HUMAN BEHAVIORS IN MODERN CAMPUS LUNCH LANDSCAPES

by

PONGSAKORN SUPPAKITPAISARN

(Under the Direction of Sungkyung Lee)

ABSTRACT

The exposure to “green spaces” can benefit people’s health. Human behaviors in modern university lunch landscapes and the behavioral changes created by using electronic devices in them are explored.

The thesis determined what people enjoyed doing in lunch landscapes and how their electronic devices influenced their behaviors. Twelve sites from the University of Georgia were examined during observational study; each site was observed for 20 minutes at a time for 3 times during the lunch hour.

The use of electronic devices ranked as the most popular activity engaged in during the lunch hour. Alternative seating was the highest among the seating selections. People preferred the locations in the sun and with a crowd. The preferences of those who used electronic devices and those who did not, did not differ.

This study will create a stronger relationship between built environments and health.

INDEX WORDS: Environment and Health; Environmental Psychology; Behavioral Sciences; Lunch: Landscape Architecture; Observational study; Campus design.
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PONGSAKORN SUPPAKITPAISARN

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HUMAN BEHAVIORS IN MODERN CAMPUS LUNCH LANDSCAPE

by

PONGSAKORN SUPPAKITPAISARN

Major Professor: Sungkyung Lee

Committee: Brad Davis
            Umit Yilmaz
            Marguerite Koepke

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
May 2013
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CHAPTER 1: INTRODUCTION

The university environment can be exhausting for students, faculty, and staff. The students experience stress from many sources around the university environment. They are at the age when they must respond to the pressures for social acceptance as they pursue academic success (Chow 2007). Faculty and staff members have to spend time working at their desks where they focus their attention on many issues in a limited amount of time (Broom & Starzdins 2007). Many scientific studies have discovered that students and faculty members daily need to seek out mental and emotional restoration (Matsuoka 2010; Kaplan 1993; Lau 2009). Furthermore, technology nowadays can make information quite accessible in the university environment, but also forces human minds to be attentive and work harder than ever (Louv 2011).

There are ways to alleviate part of the stress and the exhaustion that people experience in campus environments. Researchers have found that exposure to the natural environment can restore their attention capacity and alleviate emotional negativities (Hartig 2007). Being surrounded by trees, leaves, water, and wildlife reminds people of the bigger world of which they a part. In *The Kinship and Mastery*, Kellert (1997) examined the relationships between humans and nature through an extensive review of literature, and claims that these relationships can even contribute to the creation of a better society and a better global environment. However, the tight schedules of modern life and the use of technology, allowing accessibility of everything mostly indoors, make it easy for people to miss the benefits of being outside (Broom & Dixon 2007). The green spaces on campuses, which are accessible during lunchtime, allow students and faculty members to expose themselves to the natural elements and to have better physical and mental performances (Louv 2011).

this era information is accessible everywhere. If people use technology and can be outside, the quality and the quantity of information that humans can process and create may be limitless. Creating landscapes that allow the high-information human to thrive and to become a high-performance human from using lunch landscapes is an interesting idea that should be explored.

This research will seek to respond to this idea by analyzing people’s activity in green spaces during lunch breaks in campus settings, with also noting how electronic devices may affect their preferences in green spaces. These analyses will help create a design for green spaces that will encourage people with technology to stay intact with nature.

The campus landscapes studied are typical public open spaces that share a specific quality: they are accessible for students, faculty, and staffs during lunch time. The study focuses on their functions and qualities during lunch hours. The term “lunch landscape” is used to unify the qualities of the sites, and will be explained further in this chapter and chapter 2.

The findings of the analyses in this thesis will likely answer these three questions:

(1) How do people spend time in campus lunch landscapes?

(2) What spatial qualities in lunch landscapes are people attracted to?

(3) How do people with technology act differently than others in such spaces?

In exploring these three questions, each of the 6 chapters will unfold the process to find the answers. To achieve this goal, this chapter has briefly discussed the importance of the study and its objectives and will discuss some basic definitions, provide a quick view of the methodological process, and discuss the expected outcomes. Then Chapter 2 will explain restorative theories, their importance for human health and well-being, the notion and history of lunch landscapes, the importance of restoration in campus landscapes, and the prevalence of electronic devices along with their effects on human behaviors. Next, chapter 3 will discuss the existing behavioral studies about open spaces that have characteristics similar to the spaces studied in this thesis, what the researchers wanted to find, what method they used, and what they found. After that discussion chapter 4 will discuss the details of the observational study, the
site selections, what was observed, and why this method and data analysis procedure was selected. Next, chapter 5 will display the inventory of the site, the general description about University of Georgia campus, each site plan, photographs, and special characteristics in detail. Finally, chapter 6 will provide the results of the observations, the analysis of the data, and implications of the results.

Green Space: The Definition

As mentioned, a discussion about some of the basic definitions is needed at this point before providing a quick view of the methodological process, and a summary of the expected outcomes. Throughout the research, there are several mentioning of “green space,” “open space,” “natural environment,” and “garden.” These words are used in very similar contexts to refer to open spaces with vegetation. In this study, the term “green space” is mentioned as a combination of the terms “open space” and “natural environment.” The Planning Institute of Australia and The State University of New York define “open space” to describe the function of the subject, which this thesis focuses on. Kaplan’s definition of the terms “natural environment”, and “nearby nature” describe its quality.

The Planning Institute of Australia describes an “open space” as a setting that contains natural elements, mainly plant communities. These open spaces can be used for recreation, sports, or interactions (Australia, T.P.I.o 2009). The function of the open space is to be open and accessible to the public. However, if the open space is to be restorative, it has to have a vegetative quality of the “natural environment.”

“Natural environment,” as explained by Kaplan, includes a variety of outdoor settings with a substantial amount of vegetation. The nature that Kaplan describes can be in such places as parks, arboretums, and vacant lots with some grass and trees. The definition for “natural environment” will mainly focus on the floral aspect, not the fauna (Kaplan 2007). The quality of the space this thesis refers to when discussing the green space is based both on this term and the term “nearby nature.” Kaplan explains that “nearby nature” is the natural area that can be intertwined with everyday environment. These spaces are near most people, such as at a metro park, a plaza with substantial vegetation, or a green trail.
It usually refers to a space within the urban areas, but does not limit it to a city—a place where someone can walk around or experience as time allows (Kaplan 2007).

In conclusion, the terms “green space” and “natural environment” in this thesis mean the open spaces that contain numerous plants and vegetation and are accessible to people. This area includes the environment that human beings can see from far away and the place they can be in, big and small. These environments can differ in quality and effects on human experience as will be discussed in chapter 2.

**Campus Lunch Landscape**

“Lunch landscape” is the term used by the author of this thesis to refer to any public green space in which accessible hours include the time during lunch breaks. The examples of lunch landscape include the outdoor cafeteria, the open spaces within walking distant to food vendors, or the seating areas between food access and classes or workplaces. That is, the lunch landscape is the area where students, professors, or employees can retreat to in the short period of time between their compacted morning and afternoon schedules. People do not necessarily eat in a lunch landscape, but use it along with other purposes, such as people watching, conversing, sunbathing, or communicating through electronic devices. The use of lunch landscapes will be fully explored and discussed in Chapter 2.

For most people in the urban setting, who have strict hours of work, the opportunity to be exposed to the green environment daily is very valuable for their physical and cognitive functions (Kaplan 2011). A university campus is an excellent example of an environment that can leave humans stressed or mentally fatigued. Thus, the restorative benefits of nature are necessary to optimize the abilities of students, staff, and faculty members.

The design of spaces that allow human interaction with nature must be further researched. It is important to understand what physical elements will influence college students, faculty members, staff members, and visitors to stay and interact with nature in public green spaces during their lunch break.
Methodology

This study focuses on activities in the lunch landscape because it offers the opportunity for students and faculty members who have a tight work schedule. The study has two phases of observation: the primary observation and the secondary observation. In the primary observation phase, the researcher visited several different sites around the University of Georgia campus and stayed for the length of 5 to 10 minutes. The sites were selected by using aerial photograph searches to pinpoint possible green spaces that matched the “lunch landscape” description. The primary observation helped the author of this thesis see the basic behavioral pattern of the users of the space and determined how the observations would be conducted, where the optimum sites would be, and how the sites would be categorized.

After the primary observation, the sites were selected so that the researcher could then access them by bicycle during his own lunch breaks, which varied between 11 a.m. and 2 p.m. on weekdays. The researcher made an inventory of the sites and categorized the spaces into 4 types based on their intended functions: (1) the spaces for dining, (2) the spaces for active recreation, (3) the spaces for passive recreation, and (4) the spaces for other uses. The time span of research ran through the middle of fall semester, during October 16, 2012 to November 5, 2012. The temperature range of Athens is usually 60° to 70 ° F during the time, making it the preferred temperature to be outside according to an observational study done in San Francisco (Zacharias 2004). The researcher stayed at each site for about 20 minutes, looking at how people used the space, what action they performed at the site, how long they spent there, and what the environmental conditions were at the time (for example, weather condition and temperature.)

The observed behaviors are listed in 6 categories: (1) dining, (2) socializing, (3) being restored, (4) using electronic devices, (5) non-electronics reading, and (6) physical activities. The data was analyzed quantitatively to determine the relationship between the actions and the spatial characters. For example, from x persons who used electronic devices, y persons sat on seating furniture facing traffic, which count as z% of all the subjects studied.
The activities were analyzed qualitatively in spatial mapping that can visualize the behavioral patterns in order to see if it can answer the researcher’s inquiry. People engaging in electronic devices were carefully noted and compared to people in other categories to see if there were differing patterns, such as the selection of their seating location and the length of their stay. The results can be included to make a design insight that applies to the future design in campus lunch landscapes. Further details about the methodology used in this study can be found in Chapter 3.

Expected Outcomes

The outcomes are expected to stay true to the previous observational studies on open spaces, such as those that Golicnik (2010), Marcus (1998), and Whyte (2001) provided. Whyte, who explored the urban plazas in New York City, found that people are attracted to sit near people. The seat choices and options should be available. The natural elements are important, but the shelter from too much of them is to be provided, and if possible, extra stimuli should be provided to create social triangulation (Whyte 2001). Marcus (1998) makes a design guideline to campus landscapes and provides a variety of instructions specific to the spaces. Most of these instructions mention that people are attracted toward the edge of the space, that the fascination elements such as water, plants, and wildlife must be accessible as well as food vendors, and that there should be variety of seating options with tables. Golicnik (2010) made observations in 3 open spaces in European cities, and noticed that the transparent edges, solid edges, and programming buffers will help determine the character of the space. These observations, however, do not regard people with portable electronic technology, so the second part of the hypothesis has been created on basis of the primary observational study of this thesis.

With the information obtained from these three related observational studies, this thesis hypothesizes that the students, faculty members, and staff members on campus will be attracted to the areas where there are edge seating with shelters. They will be there if there are plenty of fascination elements, and will stay longer with the food access and tables along with other types of seating. The people who are using electronic devices outdoors might react to the space differently, such as they will prefer the spot in the shade even in the colder days to prevent sun glare. They might have their headphone plugged in; hence the sound buffer might lose some priority to this user group.
In term of limitations, the results of this observational study will be rather specific with respect to many factors at the observation time, the seasons, and the locations. These factors can obscure the outcomes of the study. The carefully selected times and dates of observations and the references in previous studies, as well as a set of assumptions, can be used to ensure the accuracy of the outcome.

Conclusion

The university campus, as much as other work environment, can cause stress. Measures to alleviate stress and to increase the mental capacity of the students, the faculty members, and the staff should be taken in order to improve the quality of the academic life of the University as mentioned, researchers have found that the restorative environment or the natural environment can significantly help reduce stress, deflect negative moods, and increase attention span. During the modern era, time management can be a key issue, so campus lunch landscapes that people find inviting are very important. This research has aimed to determine what people like in such landscapes, what they do in them, and how they accomplish their tasks differently with the mobile electronic devices with them. The researcher of this thesis selected the approachable sites and made the observational studies that looked at the behavioral patterns in different spatial qualities. Statistical data was also collected and analyzed. The expected outcome was that people would enjoy those areas with fascinating elements, a wide range of seating, and food, while people with electronic devices may react to the space differently because of the specific needs their devices require.

The next chapter will explain current theories about the restorative benefits of nature, the definitions, significance, and history of lunch landscapes, and the importance of this study for individuals, society, and the ecological system.
CHAPTER 2: RESTORATIVE BENEFITS OF NATURE AND MODERN CAMPUS LUNCH LANDSCAPES

This chapter will first provide background information about restorative theories and the application of these theories to address the problematic issue of obesity. Next, after discussing the terms campus landscapes and lunch landscapes, the interrelation of these three ideas (restorative theories, campus landscapes, and lunch landscapes), will be discussed along with reviewing the relevance of restorative benefits of these landscapes to the University of Georgia. Included is an exploration of how engaging with electronic devices can affect health and behaviors and its prevalence in today’s society. To understand the bigger picture, theories that the exposure to natural environments is essential and beneficial to human as a species need to be discussed. That perspective would lead to the application of those benefits to the students and the faculty members as individuals, and to suggestions for how natural campus landscapes can support and improve the overall university’s performance and environment.

