip-boarding, tabling, and voter registration. Advocated for climate issues during the 2016 presidential election.

Gleaning and Transport Volunteer (April-July, 2016)

- *Rolling Harvest Food Rescue:* Gleaned crops at local farms, transported crops to distribution sites and helped with the distribution of crops to 83 local food pantries and hunger-relief organizations.

Student Volunteer (January-April, 2016)

- *Providence Row Homeless Day Center:* Triageed new clients of the center and completed appropriate paperwork. Warmly greeted and answered questions of clients at the welcome desk, answered phone calls, and responded to emails.

Shaver's Creek Outdoor School Counselor (October, 2015)

- *Shaver's Creek Environmental Center:* Guided 5th grade students through a week of outdoor education. Taught lessons and ensured the safety of the students.

Cross Country Cyclist & Volunteer (May-July, 2015)

- *Bike & Build:* Cycled 3,609 miles from Nags Head, NC to San Diego, CA on a team of 28 riders advocating for affordable housing. Spent 13 days volunteering with affordable housing organizations. Fundraised \$5,035 for the affordable housing cause, and reviewed grants for the distribution of the \$168,000 fundraised by the team.

Extracurricular:

- Penn State Club Cross Country: 2014-Present

- Penn State Student Society for Indigenous Knowledge: 2017

- Penn State Alternative Breaks Participant: 2017

- Penn State IFC/Panhellenic Dance Marathon (THON) Hospitality Committee Member: September, 2014-February, 2015