Restorative Benefits of Nature

Many studies involve the restorative benefits of nature for humans. In their Biophilia Hypothesis, Kellert and Wilson (1993) have explained well the notion of the relationship of nature and humans. The more practical studies, however, are based on two theories: Ulrich’s Psychoevolutionary Theory and Kaplan’s Attention Restoration Theory. Each one has conducted a different set of studies and has applied guidelines for the design of landscapes that foster health and well-being. For example, Ulrich has used the Natural Distraction Design for formulating the healing-oriented landscape, and Kaplan has used the Attention Restorative Elements for devising the restorative landscape. Furthermore, Kaplan has recently proposed that using the benefits of nature can create a better environment. Kaplan’s new applied theory is called “The Reasonable Person Model.” Before the findings of modern science, the healing and health benefits of landscape have been known and applied in the course of human history, even as early as the
time of Ancient Greece. Using an anthropological approach, Stella Maria Hug (2011) traced the evidence of the therapeutic effect of landscape on people’s health from the ancient time of Greek and Roman culture to the present day in order to display how landscape and nature can have therapeutic influences. Her study stresses the need for people with urban lifestyles to have access to the natural environment; however, she admits that conveying this finding needs scientific evidence to convey (Hug 2011). The modern conceptual idea of the restorative environment is described extensively by Stephen R. Kellert and Edward O. Wilson in *The Biophilia Hypothesis*. Their book provides extensive empirical reviews and applications of ideas that relate to the notion of the restorative environment. Wilson’s Biophilia Hypothesis contends that humans have a very strong connection to their natural environment, a connection that has developed throughout the evolutionary process. Humans evolved in a natural environment, and so genetically grew dependent on it. Human beings like certain elements of nature because they are hardwired to like these elements (Kellert & Wilson 1993). These reactions are thus inherent. This connection with nature is associated with human competitive advantages and genetic fitness; in other words, during the evolutionary process, those humans who tended to interact with nature became more suitable to survive and reproduce. The existence of our preference toward certain elements of nature implies that interaction with them increases the possibility of achieving personal goals and fulfillment in life as the population with biophilic tendency had thrived, making it a common trait throughout most human populations (Kellert 1997). While the book has set a basic understanding of why humans are connected to nature and how humans can benefit from nature, two more prominent theories can be used to scientifically explain the effect of nature on human health and well-being.

Terry Hartig (2007) collected the literature on restorative relationships between humans and nature so that the public could understand that the restorative environment provides health resources. In his essay, he separated the theories of restorative nature into two interconnected groups: (1) Ulrich’s Psychoevolutionary Theory and (2) Kaplan’s Attention Restoration Theory (Hartig 2007).
Although the term “Psychoevolutionary Theory” that Hartig used in his essay is not found in any essays that Ulrich has written, the prominent theory that Ulrich proposed was that humans have evolved along with nature; hence they respond to the natural environment. Ulrich agreed with Wilson’s Biophilia Hypothesis that humans are hardwired to respond positively to the natural environment. Through the use of evolutonal theory, he explained that the natural environment relieves the stress from fight-or-flight situations more quickly after the stressor has been removed; thus it allows a mental shift toward a positive emotional state. He also mentioned that only a few minutes of exposure to nature will reduce the symptoms that indicate stress. In the modern urban environment where there are many stressors, the exposure to the natural environment will help humans psychologically so that they are more resilient toward stress; thus they will suffer fewer hormonal responses from stress and have better physical health (Ulrich 1999).

The psychoevolutionary theory focuses on the reduction of stress and on emotional improvement after being exposed to green space, and was initially tested on the visual exposure of humans to vegetation. Ulrich (1984) provided a brief explanation of the theory in the introduction of his study on operational patients. In the study, the operational patients were assigned to random rooms with windows to either green space or brick walls. He found that the patients to whom the view of nature was available recovered one day faster and used fewer self-issued pain-killers. This well-known study proofs that visual exposure to the natural environment has a positive impact on physical and mental health (Ulrich 1984). To relate it to Kaplan’s Attention Restoration Theory, this thesis will refer to Ulrich’s theory as the “Stress Reduction Theory.”

Many applied studies have conducted an experiment related to the notion of Ulrich’s Stress Reduction Theory by seeking the stress reduction effect from visual and physical access to nature (Matsuoka 2010; Lau 2009; Leather 1998; Kaplan 1993; Lottrup 2013). Most of the studies assign the participants from different backgrounds (high school students, desk workers, college students) to the windows with natural views and compare them to the participants who have no access to views of nature
or to no view at all. The results always show that the view of nature produces the benefit of stress reduction and, in some cases, happiness in the work or school environment.

While Ulrich’s Stress Reduction Theory responds to alleviating stress and emotional response, Kaplan’s Attention Restoration Theory focuses on relieving mental fatigue and enhancing mental capability. In the book *With People in Mind: Design and Management of Everyday Nature* (1997), written to collect all the empirical studies and applications for designing restorative landscapes, Stephen and Rachel Kaplan mention the Attention Restoration Theory. Kaplan and Kaplan explain that humans have two different types of attention: involuntary attention and directed attention. In everyday life, humans have to battle mentally between the matters they need to direct their attention to, such as work or driving, and the other matters that will attract their attention such as loud noises. The effort used to focus with a directed attention leaves a person mentally fatigued. Mental fatigue can lower the ability to perform cognitive functions. It can also make people focus only on achieving short-term goals while ignoring long-term goals. According to Kaplan, their attention can be restored as they are exposed to the natural environment. The natural fascination helps alleviate the fatigue and allows the mind to be vigilant for decisions and cognitive ability.

Many studies have been completed to show that the Attention Restoration Theory has a wide range of application: motivation to study (Matsuoka 2010), better attention capacity (Lauman 2007), reduction of aggression and violence (Kuo 1998), better cognitive function (Wells 2000), and the creation of a better society (Kaplan 2011, Louv 2011). These studies compared two groups of subjects. One group had access to nature on a regular basis while the other group did not. The results showed that negative, impulsive thoughts were reduced when the group members were exposed to nature, and that their attention capacity was also restored, making them perform cognitive tasks more efficiently.

Ma (2007) conducted an extensive literature review to show the experiments based on these two theories, which had been conducted up to the year 2007, and included data on how the theory was measured and what the results entailed. These experiments concluded that the exposure to green space not
only mitigates negative health impact but also supports health improvement and happiness in many ways. A summary of the results can be seen in the table in appendix A.

Now that the basic theories have been discussed, the next step will be to look at what theories or models derived from these theories can affect the design guidelines. Two sets of elements essential for designing a restorative landscape will be discussed in this study: the Natural Distraction Elements and the Attention Restoration Elements. Then the Reasonable Person Model will be explained.

In 1999, Ulrich mentioned the Supportive Garden Design Theory. The theory described certain elements that will improve the health outcome of the patients in the healthcare facility. He claimed that stress reactions, such as blood pressures and stress hormones (Ulrich 1993), will affect the health condition of patients and that the exposure to the natural environment will alleviate the stress and hence improve the psychological and physiological well-being of patients. The natural alleviation of the stress in this design theory is called “natural distraction.” The natural distraction elements include (1) social support, (2) exercise, (3) positive distraction, and (4) sense of control. In other words, the therapeutic quality of the landscape can be accomplished by providing different seating groups for different sizes of social encounters; the opportunity to exercise at different intensity levels; the soft distraction of plants, arts installation, water, or wildlife; and the sense that the user of the site or other human has some power to control the environment, such as having a movable chair, choices of seating and paths, and a clean environment.

The Attention Restoration Elements has been explained in Kaplan’s book, *With People in Mind: Design and Management of Everyday Nature* (1998). The theory indicates that people have certain environmental qualities in which they will be most restored. The restorative elements include (1) being away, (2) extent, (3) soft fascination, and (4) compatibility. In order to optimize the restorative effect in human mental capacity, the landscape has to remove the user’s mental awareness from the stressor. The landscape also has to promise a physical connection to the bigger environment (curvilinear paths that promise more will be seen) or mentally (a miniature waterfall that reminds the user of the larger, natural
ones). In addition, the environment has to contain the element of soft fascination. Soft fascination is an element, such as water, vegetation, or wildlife, that can retain the users’ attention but does not force the users to strain their indirect attention. Finally, the landscape has to be compatible, which mean that the user will be able to navigate among and access the parts of the site they wish to.

It is essential to note that there is an overlapped connection between their theories. The soft fascination of Kaplan’s theory and the positive distraction of Ulrich’s theory are defined similarly and function in a similar manner; in addition, the compatibility in Kaplan’s theory and the sense of control in Ulrich’s theory have similar meanings and purposes. This overlapping may mean that the restorative environments discussed in Ulrich’s and Kaplan’s theories are similar environments, and thus display the connection between the two prominent theories that describe the restorative benefits of nature.

The Reasonable Person Model (RPM,) introduced by Kaplan in 2009, differs slightly from the two theories, the Stress Reduction Theory and the Attention Restoration Theory, discussed earlier in this chapter. The RPM approaches the relation of humans to nature more from the psychological side of environmental psychology; however, it shows the relationship between how humans process information in relation to the surrounding environment. The term “environment” used in the Reasonable Person Model also differs slightly since it includes the social environment as well as the physical environment.

Kaplan (2011) describes the RPM clearly. The model starts with the notion that a person can be reasonable, attentive, and focused, but that same person can be very distracted, impulsive, and unreasonable. The fluctuation between the two sets of activity comes from a person’s ability to process the information in a thought cycle that consists of three elements: making mental models, being effective, and creating meaningful actions (Kaplan 2011).

Mental model building is the thought process that humans make to see the causes, the effects, and the efficiency of creating an action. That is, it is the process that makes us decide whether our action would be reasonable. If the mind is distracted, the person will not have expansive access to the reasoning process, and thus the person will be less reasonable.
Meaningful Action is an aftereffect of mental model building, but it also can be influenced by the person’s social and physical environment. People become unreasonable when their efforts turn unfruitful or unrecognized. Their efforts produce frustration, which in turn creates a less effective mental model, and hence creates more meaningless actions. For this reason compatibility and the sense of control are important in the restorative and healing environment.

Being effective is the cumulative of being sharp and decisive. Being effective will create the confidence from mental models and meaningful actions that have been built in the past and enhance more efficiency in future mental models. If the environment causes the human mind to be distracted and impulsive, the person will be less effective and will have less confidence in the decision making process. The diagram below shows the relationship between the three elements of RPM.

![Figure 2.1 Reasonable Person Model, illustrated by Kaplan (2011)](image)

The natural environment helps people to respond to the model with more capacity, leading to stronger, more meaningful action, and ensures the sense of being effective. In short, the Reasonable Person Model explains how the exposure to green space can lead people to an overall better and healthier lifestyle. It also supports the hypothesis that those who are exposed to the natural environment will more likely achieve their personal goals in the long run (Kaplan & Kaplan 2011b).

This brief introduction to each theory associated with this thesis paves the way to discuss the importance of an individual’s benefits from natural exposure. It is crucial to understand how these theories and their related studies help explain the importance of regular exposure to the natural environment.
The proof of the relationship between physical health and the exposure to nature can be shown in Ulrich’s study (1984), which indicates that the viewing of green space shortens post-operative hospital stays and lessens the amount of self-issued painkillers used by patients. Hartig (2003) and Laumann (2003) agree that the exposure to green space lowers blood pressure and the heart rate. These physical changes, as noted by Ulrich (1984), may have resulted from the lower levels of stress and anxiety, which are affected by the exposure to the green spaces and the representation of natural environments, such as views from windows or graphic murals.

The most direct and obvious links between green space and physical health are stress and negative emotional responses, just as Ulrich (1999) mentions that stress can be a factor that effects negatively on physical health. Chronic stress has been proven to affect poorly on physical health and can lead to many health issues such as obesity, high blood pressure, and cardiovascular diseases (Kuo, Czarnecka, et al. 2008). As the exposure to the natural environment alleviates stress, it also reduces some factors that may lead to these health issues. Hartig (2007) has collected the data that physical access to a green space will reduce blood pressure back to the pre-stressor condition within 4 to 10 minutes. In the same study, Hartig mentions that the natural environment can evoke positive emotions and deflect negative ones within 7 to 15 minutes of exposure. Louv (2011) explains that green and open spaces help people meet each other in a less negative mood, allowing the social interaction that may help them cope with the stress. This way of coping reflects Ulrich’s natural distraction that social support helps reduce the stress in therapeutic landscapes (Ulrich 1999).

Besides relieving stress, the actions that lead toward better lifestyles can be inspired by the exposure to green space. Several studies have shown that the green spaces that accommodate physical activities such as jogging, walking, or other recreation can help encourage people to engage in those activities (Maller et. al. 2003). Hug (2009) compared two groups of people who exercised in indoor and outdoor facilities, asking them to give a score to both in term of restorative elements, excitement, and whether they should do it more often. The results showed that both groups considered exercising outdoors
as much more fun (Hug 2009). In addition, the study by Bodin and Terry (2003) tested 12 runners’ reports on emotional changes during urban and natural jogs. The results showed that the runs among nature had a moderate effect on improving depression and anxiety while these runs completely deflected the angry mood (Bodin, 2003). These positive reinforcements for physical engagement are helpful to reduce the factors of certain diseases like type II diabetes (Wells 2007). Brisbon (2005) also indicated the relationship between the quality of the built environment and asthma by showing that the lower level of physical activity along with a poor air quality can lead to a lower immune system. With the existence of more green space, the air quality can improve, and encouragement for physical exertion can be voiced. These findings mean that green spaces that offer opportunities for exercising can offer an additional health benefit.

Maas (2006) has further investigated whether the morbidity defined by physicians is also related to the green space found in people’s living environments. The study took data from medical records and compared these findings to the percentage of green spaces in 1 km and 3 km radii. At the 1 km radius from green space, 15 to 24 diseases appear in the lower rate. The relationship is the strongest for anxiety disorder and depression. The result yet again expands the endless restorative benefits of nature.

As explained earlier in this chapter, the Reasonable Person Model explains that humans will be more likely to achieve a long-term goal and have higher awareness of their well-being (Kaplan et al. 2011). That model implies that people with less mental fatigue will be more mindful about their diet, sleeping pattern, and exercise routine than those with higher mental fatigue; thus leading to a healthier lifestyle.

Specific Benefit Example: Obesity

To paint a clearer picture of how the exposure to green space can help reduce the factor and improve the conditions of a specific health problem, a prevalent health issue is picked to make a case study. The epidemic of obesity has been discussed for in depth. According to the University of Georgia Obesity Initiative (2012), which has a goal to tackle obesity in the state of Georgia, over 65 percent of the
adults in Georgia and 40 percent of the children are overweight or obese. The state has to spend more than 2 billion dollars each year to healthcare cost and the loss of productivity by obesity related issues (Obesity Initiative 2012). The University of Georgia has several movements to assess the issue such as the UGA Obesity Initiative, and hence will be discussed briefly to show the important role of green space in human health.

Obesity is a very complicated issue that consists of many contributing factors ranging from genetics to food to urban infrastructure. It requires a multidisciplinary approach, and cannot be solved by the exposure to natural environment alone (Wells etal. 2007). However, the natural environment can offer some contributions to reduce certain factors that may cause or prolong the obesity issue in an individual.

Stress, as the main link between physical and mental health, is a contributing factor to obesity. Lydia Kuo(2008) described an experiment in which she had given mice an energy dense diet, with the experimental group receiving some stressors and the control group receiving none. She recorded their changes several weeks later when she found that the visceral fat grew in the mice who had been exposed to stress compared to the control group whose mice had not been exposed, proving that stress can have a direct link to food consumption and storage. This experiment affirms that stress affects behavior and so can also affect human behavior, making people demand a quick, high calorie diet. Chronic stress also stimulates the brain to generate the hormones called neuropeptide Y, which increases the accumulation of belly fat (Kuo 2008). Cortisol also makes people tired and unproductive, which leads to less sleep and more stress (Kyrou 2008). The reduction of stress induced by the exposure to the natural environment, by theory, will reduce the time and the intensity of the stress (Ulrich 1984). When the period and the intensity of the stress have been reduced, the levels of the cortisol and the neuropeptide Y will have also decreased (Kuo 2008).

As discussed earlier, certain green spaces accommodate and inspire physical activities. Hug (2005) proves that exercise, either indoor or outdoor, reduces chronic stress. Regular physical activity will
also reduce the risk of obesity, since it stimulates muscle growth, increases metabolic activities, and increases caloric output. These factors contribute to reducing the risk of obesity (Brisbon 2005).

People with mental fatigue will be less likely to do something toward achieving long-term goals, according to Kaplan (1995). Their actions will come from impulsive thoughts, meaning that a person with fatigue will more likely eat an unhealthy food choice or decide against doing physical exercise. The sedentary lifestyle that can be caused by such impulsive behavior (Kaplan 2011) can contribute to obesity (Wells et al 2008). Exposure to the natural environment can increase human’s reasonableness and thus reduce the occurrence of this circumstance (Kaplan 2011).

Although regular exposure to green space alone will not cure obesity, the link between this prevalent issue and people’s physical and mental restoration can still be traced. In further studies and experiments, a stronger relationship may be found. As it is, this section of the study has shown the benefits of green space exposure to improve a specific health issue.

**Campus and Community Context of Restorative Benefits**

The benefits of regular exposure to the natural environment can extend beyond those that an individual gains. In a campus context, this exposure promises the improvement of the university as a whole. The physical attributes of the green space can contribute to microclimate control and a better environment (Erell 2011). The presence and the access to green spaces can heighten the students’, faculty members’, and staff’s cognitive performance (Kaplan 2007). A well-designed natural environment can also inspire the people around the university to make a better society and environment (Kaplan 2011). In addition, green space helps contribute to the system of creating a healthy campus design (Dooris 2001).

Not only do the landscapes such as lunch landscapes offer social and economic benefits, they also offer environmental benefits. A properly designed lunch landscape can help take care of the environmental issues in urban or developed settings such as storm water runoff, microclimate control, and wildlife habitat.
Berthier (2004) attempted to quantify how the storm water runoff from vegetative ground differs from the runoff from pavements in an urban catchment by using 2D analysis and proves that the presence of soil surfaces in the paths of runoff water makes a significant difference in urban and suburban environments. The green spaces that have soft surfaces, trees, and plants can help absorb the water from the storm water runoff that can be a big environmental issue in developed environments. Although the full effect of storm water mitigation can be achieved only by a carefully calculated design, the presence of green spaces in the middle of paved areas can help reduce the speed of runoff and offer the precipitation to the ground (Berthier 2004).

The landscapes between workplaces and food vendors, which are both fairly well-developed spaces, can also help control the microclimate and mitigate the urban heat island effect. Erell (2011) explains that many factors including building density, impervious surfaces, and the lack of vegetation can cause and intensify urban heat islands. To solve the problem, in another chapter Erell explains the significance of vegetation in the microclimate. Vegetation will help reduce the penetration of short wave solar radiation and intercepts the infrared rays coming into the atmosphere. Vegetation can create heat balance through its physical heat storage and photosynthesis, creating the park cool island effect that converts the urban heat island in the summer months. Urban parks with only 10 m (30 ft) across can reduce the microclimate temperature down as much as 2º K (4º F). The presence of an urban canopy can also help reduce the strength and the advection of the wind, making the microclimate more comfortable (Erell 2011). Erell’s study is supported by that of Masakazu (2012), who examined the relationship between the urban canopy and the radiant environment in street canyons. The results show that the urban canopy reduces the heat island effect and that the canopy should be required if the ratio of the width between two tall buildings and the height of the shortest one exceed 3:2(Masakazu 2012).

The more accessible the green environment is, the smarter and the more effective the members of the unit are. Studies have shown that human subjects can perform cognitive tasks better after their exposure to a green space. Wells (2000) demonstrates that children growing up in an area with a natural
environment have more attention capacity and cognitive ability. Tenessen and Cimprich (1995) looked at the window views of student dormitories and related them to the residents’ attention capacity. The students who had a more natural view out of their window scored higher than those whose views were directed to the built environment. Not only are students and children effected by the natural environment; older adults can also improve their cognitive function through their exposure to green spaces. A study in the geriatric care of older adults demonstrated that the elderly have more concentration if they spend time relaxing outdoors (Ottoson & Grahn 2005). In his study, Rodney Matsuoka (2010) mentions a more direct impact of the viewing of green space on high school performance. His study shows a strong relationship of the viewing of green space to students’ standardized test scores and their future life plan. With respect to college students, Lau (2009) reports the improvement of college students’ cognitive ability after experiencing a healing garden on campus.

The Attention Restoration Theory provides an explanation for these results. As mental fatigue builds up, people who have visual or physical access to nature have quicker, more effective way to relieve those tensions and to refresh their attention capacity; hence they can perform better in cognitive tasks. These studies imply that the views out of the windows and the exposure to nature can improve the work quality of people who have access to them. The campus can benefit from having smarter students and more capable staff and faculty members; thus it might be a good idea to provide the green space for them to visit on a daily basis.

The reduction of mental fatigue and stress can benefit faculty and staff in another way too. It makes the staff and faculty members love their job (Kaplan 1993). Employees who are happy with their jobs will perform their tasks better and will be less likely to resign. Furthermore, Kaplan (1993) mentioned the lower rate of ailment. Leather (1988) agreed that the exposure to green space buffers the effect of stress from work, thereby improving the general well-being of the workplace. Having fewer sick employees means better job performance, which will enable the system of the campus to run more smoothly and effectively.
The exposure to green space can contribute not only to the improvement of the individuals in that space and enhance the performance of the university campus—but also to forming a better society to a certain degree. In this section, the capability of the exposure to the natural environment to improve one’s social behavior, the quality of the neighborhood, and environmental actions will be discussed.

In its theoretical perspective, the study of Kaplan (2011) mentions reasonableness and its effect on people. One can understand that a person can be very reasonable, nice, coherent, and generous at times and that the same person can be irritable and out-right uncooperative at other times. This understanding occurs because the human mind processes emotional reflection and responsive actions, as described in the Reasonable Person Model. The model requires directed attention; in other words, if a person has a lower attention capacity, the model will not run as effectively. The outcome is that people will more likely be irritable, impulsive, and responsive to negative emotions. Kuo and Sullivan (2001b) have proven that people who have regular exposure to a natural environment while living in low-income housing will be less likely to use aggression and violence in comparison to those in the same situation who do not have regular access to green space.

In another study, Kuo and Sullivan (2001) examined the crime rate in 98 apartments in inner city neighborhoods with and without green spaces. Their results show that the apartments with less access to the natural environment had more crime reports. The same study suggests that there is a negative relationship between the perception of danger and the amount of green environment, while the relationship of the accessibility to green space, trust, and perception of safety is positive. This study shows that the regular exposure to the natural environment can be a factor that contributes to a better neighborhood and community.

The exposure to a green environment may increase the tendency for people to create a better environment according to Kaplan (2011), who also discusses the factors that can affect the global environment. A common term that is used to describe the decline of the quality of the environment, which is caused by humans, is called “the anthropogenic factor.” Kaplan (2011), who discusses the
anthropogenic factor, offers the new term called “the anthropogenerous factor”: a human factor that positively affects the quality of the environment Kaplan suggests that by being surrounded by a supportive environment, people will be generous and caring for the environment as well. This extension of generosity and care can be supported by the Reasonable Person Model Theory (Kaplan 2011b). If humans have a very effective decision-making model, they will realize that those actions that are friendly to the environment will positively affect humans as a species; hence, they will be concerned about their environmental actions (Kaplan 2011).

The quality of the campus landscape can improve the quality of the overall campus. Dooris (2001) discussed the emergence of using the setting-based approach to promote health and its application to higher education by creating a case study at the University of Lancashire, England. He studies the structure of how health and well-being concerns can be addressed through settings and how the external environment can be included in part of the planning. The factors of students’ and faculty members’ well-being include (1) a healthy, supportive empowering workplace; (2) healthy student personal and social development; (3) supportive and health-promoting physical environments; (4) a wider community; (5) academic development in curricula and research; and (6) health policy and planning. The relationships of these five factors are shown in figure 1.2 below. Lau (2009) used this model to make a case study at the University of Hong Kong to add a “healing garden” to the university campus. He mentioned that the requirements in numbers 1, 2,3, and 4 can be accomplished by a well-designed campus landscape.
Lunch Landscape and Campus Lunch Landscape

“Lunch landscape” is the term designated in this thesis to describe the landscapes that the thesis focuses on. This term will be referred to often in this study. The lunch landscapes are defined by their relative distance to two components of the daily schedule: work and lunch. The location is what makes this type of landscape a prime spot to have daily exposure to green space. With the limited use of vehicular access on campus, the walkability between the green spaces, the food vendors, and the lunch landscapes should be highly considered. According to Marcus (1998), a campus open space is more likely to be used if it is associated with class buildings or food vendors. In 2002, the Mineta Transportation Institute published an article to introduce design and planning professionals to the technology needed for the application of the Transit Oriented Design study (TOD). Most of the publication applies the Geographical Information System to planning, but the regulations and basic theories regarding the TOD...
are explained thoroughly. The publication’s lead author, Bossard (2002), indicates that the distance should be 0.5 mile for walking and 2 miles for bicycle. Hence, the definition of the term “lunch landscapes” in this study includes the green spaces that are 0.5 mile within the radius of a food vendor, and at the same time are 2 miles within the radius of any work places or classes, and vice versa.

There are not many case histories relating dining and the public landscape together, especially lunch. The few studies provide limited insight about the design for eating outdoors, and about how the surrounding environment can affect the size of the eating portions and the type of food being eaten. To understand the notion of lunch landscape, these available studies will be explored.

The only resource found so far that describes the physical setting of outdoor dining is Women and the Everyday City: Public Space in San Francisco, 1890-1915, written by J. E. Sewell (2011). Sewell explores how women experienced the urban landscape and the modern [1900s] use of public space, and how the landscape changed when women became a part of urban society. The study uses the records of three women in different social statuses between 1890-1915 in San Francisco to map out the location each one visited and to reconstruct their fantasies and memories in historic perspective. The section that involves the built dining landscape for women explains that the dining for women is hidden from the main promenade, with vegetation for privacy. There is the notion that eating outdoors in the urban space is more for entertainment than function. On the other hand, the section implies that dining for men when they socialize is just among men who are out at the promenade, observing the pedestrians (Sewell 2011).

The trend of men’s outdoor dining seems to have become universal in the study conducted by Whyte (2001) in the late 1980s. Through an observational study called “Street Life Project,” Whyte and his peers collected information and direct observations in many parks and urban plazas in New York City. In his concluding chapter Whyte indicates that food attracts people who attract more food and food in turn again attracts more people. The plazas and spaces should be made versatile to embrace street dining and outdoor plazas that transition gracefully and transparently into the traffic flow. He suggests that the space should be designed so that people can stay a while. His observations about the Southledge area show that
three-fourths of all users during the lunch hour stuck around for more than 15 minutes, and that they stayed when the space was crowded. The more recent study by Zacharias (2004), who observed 7 popular urban plazas in San Francisco during 11 a.m. to 3 p.m., supports Whyte’s observations by saying that people will adjust their crowding threshold when the space is quite attractive.

Claire Cooper Marcus and T. Wischemann (1998) suggest many directions in designing campus landscapes, options which concern their use during lunch time. The uses of approachable, affordable food vendors, along with having tables for the users to eat on, are suggested. It seems that the choices of seating comprise a very important part in the design of a lunch landscape. The seating must be flexible enough to allow a private time, a small group, or a large social dining encounter. The detailed considerations even include watering the vegetation during the evening, so that the grass could dry by lunchtime.

The two studies by Woodruff and Sobal have related the surrounding environment with dining portions and types. Sobal (2007) investigated how the microenvironment can affect food intake. He found that the color, the package, the size, and the surrounding distractions can contribute to making food intake differ. For example, when an eater is distracted, they tend to eat more than the usual portion. This study shows that the environment can affect food intake, but it does not discuss the effect that the outdoor environment may have toward the dining experience. Woodruff (2005), on the other hand, studies the relationship between the location where the Canadian students eat food and the types of food they eat. The results showed that the students who ate food at home or at school were more likely to get healthier food than those who ate at the food outlet or “between the places.” Unfortunately, Woodruff admits that the location “between the places” is unclear; hence the study cannot prove more than to explain that the location of dining can affect the choice of food that students eat.

The historical perspective of landscape regarding lunch is succinct, since the landscapes are built to be used for many purposes other than lunch (Marcus 1998). However, having landscapes and open
spaces known as lunch landscape around campus could make a significant improvement to campus environment.

Because of the poverty of time that people are facing in the modern environment (Broom & Starzdins 2007), lunch landscapes have great value in that they offer a quick way for natural exposure. During the tight schedule of the day at a university and in the midst of the new technology that creates the information overload, a 4-minute exposure to green space will help restore attention capacity and alleviate stress (Kaplan 1988).

The lunch landscapes are like other green spaces in that they draw the sense of place into the location they are in. The spaces are thought of as parts of the work places or campuses. In this regard, the lunch landscapes can make the work or school environment persuasive for visitors to join the institution. It was studied that these lunch landscapes would make the employees and students work more efficiently and keep the job longer, and that these designated places can create a sense of community in a workspace or a campus (Ma 2007).

Well-designed landscapes are attractive. People are drawn to nature and tend to feel happy around green spaces. The campuses and workplaces that have green spaces such as lunch landscapes create the “cue to care” which makes people feel secure; hence, the lunch landscapes on campuses or businesses that are well designed can attract new students to attend that university and new employees to join company (Kaplan 1997). Because of the restorative benefits of nature and the human intrinsic value to love certain language of green spaces, the well-designed landscapes around work or study areas make people happier and do their jobs better. Matsuoka (2011) shows that students score better in standardized exams and think more about their future in schools that make exposure to nature accessible (visually or physically). Kaplan (1993) also states that people will keep their job longer and perform the jobs more efficiently with the green spaces around workplaces. Finally, the green spaces on campus or workplaces such as lunch landscapes create the sense of community (Kuo and Sullivan 2001). The green spaces allow people to meet when they are relaxed and attentive, making them friendlier to each other than usual. In term of
workplace or college campuses, these effects can lead to collaborative work and companionship among students, faculty members, and staff.

The restorative benefits of lunch landscape can improve the University of Georgia in similar ways so that it can improve other campus landscapes, but some specific information is specifically relevant for making the University of Georgia campus the optimum place to study.

The Main Campus of the University of Georgia in Athens is quite large. According to the webpage, UGA by the Numbers (September 2012), the main campus consists of 389 buildings on 759 acres and is expanding. The workforce in total of 9,757 includes 2,862 faculty members, 4,053 administrators, and 2,842 staff members. The school has the total of 34,475 students (including extended campus). To make this information relevant, the University of Georgia is bustling with people who seek stress reduction and attention restoration, thinking it would be good to improve cognitive performance (aka. hoping for a better grade), and who want to have a happy, healthy workspace.

**Mobile Electronic Devices and Behavioral Impact**

Studies involving mobile devices are available, with most looking at the use of the mobile telephone, since it has been there the longest. Many studies link the effects these mobile devices have on human behaviors (Yuan 2012, Hong 2012, Mansar 2012, Turner 2008). Unfortunately for smartphones, the behavioral studies are aimed for examining mental health related behavior along with market buying decisions (Mansar 2012, Fjeldsoe 2009, Morris 2012, Hong 2012). A few studies mention how these mobile devices can impact health and cognitive related behavior both positively and negatively. Among those studies, one study (Turner 2008) shows that the location and the surrounding environment have an effect on the comfort of using an electronic device; however, this study does not include the green environment as a specific setting.

Studies show that having electronic devices available can result in positive effects. Mansar (2012) and Fjeldsoe (2009) claim that electronic devices can be used to promote a healthy lifestyle and well-being. Fjeldsoe (2009) reviewed 14 studies that evaluated health behavior interventions generated by
Short Messages System and assessed the changes in behaviors to see if virtual social support could make a change in bad habits. The result is that the social support from short messages can intervene to counter unhealthy behaviors and promote healthier ones. Mansar (2012) focused on a more specific problem. In order to design a web interface for Middle Eastern people to fight against obesity, the researcher made a brief literature review of how action intervention provided through the use of electronic devices can help improve social behaviors. The answer is that the web-based electronic devices can, at all times, increase awareness of people’s goals, foster motivation, and improve the attitudes of the participants. This finding means that when the electronic devices are used in the right way, their use can promote health and strengthen social supports for better social behaviors.

However, negative behaviors can also impact upon the use of mobile electronic devices. Hong (2012) examined the relationship between the psychological character of phone addiction and the use of mobile phones in Taiwanese female students. Hong explains that electronic devices can reduce concentration during class, lead to unsafe driving, and create more stressful financial situations. Chow (2007) showed that the financial situation is one of the main issues that puts stress on the students and hinders their academic performance. According to Hong, high anxiety and low self-esteem are related to the amount of cell-phone use. Female students, more likely than male students, use the cell phone as their primary social interactions with friends, romantic interests, and family members (Hong 2012). The study shows that the electronic devices can be overused and create more stress.

The most relevant research data found on mobile devices and human behaviors while using mobile devices in public was made by Turner (2008). Turner considers those phone behaviors with which people are comfortable and those that annoy them, in different settings. According to Turner (2008), cell phone subscription has soared beyond the population size in many countries. People have started using cell phones in places such as the streets, public transportation, and bars. Mobile phone conversations can be an extra cognitive burden for those who use the device and those who overhear the conversations. In the study, Turner gave a survey to 184 participants to assess their comfort when using
the phone or hearing someone using it. The results show that people are more comfortable using cell phones on the street, then at public restaurants. The place people feel less likely to use their cell phones is a public transportation line (Turner 2008). The study, although very detailed, does not mention the use of cell phones on green spaces or in any outdoor settings that are not on the street sidewalks.

Many studies admit the prevalence of mobile technology. The first published journal relating mobile devices and human behaviors together, so far found, was published on 2008. Most of the studies related to smart phones were published in 2012, (Mansar 2012; Morris 2012; Hong 2012; Bernacki 2012). The use of laptop computers or tablet computers has not been widely studied in behavioral field. As far as the research literature conveys, environmental behavior studies have never focused on the use of electronic devices. Turner (2008) mentions in his results that only 58% of the participants carried their cell phones everywhere, and 59% of them thought that a public call should only be made in an emergency situation. Marcus’s study was published in 1998, and Abu Ghazzeh’s study was published in 1999; hence, the use of this type of electronic device was probably not a prominent activity at the time. However, since people are now using cell phones and other electronic devices in many different ways, their use may significantly affect how people act and react in an outdoor environment as well.

The University of Georgia Relevance

The University of Georgia is on its way to becoming a healthy and green university. The main campus is adorned with many attractive green spaces based on the primary observations gleaned from the data collection for this thesis. There are many organizations in the University of Georgia that target the improvement of the health and well the being of the students, the faculty members, the staff members, and even the population of Georgia. The Obesity Initiative, for example, creates an opportunity to tackle obesity health-related problem (Obesity Initiative 2012). The University Health Center and the Department of Sports and Recreations have many health enhancing programs, such as counseling, cooking classes, and the Biggest Loser UGA activity (UHC).
However, having more insight about the present design of the University of Georgia campus would make the future design and planning of the main campus filled with health and well-being goals. This study can help provide information for the development of the Health Science campus as well as the campus Transit Oriented Design master plan in 2050.

**Conclusion**

Many theories relate humans with nature. Kellert and Wilson’s Biophilia hypothesis suggests that humans and nature cannot be separated. Ulrich’s psychoevolutionary theory agrees and maintains that when humans are exposed to natural environment, they feel happier and less stressed. The Attention Restoration Theory focuses on the attention capacity in human beings, and how the natural environment can replenish them. These theories have been tested to show that the exposure to green spaces can contribute to reducing the factors of prevalent health problem such as anxiety disorder and obesity. Further studies show that the natural landscapes in campus environments physically enhance the ecology of the campus, increase student and faculty performance, making them love their jobs, and create a better society and community. However, because of the time crunch, the option of accessing the landscape during lunchtime is crucial. Time does not often allow people to be outside and do other activities after they have finished their work. Work also builds up stress, which the exposure to natural elements can break down. The University of Georgia is a large campus with a lot of mature trees; thus its green spaces can provide replenishment to people seeking restoration. Although the current campus is already healthy and green, more information about the use of green space needs to be explored, especially with respect to the TOD and the development of the Health Science Campus, so that green spaces will be planned in the pocket spaces during train and bus rides and so that green roofs, green walls, and more healing gardens will be added as well.

The next chapter will discuss current behavioral observations and surveys about open spaces, which can be applicable for campus lunch landscapes.
CHAPTER 3: IN-DEPTH LITERATURE REVIEW– CASE STUDY APPROACH

Looking through the available studies provided a substantial amount of information. It showed what has been found, what is left unclear, and what can be further explored and examined. The last chapter discussed the theories that prove the restorative benefits of nature. In this chapter, the studies that measure the importance and the guidelines for the design, which can be relevant to lunch landscapes, will be fully discussed. Many studies have been conducted to look at the behaviors of teenagers, at various settings such as the campus landscape, the urban plaza, and the pocket parks. These studies will not only contribute to seeing the design of such spaces in a different light, but will also help create the experiment that is compatible to the timeframe available and the information that is needed in the author’s study.

In the research for this thesis, 8 studies presented themselves as having a close relationship to the thesis and so need to be examined for the contributions they can provide. Each study was examined closely, based on the following six categories.

Purpose: The purpose of the study helps the reader identify whether the study is related to the reader’s topic of interest. In these case studies, the purpose will help the thesis author understand what the case studies’ authors were looking for.

Methodology: Methodology is the way that the study sought to answer the questions posed in the purpose. The thesis’s author can use this part of each case study to modify the observational study for accurate results.

Measurement: Measurement is a part of the methodology that the thesis’s author wants to focus on. It shows form in which each study recorded its data. Again, this part will help the thesis’s author create a practical, believable result in his study.
Results: The results of the previous studies show what has been done and what can be applied in the future. The thesis can use supportive evidence and factual bases to build on, make comparisons to, and offer as explanations about, specific circumstances.

Discussion, Application, and Analysis: The discussion, application, and analysis shows the readers how the results can be applied or generalized for utilization. Many studies lack this part of the study, but by identifying the process used to determine the results of the data, the thesis can complete its inquiry more accurately and efficiently.

Relevance to this thesis: The relevance is created to show the thesis’s author reasons to select the studies.

These are the case studies selected for this thesis, ordered at the time the experiment is conducted.

1. The social life of small urban spaces / by William H. Whyte (1980)
2. Campus Outdoor Spaces/ by Claire Cooper Marcus (1998)
5. Introducing Healing Gardens into a Compact University Campus: Design Natural Space to Create Healthy and Sustainable Campus/ by Stephen Lau (2009)
7. Emerging relationships between design and use of urban park spaces/ by Barbara Golicnik (2010)
Overall Relevance

Overall, these 8 studies present information that can be used in three different parts of the current thesis: supportive background information, methods, and design suggestions, including design theories.

Abu-Ghazzeh (1999), Lau (2009), Matsuoka (2010), and Ivarsson (2012) present strong cases about the benefits of natural exposure at different levels, which are closely related to the thesis. The sections in Abu-Ghazzeh’s and Lau’s literature reviews provide information about the benefits of green spaces on the university campus and their exposure to the students and the professors. While Lau (2009) focused on a more compacted sized university in his case study (Hong Kong University), Abu-Ghazzeh focused on a university similar in scale as the University of Georgia (University of Jordan) in his case study. They both confirm that university campuses, regardless of size, need the restorative landscape. Matsuoka (2010) looked at the high schools in the Michigan area. Although his study subjects are slightly younger than the ones in the focus group of this thesis, Matsuoka effectively presented the increase in academic performance and positive student behaviors in relation to their exposure to green spaces. His study stands out from the other studies because it is the only study that the thesis author could find that recognizes the significance of lunch landscapes. He also suggests in his discussion the need for a specific study to look at individual behaviors that people might do during lunch breaks. While Ivarsson (2012) did not focus on students or campus environments, his study shows several activities that can relate to the restorative environment, which demonstrate that a variety of lunch landscapes should be provided.

Many studies contributed to the methodology for this thesis. The research studies of Whyte (1980,) Marcus (1998), Zacharias (2004), Matsuoka (2010), Golicnik (2010), and Ivarsson (2012), provided ideas to create the methodology used in this thesis study. Whyte (1998) originated observational study and confirms it as the optimal way to look at specific behavioral patterns in given spaces. Marcus (1998) has recommended the Post Occupancy Evaluation method and explains it in practical details. Parts of the methodology used in this thesis, including the preliminary observation, the site inventory, and the primary observation, have been modeled after the Post Occupancy Evaluation method. Zacharias (2004)
observed the habits of people who smoked, which according to his study caused the public to feel aversion towards those people. This specific information was adjusted to fit the assessment of attitudes towards the electronic device users. While Matsuoka’s methods (2010) do not involve observations, his methods have helped towards generating a clear set of hypotheses. The steps for creating the hypotheses and proving them by the results are easy to follow and thus have been integrated into this thesis.

Golicnik (2010) suggested the technological use of the site inventory and provided observational tables and maps, which this thesis has used as an example. Ivarsson (2012,) states the typology of landscape she used and formulated during her preliminary observation. The process of creating a type as Ivarsson did is improvised in this current thesis in that the categorization of the sites is based on activities themed by the observer.

Table 3.1 concludes the studies according to the six criteria mentioned previously. The full analysis can be found at APPENDIX B
<table>
<thead>
<tr>
<th>Number</th>
<th>Journal Article/Book Chapter</th>
<th>Author</th>
<th>Year</th>
<th>Aspect</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The social life of small urban spaces</td>
<td>Whyte</td>
<td>1980</td>
<td>Purpose</td>
<td>examine the behavior of social life in urban spaces and explain it in simpler manner</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Methodology</td>
<td>The time-lapse filming and video records</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Measurement</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Results</td>
<td>1. People are attract to people</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Use movable seats</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Create Suntraps/ wind protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Food attract people</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. Smooth transition between spaces and transit</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. Undesirables avoid people</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7. Create triangulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Discussion /Application /Analysis</td>
<td>The analysis is unclear/ The application is the design guideline for public spaces</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Relevance</td>
<td>The directional guidelines can be used to evaluate the sites</td>
</tr>
<tr>
<td>2</td>
<td>Campus Outdoor Spaces</td>
<td>Marcus</td>
<td>1998</td>
<td>Purpose</td>
<td>Discuss the guidelines of the design in social landscapes around campus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Methodology</td>
<td>Post Occupancy Analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Measurement</td>
<td>Who are using the spaces?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>How are they using it?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>What trace do they leave behind and what does it indicate?</td>
</tr>
<tr>
<td></td>
<td>What works and what does not?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>---</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results</td>
<td>Separates types into 'rooms'; gives different guidelines to each room</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mall, front porch, front yard, backyard, and study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow the activities to match rooms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide good microclimates and choices of seating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back of the seats must me trees, shrubs, or walls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussion/Application/Analysis</td>
<td>Applied into guidelines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relevance</td>
<td>The methodology is clearly laid out and easy to follow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th>Communicating Behavioral Research to Campus Design: Factor Affecting the Perception and Use of Outdoor Spaces at the University of Jordan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abu-Ghazze</td>
<td>1999</td>
</tr>
<tr>
<td>Purpose</td>
<td>Find people’s meanings and values associated with outdoor spaces, the quality of the space that infuses sense of place, and the importance of the perception of green space to every day’s experience.</td>
</tr>
<tr>
<td>Methodology</td>
<td>Observation, survey, and interviews</td>
</tr>
<tr>
<td>Measurement</td>
<td>simplified and reconstructed interviews, survey results</td>
</tr>
<tr>
<td>Results</td>
<td>People see the importance of green space</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Discussion /Application /Analysis</td>
<td>People's preferences are based on perceived functions</td>
</tr>
<tr>
<td>Relevance</td>
<td>Applied results based on Marcus's studies.</td>
</tr>
<tr>
<td><strong>4</strong> Spatial Behavior in San Francisco Plaza: The Effects of Microclimate, Other People, and Environmental Design</td>
<td>The author suggests the implication and recommendation on further researches by recite three approaches to evaluate landscape: the physical and ecological quality, the behavioral and functional quality, and the visual quality.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Determine whether the behaviors are similar across different microclimate regimes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodology</td>
<td>Seven privately owned plazas in downtown core of San Francisco are examined in 30 minute temporal periods randomly picked from 11am to 3pm.</td>
</tr>
<tr>
<td>Measurement</td>
<td>The effects are interpreted by measuring the length of seating or standing in sun and shade. The head count is conducted to calculate density. The information is processed through multiple regression analysis</td>
</tr>
</tbody>
</table>

Zacharias 2004
<table>
<thead>
<tr>
<th>Results</th>
<th>Discussion /Application /Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>The hotter it is, the more people sit in the space</td>
<td>The study disproves the conventional believes that people in different climate will have different preference in microclimate conditions. Social factors and design factors have been considered differently for quite some time, but upon this study show that two social behaviors will not disturb each other as long as there are available zones for each one. Designing seating and effective social setting cannot replace the thermal comfort or sunlight, which the designers have to truly bear in mind.</td>
</tr>
<tr>
<td>Smokers move to the less desirable spaces and group among each other.</td>
<td></td>
</tr>
<tr>
<td>The amount of seating space or alteration of environmental design has only modest impact to the user compared to the existing microclimate.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relevance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>This study mentions that the outdoor temperature people prefer fall around 60-69 F</td>
<td>Supports that the observational study done in University of Georgia can be generally applied to the certain extent.</td>
</tr>
<tr>
<td></td>
<td>The methodology of this study is very well documented, hence can be highly used in consideration on how to conduct the thesis observational study</td>
</tr>
</tbody>
</table>
The analytical process is very transparent and clearly explained

<table>
<thead>
<tr>
<th>5</th>
<th>Introducing Healing Gardens into a Compact University Campus: Design Natural Space to Create Healthy and Sustainable Campus</th>
<th>Lau</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>Seek understanding and provide the proposal for campus natural space and potential roles of creating supportive campus environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methodology</td>
<td>Questionnaire to 33 participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td>Multiple choices for the perception and usage pattern, natural view, and preferred areas to sit in a natural space.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results</td>
<td>People enjoy green spaces for an escape from stressful environment, but they prefer more urbanized settings for socialization. Most participants visit the green space once a week. Half of the participants stay in the space for 10-20 minutes. The reasons for the visit are taking break from work and just to get outside. Time seems to be among the strong factors that inhibit the subjects from visiting the green spaces. 94% of the participants have visited and enjoy the views at the green space. The participants indicate that visual access is important.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Student performance and high school landscapes: Examining the links</td>
<td>Matsuoka</td>
<td>2010</td>
</tr>
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<td>---</td>
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</tr>
<tr>
<td>Discussion /Application /Analysis</td>
<td>Enhanced visual connection of natural space</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Space morphology must be coherent to its function, and microclimate control is to be highly analyzed.</td>
<td></td>
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<tr>
<td></td>
<td>Chose plants that allow fascination while ecologically friendly</td>
<td></td>
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<tr>
<td></td>
<td>The vertical spaces such as green walls and green roof should be highly considered.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relevance</td>
<td>Shows that there are connections across culture in human preference and perception in natural exposure.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purpose</td>
<td>Examines roles played by the availability of nearby nature in high school student academic achievement and behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methodology</td>
<td>Hypotheses are tested in 101 high schools around the state of Michigan, making correlation between the performances and 4 different types of access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement</td>
<td>Chimprich rating to rate the views of nature in each school</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The naturalness is measured and rated in the campus’s cafeteria and classroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher visual access to nature and higher performance are highly correlated</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discussion/Application/Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>More contact of naturalness during lunch can lead to higher performance. Landscape without nature brings stress. Green spaces can affect important decisions in students. Nature in campus landscape is not just for beauty.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The notion of lunch landscape is mentioned to correlate with academic accomplishment.</td>
</tr>
</tbody>
</table>

The length of lunchtime is recorded to compare with student performances.

The views that contain trees and shrubs have more positive effect to students’ performance and behavior than those with grass and parking.

The vegetation rate has positive effect in performance and behavior.

The higher performance is correlated with the ability to physically contact natural elements. However, the size of the window generates no difference.

The significance of decision making in late adolescent age is discussed and proven to be important.
<table>
<thead>
<tr>
<th>7</th>
<th>Emerging relationships between design and use of urban park spaces</th>
<th>Golicnik</th>
<th>2010</th>
<th>Academic setting, although in a different level, has been used to be a focus area in the study.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Use GIS to map behaviors in open spaces</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Methodology</strong></td>
<td>The observation are recorded on map by graphic notes with very detailed description and programmed into GIS.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Measurement</strong></td>
<td>Symbolizations of common activities such as sitting in pair, walking in pair, fishing, skateboarding, lying down, etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Results</strong></td>
<td>Landmark and edge can create attractive seating. Active use of lawn depends on buffer zone and inner edges of the space. Perfect seating is against a solid edge at least 5 m (15 ft) from pathways. Sizes of lawn will accommodate activities that can be performed in the inner buffer. If the character of the space becomes an island: no solid edge, people will not stay there. Trees can be anchor to solve the island issue.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Discussion/ Application/ Analysis</strong></td>
<td>Golicnik concludes that GIS helps develop an effective analytical data, and recommends it to be used in further observational research.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Differently Designed Parts of a Garden Support Different Types of Recreational Walks: Evaluating a Healing Garden by Participatory Observation</td>
<td>Ivarsson</td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------</td>
<td>---------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
<td>The observational part of the methodology is clear, detailed, and precise, and may be used as an example to develop the thesis’s own list of things to observe.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>Explores how patients use and interact with the therapeutic settings by looking at the behavior and location.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Methodology</strong></td>
<td>The time of observation is between 9 am to 12 pm. The observation lasts 7 months. The data of 17 patients is collected consistently.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Measurement</strong></td>
<td>The process used is called participant-as-observer.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Results</strong></td>
<td>Data are systemized into several themes to conclude in behavioral patterns. The researcher categorized different types walking into two main themes: Introvert walk and Extrovert walk.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
No analytical procedure is explained to how to apply the emergent knowledge into the designs, but the author presents it as the description of the result and possible application that can be derived from such results.

The study is related to the current thesis by showing an example case of observational process.

Table 3.1 In-Depth Literature Review: Case Study Approach
Conclusion

All of the studies provide some design suggestions on which the hypotheses and the discussions can be constructed and based. While most of the general information, such as the microclimate, the seating positions, and the involvement with food, is provided by the guidelines suggested by Whyte (2001) and Marcus (1998), the thesis author’s study provides more specific information that can be applied. For example, Zacharias (2004) suggested that the optimal temperature is 50 to 72 degrees. Lau (2009) stressed the importance of ventilation and visual mystery. Matsuoka (2010) focused on the views from windows. Golicnik (2010) looked at the specific measurements and the shapes of individual activities, and Ivarsson (2012) focused on restorative walks, active and passive, which foster reflection on the landscapes that are appropriate for reflection and intimacy.

Existing studies can be used to determine the direction of future studies. The methodology and analytical process build a good example of how the studies that ask questions similar to those of the thesis, have been conducted. The results can be used to support, contrast, or compare with the thesis’s results to create more discussion. In this chapter, 8 studies from the field of environmental psychology and landscape architecture were explored, in particular examining them for the relationship between the physical character of open spaces and human behaviors. Many methods have been used to answer such questions including surveys, observations, interviews, and spatial analysis. The results point to a similar set of behaviors: people like nature, people need to feel secure and know where they are, and people enjoy the feeling of being away from a stressful environment.

In the next chapter, entitled “Methodology,” the method of observational study, which will be used in this thesis, will be discussed in great length. The importance of using the observational study, the sites selected, the analytical process, and the data collected will be revealed.
CHAPTER 4: METHODOLOGY

This chapter will explain the methodology that was used for answering the three thesis questions. As provided in the first chapter, the research for this thesis sought specifically to answer these three questions:

1. How do people spend time in campus lunch landscapes?
2. What spatial qualities or elements in lunch landscapes are people attracted to?
3. How do people with technology act differently from others in such green spaces?

To find the answers to those three questions, a participant-observation study was conducted along with two secondary studies: preliminary observation and site inventory. The two secondary studies have helped explain the results and shape the design experiment. The process of the study started with the exploration of possible sites via looking at the Google map and the maps from the University of Georgia Campus Architect website. From those maps, 12 sites were selected. The observer conducted preliminary observations and categorized the sites into 4 types of lunch landscapes. A site inventory was made for each landscape. The primary observation was conducted to observe and determine the specific elements that would be analyzed in the results. The full process of this research method is illustrated in figure 4.1.

This chapter has been structured into four sections. The first section will explain two supplementary processes, the significance of each process, the manner in which the data was collected and what information was retrieved from it. The second section explains the primary observation. In particular, it explains the possible approaches that could have been used for the studies and the reason why participant-observation was the one selected, the site selection criteria, the site categorization process, and the nature of the study. The third section explains the analytical process, telling why this process was selected among others, and what type of information will come out of the interpretation. The last section discusses the hypotheses, that is, the expected answers to the three thesis questions.
Figure 4.1 Diagram Showing the Process of This Study
Supplementary Processes

1. Preliminary Observation

As reflected in Figure 4.1, the preliminary observation was conducted to understand the space and create a better inventory for the sites, to identify the functional subspaces of the sites, to look for the “message from the administrator” and find what the spaces might be appropriate for, and to look for common behavioral patterns. This information was crucial for formulating the site categories and the action categories.

The method for this thesis drew partly from the step for Post-Occupational Evaluation (Marcus 1998) to guide the preliminary observation by being in each space and taking notes to describe what being observed on the site. These notes were taken into the analytical process of each site. This approach is relevant to the study because some behaviors that occurred on the sites were caused by certain subjective characteristics such as the relation to a building and the locations of the seats. The study was conducted as participant-observation, meaning that the observer acted as the user of the site; hence this approach reduces any impact that might affect the observed behaviors.

To record those subjective characteristics, the preliminary observation was conducted on October 5, 2012. Nine sites were selected at the time. The thesis author added three additional sites to the observation to create more variety and accuracy to the study, and then made the secondary observation on October 16, 2012. The full process of the selection of the sites will be explained in the second section of this chapter: the preliminary observation. Spending 5-10 minutes at each site, the observer noted how people moved through each space, the common behaviors occurring on each space, the information that surprised the author, and what matched the author’s expectations of each site. The notes taken on the primary observation and the list of actions observed are presented in Appendix C. The most common themes in the recorded actions are eating and drinking, reading a book, using electronic devices, and social interactions. There were physical activities at certain sites, but not at all of them. The author had expected to see more people having direct interactions with nature, such as sitting on the grass and
underneath the trees, but the results of such behaviors are quite low. These elements were noted and helped categorize the sites and actions as discussed in the next section.

2. Site Inventory

The site inventory is important for this project because its formulation allowed the observer to study the selected sites thoroughly. Such inventories provide records of what the observer saw in visual form and is easily accessed now and later by the readers interested in the study. The site inventory also helped identify the subspaces in term of areas, connections, and locations on large and small scales. Making inventories of the site helped record the location of circulation, messages of administrators, and behavioral trace, which can be used to generate the hypotheses of the sites. The information can help form hypotheses, for it allows the observer to generate connections between behaviors, furniture, and location.

The data was collected by using maps and observation data. The map data was acquired by using Google Map, Bing Map, the University of Georgia Campus Architect websites, and the Athens Clarke County data acquired through Taylor Ladd in 2012. The observational data was obtained from a photographic site visit on November 2, 2012, and two preliminary site visits. The compilation of the data for the site inventory will be shown and discussed in “Chapter 5: Site Inventory.”

In each site inventory, the observer provided (1.) the overall maps, (2.) the photographs, and (3.) the sketched plan with a text description.

1. The 1:1000 scale plan addresses where the site is on campus in relation to the campus precincts, the available eatery, and the available dining commons. It also shows the 0.5 mile buffer around the green space being addressed. The purpose of the overall map is to locate the site in campus context and to identify the potential users.

2. The photograph records the physical data and the quality of the site. Some of the quality cannot be captured only by photographs, such as the light play or the organization of the space looked at from ground plain. These photographs will be used to support some objective descriptions recorded for analysis, and some suggestion notes.
3. The sketched plan shows the site features, the site furniture, and the surrounding buildings to display what are offered to be done on the site. The messages from the administrator, such as the path that cuts through the grass a certain way, a sign (if applicable) along with the behavioral traces such as the foot path on the grass to show the effectiveness between design intentions and the uses observed. The circulation observed during preliminary observation is recorded in the site sketch.

**Primary Observation**

*Scope*

The study observed students’ behaviors on campus landscape during the lunch hours by using the participant-observation method. The time of observation was 11 a.m.–1 pm during the week days, as it is the time frame when people are likely to be at their lunch break. The session would last about 20 minutes. Whyte (2001) suggested that people stay around 15 minutes or more during the lunch hour in New York City. The case study provided by Ziesel (2007) also indicates that 20 minutes is enough time to observe the behavioral patterns and dynamics. Golicnik (2010) only spent 10 minutes on the visual scan of her observational study to identify the results. These studies show that 20 minutes is sufficient time to conduct an observation.

Due to time limitations, the study could not be conducted all year long. October, November, and February were the suitable months since the temperature range at lunch time fell at 50–70° F, covering the pleasurable temperature range offered in the study by Zacharias (2004,) who stated that the comfortable temperature to be outside is 60–69° F. The weather condition and temperature were recorded as variables that could factor into human behavior, but the observation was planned that it would not be conducted during the temperature below 50 degree or if it rained. The timeline of the observation is included in Appendix D.
Observational conducts.

1. The observer’s presence has minimal to no influence on the subjects’ behavior. This study is a participant-observation study, meaning that there should be no contact between the observer and the subjects. The contact between subjects and observer would also compromise the outcome of the study. The observer assumed that by observing the behaviors in the space, the observer had little to no effect on what the subjects were doing, and that the subjects assumed that the observer was another user of the space. However, some effects may be unavoidable. For example, the subject would not take the seat that the observer was taking, or they would not use the space in the same way if they were using the space alone (i.e., engage in very personal or intimate actions). These effects were minimized as much as possible.

2. There were no highly influential or mandatory campus events during the observation. The influential or mandatory events, such as University sport events, commencement, or graduation may have thrown off the dynamic of the space completely, so the observation was not scheduled to be conducted during such times. However, the regular events that happened around the spaces such as student activities, campus tours, or class dismissals helped describe the quality of the space clearer. In this observational study, the observer assumed that there were no influential of mandatory campus events happening on campus during the observation.

Site Selection

Since the University of Georgia is named one of the greenest campuses and is filled with green spaces and mature trees, the campus lunch landscapes in this study were sampled from several existing ones. The site had to follow the lunch landscape criteria. That is, it had to be within 0.5 mile walking distance from food vendors or an eatery, and within 2 miles or within bicycling distance to academic buildings. The University of Georgia has several types of food vendors as the map from the University of Georgia Campus Architect displays in Appendix E; however a certain types of vendor, such as those with fix-
priced meals and a meal plan system, do not allow the students to bring food outside; hence the study did not focus on those dining locations.

The sampling of green spaces was selected in numbers to closely resemble the number of food vendors in each campus precinct, but slightly differed because of the availability of green spaces to be studied. Campus precincts, according to Campus Architect, offer their own sense of place. According to Marcus (1998), students on campuses have developed a feeling of “home” based on the academic building they use the most. The author of this thesis has developed the notion that if a precinct carries the sense of place with that academic building, it can possibly act like a neighborhood to the students. This notion explains why the delineation of campus precincts is included in the study. The priority of the landscapes selected includes the ones closest to most food vendors; the ones varying in shapes, sizes, and characters; and the ones displaying a uniqueness of its spatial characters.

Overall, there are 6 campus precincts at the University of Georgia Main Campus. Of these 6 precincts, 4 have food vendors that fall into the focus for this thesis. In the 4 campus precincts that contain focused food vendors, there are 11 focused food vendors in total that are recorded by the University of Georgia Campus Architect, and 12 lunch landscape were selected for the study in this thesis. Figure 4.2 shows the locations of the focused food vendors in relation to the list of the study sites and campus precincts. The data and the geographic information used in this map of Athens Clarke County was acquired by Taylor Ladd in 2011.
Figure 4.2 Campus Precincts, Eateries, and Selected Sites
Site Categorization

The categorization of the selected sites was based on two factors: the general physical arrangement of the site and the behavioral traits most common in each space. The general physical arrangement criteria of the site are explained in Figure 4.3. The questions are asked whether the green space is a part of a food vendor, offers visually and physically wide open spaces, connects between multiple buildings, or supplies people with intimate areas where they can feel privacy and be alone. These characteristics were used to decide what categories they belonged to. The categorization was reinforced by the behavioral patterns in each space. The majority of the behavioral patterns such as eating, moving through the space, taking a nap, or other behaviors helped determine the categorization of the sites with less clear features.

![Diagram of Site Categorization](image)

Figure 4.3: Categorization Mapping Based on General Physical Arrangement
Out of the 12 observation sites based on primary observational study, the sites were placed into one of the four categories:

1. **The green spaces appropriate for dining activities** are the spaces that are adjacent to the food outlets, or the spaces that the food outlets on campus provided for dining. Most green spaces falling in this criterion will have a close proximity to, or are a part of, the food outlet; will offer intimacy; and be provided with seating with tables. The circulation will mostly be strict and efficient. Usually, these spaces are slightly smaller than the sites from other categories.

2. **The green spaces appropriate for movement and circulation** are the spaces that have a lot of open areas for active movement and multi-purpose uses. Usually, they are adjacent to many academic buildings and are large enough in size to accommodate a variety of activities. The circulations are very open for interpretation, and the seating is limited. The designs are usually formal.

3. **The green space appropriate for intimacy and reflection** are the spaces carefully designed to be experienced with the senses. They are treated to block off any distraction and usually reflect the naturalistic quality of design. Their size range from small to large. The green spaces for passive recreation would have a medium to large size and be filled with variety of plants.

4. **The green spaces for other purposes** do not fit in any of the above categories, but usually are much smaller pocket spaces that intermingle with the academic buildings or the pathway between classes. The special quality of these green spaces is that they create an interesting dynamic for people who use them. The examples for these spaces are pocket parks, transit hubs, or the front yard of academic buildings.

Table 4.1 shows the selected sites in their categories, and Figure 4.4 shows the selected sites according to the categories in campus context.
<table>
<thead>
<tr>
<th>Location</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green space appropriate for dining activities</td>
<td>Bulldog Café Courtyard</td>
</tr>
<tr>
<td>[cafés and restaurant courtyards]</td>
<td>Georgia Center Courtyard</td>
</tr>
<tr>
<td></td>
<td>University of Georgia Creamery</td>
</tr>
<tr>
<td>Green space appropriate for movement and circulation</td>
<td>Main Library Quad</td>
</tr>
<tr>
<td>[lawns and open spaces]</td>
<td>MLC Lawn</td>
</tr>
<tr>
<td></td>
<td>Brooke Mall</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Green space appropriate for intimacy and reflection</td>
<td>Warnell Garden</td>
</tr>
<tr>
<td></td>
<td>Founder's Garden</td>
</tr>
<tr>
<td></td>
<td>MLC Plaza</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Green space not intended for other purposes</td>
<td>Tate Deck  Greenroof</td>
</tr>
<tr>
<td>[pocket spaces, academic building front yards, etc.]</td>
<td>Lamar Dodd's Rain Garden</td>
</tr>
<tr>
<td></td>
<td>Odum’s pocket lawn</td>
</tr>
</tbody>
</table>

Table 4.1: The Sites in their Categories
Figure 4.4 Categories of Selected Sites in Campus Context
Observation subjects

Five dynamics were observed in order to answer the three thesis questions: the number of people circulating through the space at one time, the rough demographics, the location within the site, the actions, and the length of stay. The process of observation in each topic is described below.

1. The number of people circulating through the space: In certain sites, the areas are used for circulation. The number of people passing through the space can build the character of each space at the moment. To measure this category, the observer counted the number of people circulating through the area in thirty seconds at every five minutes’ increment. The number of people circulating may correlate with how many people decide to use the space and how long they stay (Zacharias 2004; Marcus 1998; Whyte 2001). A very well designed space, however, can alleviate the threshold of crowdedness (Zacharias 2004).

2. Demographics of the subjects: People with different ages and genders may have different preferences in environment (Abu-Ghazze1999; Whyte 2001). In this study, the observer looks at the estimate age groups of the participants (children, teen and young adults, adult, and elderly) and genders. The observer also takes notes on whether the participants come alone, in pairs, or in a group since they will act differently (Golicnik 2010).

3. Actions: The behaviors were themed into 6 categories based on the activities that the people performed during the preliminary observation. These activities include the following:

3.1 Eating and drinking: Eating and drinking is a part of a lunch break. Foodscape, to a certain extent, has influences in dining behavior (Sabal, 2007). This category includes snacking, drinking coffee, or any kind of meal.

3.2 Face to face social interaction: Social interaction is an important element in many observational studies (Marcus 1998; Whyte 2001; Golicnik 2012). The observation category includes only face to face interaction such as talking, showing intimacy, etc.
3.3 Non-electronic reading: Non-electronic reading is used because there are many people who read hard-copy materials outdoors. It also acted as the control variable when looking at those who engaged in electronic devices.

3.4 Restoration and natural engagement: Directly or visually engaging in natural/ restoration elements is a factor for improving cognitive ability and human functioning. Such behaviors included in primary observations are watching people, looking at the grass, and lying down. Although subjects may also get restorative benefit subconsciously by just being around the space (Abu-Ghazzen 1999), whether a participant enters the lunch landscape just to enjoy nature or not is worth exploring.

3.5 Physical activity: Physical activity is a rare pattern happening during lunch time. However, many spaces are suitable for physical activities. This category examines the possibility of physical movement during the lunch break such as throwing a Frisbee, throwing and catching a ball, or walking a dog. In some spaces, physical activities can happen often, while in some it is impossible.

3.6 Engaging in electronic devices: Since the portable technology has become popular, people are using them outside more freely. No observational study conducted outdoors has focused on these types of behaviors in environmental psychology, just yet. This category includes talking on phones, texting, using laptop computers and other mobile devices.

4. Location within the site: The observer took notes about where the participant stayed within the site, based on the functional subspaces indicated in the preliminary observation notes and the site inventory. This part of the observation can be used to decide which areas are suitable for certain actions (Marcus 1998; Ivarsson 2007).

5. Length of time: Although the length of time was difficult to determine because people moved in and out of spaces beyond the observational time (Zacharias 2004), the relationship between certain actions and elements and the length of stay was taken note of. In this study, if the
participants were in the space before the observation began, the observer put the word “Before” as the starting time. If the participants stayed until after the time of observation, the observer recorded the ending time as “After.”

**Hypotheses**

The hypotheses suggest answers to each of the three questions asked at the beginning of this chapter.

**Question 1:** How do people spend time in campus lunch landscapes?

**Hypothesis 1.1:** *The appropriateness of the space discussed earlier in this thesis will agree with the appropriate categories determined by the author.*

The author expects that people will spend time doing different types of actions in different types of campus lunch landscape. The uses of the landscapes will agree with the functions offered. In the green spaces appropriate for dining, most people will spend time eating and drinking at these areas provided. In the spaces appropriate for circulations and movements, the majority of the crowd will be engaging in physical activities. The spaces appropriate for reflection and intimacy will allow the majority of participants to engage in restorative activities. In the spaces for other purposes, the majority of the subjects will be engaged in socialization.

**Hypothesis 1.2:** *A higher percentage of male participants will sit closer to the crowd, and a higher percentage of female participants will use more electronic devices.*

Whyte (2001) mentioned in his study in 1980 that men would prefer the upfront area next to the crowd. Another gender-specific characteristic in this study is found in the usage of electronic devices. Yuan (2012) found that the cell phone usage rate among female students is really high in Harbin, China. The hypothesis looks to understand whether the trend of seat preference still exists in a modern world with a higher trend of gender equality, and whether the activities of electronic devices are higher among female participants at the University of Georgia campus.
Question 2: What spatial quality/elements in lunch landscape will people be attracted to?

According to many studies (Zacharias 2004; Matsuoka 2010; Marcus 1998; Whyte 2001; Ivarsson 2007; Golicnik 2010), people have different preferences for space, depending on the uses they require at the moment. However, there are some tangible common themes that recur throughout different studies. The themes described below are expected to occur again in the results of this study.

**Hypothesis 2.1: In the temperature range provided in the study, people prefer sun more than shade.**

According to Zacharias (2004) people prefer sunny areas over shaded areas in the environments where the temperature does not exceed 72° F. Whyte (2001) and Marcus (1998) also mention the suntrap area where people find the most comfort.

**Hypothesis 2.2: People prefer to stay near the movement of the crowd.**

According to Whyte (2001) and the suggestion of Golicnik (2010,) people tend to sit where there is a general flow of traffic. The site will be labeled as away from the main circulation or adjacent to the main circulation to see whether the preferences differ.

**Hypothesis 2.3: People prefer adaptable seats such as seat walls and grass rather than tables and benches in lunch landscape.**

Participants will enjoy the elements that they can control such as movable chairs and choices of seating locations (Whyte 2001). Grass is another element that seems to be important to a campus landscape for its versatile uses, especially if there are trees or wall to generate the back of the sitting area (Marcus 1998.) This hypothesis states that people will make choices toward sitting on the grass and on improvised seating rather than on fixed benches or at tables.

**Hypothesis 2.4: There will be more people who use the electronic devices outside than those who don’t.**

According to the preliminary observation, many participants used some kinds of electronic devices such as smart phones, cell phones, and laptops. The author believes that the percentage of those who use the electronic devices in the lunch landscapes will be higher than those who donot.
Question 3: How do people with technology act differently from others in such space?

Hypothesis 3.1: People with visual based electronic activities will need more shade than overall users.

The users of laptop, smart phones, and other visual devices have limitations in the sun because of the screen glare. Most of the access to these devices involves a long time of carrying a device; hence they will need tables to put their devices on. The author expects this group of users to prefer more shaded areas, even on the colder days.

Hypothesis 3.2: People with cell phone conversations will stay in a less comfortable microclimate and away from the crowd.

People who use cell phones for conversations will act differently than most people or users of other electronic devices. Turner (2008) explains that many people see phone conversation as public disturbances, even when they themselves use the cell phone. The example of how people behave while they take an action that irritates others can be found in Zacharias’s study (2004) about smoking. The behavior of this group included staying away from non-smokers and sitting in the less comfortable areas so that their actions would not bother the public. In this thesis study, the author expects that the cell-phone users will react in ways similar to the smokers in the study that Zacharias (2004) had completed.

Conclusion

The observation study is an important method to use to discover patterns of human behavior and to see how people are influenced by their surrounding environment. This chapter has discussed the method of observing people in green spaces around the University of Georgia. The observational study helped towards finding the answers to these three proposed questions: How do people react in lunch landscapes? What spatial qualities attract people? What behaviors are influenced by modern technology? To find answers to those questions, the observation was done around lunch time in the months with a moderate temperature on 12 sites across the campus. The sites were categorized into four groups based on
the function of each. The age, genders, groups, and themed actions were recorded and analyzed in statistical patterns.

In the next chapter, the selected sites will be fully described and discussed to see what their characteristics are and what results are anticipated on each site before the observation based on the existing design theories, was made.
CHAPTER 5: SITE INVENTORY

This chapter, which produces the site inventory of 12 study sites, consists of two major sections. The first section describes 4 precincts that have food vendors, their context within the adjacent area, and the relation of the location to the study sites. The second section is the inventory of the study sites. Each site contains a hand-sketch inventory that describes furniture, circulation, immediate contexts, and functional subspaces along with the text description.

Campus Precincts

As discussed in chapter 4, there are 6 distinctive campus precincts at the University of Georgia Main Campus. Each precinct has its own sense of place and character as described below. (UGA Campus Architect 2013)

1. **North Precinct** is the historic part of the campus. It has a strong connection to Downtown Athens.

2. **Central Precinct** is referred to as a heart of the campus. It has main parking facilities, the stadium, along with many plaza and activity centers. The campus architects plan to build the bridge connecting North Campus and South Campus through this part as well.

3. **South Precinct** is known for the Sciences facilities and Brooks Mall. It has a conference center and many pocket parks. The area has strong automobile access.

4. **East Precinct** contains a large parking deck, striking visual and performing art school, and the connection with Loop 10 and North Oconee River. It is also a place where indoor exercise complex and the largest student dormitory are located.

The location of the study sites in comparison to the campus precinct is shown in Figure 5.1. The diagrammatic inventory of each precinct can be found in Appendix F.
Figure 5.1 Locations of 12 Study Sites based on Campus Precincts
Site Inventory

Figures 5.2-5.13 show the site inventory. The study sites were organized with respect to their action categories listed below

1. The green spaces appropriate for dining activities
2. The green spaces appropriate for movement and circulation
3. The green space appropriate for intimacy and reflection
4. The green spaces for other purposes

Each site will be explained briefly with verbal descriptions provided by the observer, which mention features of the surrounding environment, explain why the sites were selected and categorized in a particular manner, and provide the observer’s impression of each site. Following each of these descriptions are the diagrammatic site inventory based on the area during lunchtime via primary observation with the functional subspaces map noted by the primary observation and behavioral traces. The use of the information can be respected as a part of observational study based on Marcus (1998) and Ziesel (2007). The particular notes were written to focus on the features that might predict certain types of activities, such as how the sitting at a table might predict the longer duration of sitting. The circulation was noted to see if it would allow more or fewer people to pass through and stop. Additional photographic records of each site can be found at Appendix G.

1. The green spaces appropriate for dining activities

1.1 Bulldog Café Courtyard

1.1.1 Brief description of the place and its immediate surroundings

The outside portion of the Bulldog café is adjacent to the University of Georgia Bookstore and the Tate Student Center, with stairs leading down from those areas. The area is connected to the Tate Plaza, which has many student activities. On the west side, the area is adjacent to an expansive walk connecting to Lumpkin Street and other green spaces. The space itself is multi-level and small. It consists of seat planters and tables in the shaded and sunny sides. Benches are
placed in the shaded areas and the upper level area, which overlooks a small multi-level lawn with planting. The sunny side of the area is planted with single row shrubs.

1.1.2 The reason this site was selected and categorized this way

Bulldog Café is an eatery where many students come and eat. According to primary observation, the area is always filled with noise, either from the students speaking to each other or from the events occurring at Tate Plaza. People flow quickly. There are many chances to approach the lawn or watch other people in this space. The place is adjacent to the inside dining with a lot of tables, and is categorized as a space that accommodates dining activity.

1.1.3 Subjective participant-observation reflection of the place

The interaction with nature is quite rare. In fact, it seems that nobody notices the surroundings. They are very preoccupied with their electronic devices, their company, or food. However, it seems that people stay preoccupied with the activities very long.

1.2 University of Georgia Creamery

1.2.1 Brief description of the place and its immediate surroundings

The UGA Creamery is located in the South Campus right next to Brooks Mall. The adjacent area has been recently renovated. It is now planted with prairie grasses. A path connects the mall directly to the entrance of this landscape, which is adorned with seat walls. The site is small and surrounded by tables. There is a bench near the entrance of the creamery. The landscape itself is part of a shaded walkway extending from the Warnell School of Forestry to Carlton Street.

1.2.2 The reason this site was selected and categorized this way

The site was selected because of its interesting quality. The tables and the seating are placed in different spaces that have their own characteristics in term of crowdedness, naturalness, and lights. It is categorized as a landscape appropriate for dining because it is a part of a creamery that serves food and snacks.

1.2.3 Subjective participant-observation reflection of the place
Despite being in the middle of people’s traffic on a sunny day, the UGA Creamery gives a feeling of intimacy and welcome. The tree branches create an interesting light play, and the prairie grass outside gives an interesting atmosphere.

1.3 Georgia Center Courtyard

1.3.1 Brief description of the place and its immediate surroundings

The Courtyard of Georgia Center is a very small space that is framed by the architecture from all four sides. It connects to the hotel dining service and many conference rooms. The courtyard has the policy for not having food from outside. In term of physical description, there are two levels of the space. The higher one is at the same level as the hotel lower ground, but sinks about 2 feet from restaurant entrance. It stays at the outer radius of the plaza-like courtyard, connected to the doors and surrounded by planters with shrubs, perennials and annual plants. There is a sculpture or water feature on the upper deck, but the observer never saw it in operation. The lower deck sinks another foot from the upper deck, wrapping around the giant oak tree which acts as the main feature of the area.

1.3.2 The reason this site was selected and categorized this way

The site is very small, and it functions as an outdoor eating area with a very unique characteristic. The quality of the space does not follow Whyte’s (2001) suggestions by lowering the ground level and surround everything by glass, creating an undesirable fish bowl effect. However, the sunlight streaming at the space and the arrangement of the ornamental plants and seating are inviting. The conflict of these two design elements can create interesting results in behavior observation. Since the area is provided to function as a dining space, it is categorized as a green space that accommodates dining activities.

1.3.3 Subjective participant-observation reflection of the place

Climate really takes effect on this space. On the hot, sunny day, people tend to sit at the lower deck under the shade of the tree. On the cooler day, the upper deck on the area where the sun hits
becomes popular. Nobody eats at this courtyard in any cloudy days during the observation. The fact that there are less uses of electronic devices in the space may due to the lack of evenly shaded area.
Figure 5.2 Bulldog Cafe

- MLC Lawn allows people to relax and watch the main stream of traffic.
- Tate Student Center is the large student activity center with a lot of students and staffs. The dining areas such as Bulldog Cat is located here.

Legend:
- [ ] Focused area
- [ ] Table
- [ ] Planting seat
- Sunny area
- Shaded area
- Polka area

Figure 5.3 UGA Creamery

- Tate Plaza has many activities such as fund raising and promoting campus organizations.
- Tate Center Stop is one of the major bus stops of UGA campus.

Legend:
- [ ] Focused area
- Table
- Planting seat
- [ ] Parking area
- [ ] Lower deck
- [ ] Upper deck
- [ ] Far end

- 3' Retaining wall and steps mitigate the elevation shift.
- Far end accommodate people from Creamery that needs more space.

- Green Street leads to School of Ecology.
Figure 5.4 GA Center Courtyard

LEGEND

- Focused area
- Table
- Dining, entrance
- Upper deck
- Lower deck
- Water feature

Glass hallway invites people in but creates fishbowl effect

Carlton Street leads to Ramsey Student Center, South Campus, and Stagmen Coliseum

Main tree shades site during summer and early fall

Sanford Road leads to Sanford Stadium
2. The green spaces appropriate for movement and circulation

2.1 MLC Lawn

2.1.1 Brief description of the place and its immediate surroundings
MLC Lawn is surrounded on three sides by the MLC building. The building itself is a complex containing many classrooms, conference rooms, offices, and a coffee stand. The other side of the lawn is connected to a broad walkway linking students from Lumpkin Street, one of the main streets on campus, to Tate Plaza. Across the paved walkway is Tate Student Center and its green roof. The MLC Lawn is connected to the building with the upper deck looking down, accompanied by three stairways and large planters. The façade gracefully levels down to the grass, creating an Amphitheatre-like structure.

2.1.2 The reason this site was selected and categorized this way
The multi-level seating is an interesting feature of the landscape. It is a space that connects to the high volume of people during lunch time. During a preliminary observation, the site was filled with people on the grass, planters, and steps. The size of the grass lawn is not large, and the space is fragmented by pavement. Its popularity was noted as worth exploring. It is categorized as a landscape appropriate for movement because of the high density of circulation. Its wide open spaces also allow the movement.

2.1.3 Subjective participant-observation reflection of the place
Flat, open, and highly playful with light, the MLC Lawn is attractive to many people. It seems like a quick stop before stepping inside or a place to hang out a while after lunch. The microclimate created by large trees and soft grass is relaxing, and its popularity provides many people to watch.

2.2 Main Library Quad

2.2.1 Brief description of the place and its immediate surroundings
The UGA Library quad is a part of historic North Precinct. The site is surrounded by academic buildings including Dean Rusk Hall, the Law building, the Law Library Annex, and Peabody Hall. The seating from the buildings are facing toward the lawn. There are memorial plates and a garden in the north end. At the southeast direction, there is a part connecting this quad to one of the busiest bus stops on campus.

2.2.2 The reason this site was selected and categorized this way

The UGA Library becomes the main circulation landscape for many people. In the preliminary observation, more than 25 people appeared per 30 seconds during the peak time, making this landscape filled with life and movement.

2.2.3 Subjective participant-observation reflection of the place

The site is bustling with people, and the grass is highly maintained, even in winter time. There are chains surrounding the grass on most sides, thus sending a message of limited access to it. However, occasional grass access is spotted. The trees are attractive, but cannot be sat under due to the large radius of mulch placed around them. The front of the Law Annex in particular has a suntrap that is very attractive. The main circulation cuts through the front of the library.

2.3 Brooks Mall

2.3.1 Brief description of the place and its immediate surroundings

The northern part of Brooks Mall spans down to cover the area between the Warnell School of Forestry and the School of Pharmacy. West Green Street connects people from the bus stop in Sanford Street down to this area and the Odum School of Ecology. On the east side, the area is shaded evenly with trees. The small platform in front of the Warnell Building has some seating looking toward the building. The opposite site, at the School of Pharmacy, has a stone retaining wall running down the planter edge, creating a sitting space. There is a porch with two benches under the roof.

2.3.2 The reason this site was selected and categorized this way
The site is circulated with people, but not as frequently as at the Library Quad. There is an interesting dichotomy between the eastern and western sides of this space, as well as its differences in comparison to the main lawn.

2.3.3 Subjective participant-observation reflection of the place

Most of the trees planted in the lawn are quite young and well protected. Although the shape of the lawn is similar to the MLC lawn, the grass is not being utilized. It might be due to the circulation paths cutting the lawn off on both façades.
Figure 5.5 MLC Lawn

The MLC Lawn connects to south campus, downtown, and Five Point.

MLC Lawn is one of the major bus stops of UGA campus.

Tate Center Cafeteria is located here along with other student activities.

Figure 5.6 Main Library Lawn

Pocket area used by a lot of cell-phone users.

Peabody Hall holds classes for many students and professors.

Lawn Area: Large building with library in its own and many class activities.

Lawn protected from vehicles by low chains and wooden posts.

Main Library Stop: Junction between Athens Transit and UGA busses.

Main Library Complex Entry with a lot of students and employees using the building.
Figure 5.7 North of Brooks Mall
3. The green space appropriate for intimacy and reflection

3.1 MLC Plaza

3.1.1 Brief description of the place and its immediate surroundings
The MLC Plaza acts almost as a gateway to the Miller Learning Center from Sanford Street. The space is split into two parts by the stairs and the path directed from Baldwin Street, which separates the North precinct from the Central precinct. The western side is the sloped lawn, backed by a thick spread of evergreen shrubs. The other side is marked by a set of systematic granite blocks underneath the canopies of crepe myrtle trees, surrounded by semi-circular planter about 2 feet in height. The south side of the site has a bike rack and an overlook viewing down to Tate Student Center.

3.1.2 The reason this site was selected and categorized this way
The site is selected for its dynamic movement that clashes with the intimate feeling it offers. Even with an extensive number of people circulating the area, it still contains the integrity of one site and offers a calming effect. The elements that can create this feeling should be further studied. The peaceful, contemplating atmosphere, conveyed even in a busy surrounding, suggests that it might belong to the reflective and intimate category.

3.1.3 Subjective participant-observation reflection of the place
The dense, low canopies cast shadows over the granite blocks, making it feel like a small pergola in early fall. When the leaves fall, the dense branching persists. The lawn is well surrounded on three sides, leaving the remaining side facing a circulation path. The side is perfect for people watching or sunbathing.

3.2 Founder's Garden

3.2.1 Brief description of the place and its immediate surroundings
The Founder’s Garden is adjacent to Lumpkin Street, one of the main streets connecting the campus from north to south. However, there is a limited access to this garden due to the elevation
difference. The other side of the garden is next to the College of Environment and Design. The space is enclosed by trees and contains many subspaces. The Founder’s House in the middle separates the spaces into north and south. The subspaces include the formal lawn, the smaller, informal lawns, and the shaded paths on both the east and the west sides of the garden, the deck, the courtyard, and the labyrinth.

3.2.2 The reason this site was selected and categorized this way

Founder’s Garden contains several subspaces. Each one has its own character and style. They come together coherently yet are secluded from each other, making them great spaces for reflection, intimacy, and interaction with nature. The space is categorized as a landscape for intimacy and reflection because of its secluded spatial quality and its intimate size.

3.2.3 Subjective participant-observation reflection of the place

The spaces are very peaceful. However, loud traffic noise from Lumpkin Street can interrupt the experience quite a bit. The light plate is interesting, and there are always flowers during the observational time. Natural elements are very high, and the site is highly adorned with intricate art. Founder’s House, the smokehouse, and the kitchen building create a picturesque backdrop for the landscape.

3.3 Warnell Garden

3.3.1 Brief description of the place and its immediate surroundings

Warnell Garden is surrounded by parking lots. It is enclosed on three sides by heavy vegetation and opens up one side to the Odum School of Ecology building. The space is in intimate scale, since it is located at the side of heavy foot traffic between the Odum School and Brooke Mall, yet screened from the major traffic view. People who walk past it can only partially see what is inside. The park consists of planters made of stone in perfect heights for seating, jagged in zigzag angles. The large square pond in the middle consists of turtles and fish. The floor is made of stone. The selection of plants are various but mostly native.
3.3.2 The reason this site was selected and categorized this way

In the primary observation, the garden struck the observer as an area that is really peaceful and can give a restorative experience. It has many of the qualities described in Kaplan’s ART theory (Kaplan 1997). The surrounding of the area by trees gives the feeling of being away. The zigzag shape and the planting design give the feeling of extent. The seating that can be used for taking a nap, or sitting, or socializing in big and small groups can bring compatibility, and the water with fish and turtles bring fascination. This space can offer many benefits, but it would be interesting to see how people behave in such a space. The site seems peaceful and does not have much activity to be engaged with except the interaction with nature and self-reflection; thus it was categorized as a green space for reflection and intimacy.

3.3.3 Subjective participant-observation reflection of the place

There was something magical about the light through the beech trees that made me as a user feel as though everything was going to be okay. The thesis author felt safe and protected in the space, as well as mesmerized by the sound of the wind, the gargling water, and the movement of tiny turtles at the pond. There were many people walking past the entrance, but the noises could not reach the space. The thesis author felt very relaxed and restored.
Figure 5.8 MLC Plaza

Figure 5.9 Founder's Garden
Figure 5.10 Warnell Garden
4. The green spaces for other purposes

4.1 Lamar Dodd's Rain Garden

4.1.1 Brief description of the place and its immediate surroundings
The rain garden is located directly in front of Lamar Dodd’s School of Arts. It is near a dining hall, residential halls, Ramsey Student Center, and the East Campus parking deck. Many students get off the bus at the stops just south of the space. The site is mostly inaccessible, but there is a pocket with benches overlooking planting arrangement and a bridge overlooking the space from a different angle.

4.1.2 The reason this site was selected and categorized this way
The space is beautiful, and it addresses one thing that most campus landscapes should address in the future: sustainability. This landscape uses storm water management as its true purpose. Its aesthetics comes from native plants that do not require much maintenance. However, due to its limited access, it does not respond to any other purposes in particular.

4.1.3 Subjective participant-observation reflection of the place
The area is always shed on by sun and adorned by some subtle yet peculiar artistic expressions here and there. It feels very different from any conventional campus landscape. Unfortunately, its high exposure to direct sun and wind makes the microclimate fluctuate more often, rendering the space less popular in any climate less than optimal.

4.2 Odum’s pocket lawn

4.2.1 Brief description of the place and its immediate surroundings
This circular lawn is between West Green Street at the point where it turns to pedestrian traffic, and Soule Street where it turns to a parking lot. It is in front of the Hardman Building. The space is adjacent to Brooks Mall, but elevates up about four feet above ground level. One side can be accessed by stairs, while the other is sloped up. The lawn itself is not flat but rolls up and then sinks in the middle where there is a drainage area.
4.2.2  The reason this site was selected and categorized this way
The space is close to being called a space for movement and circulation, but there is not much to
connect it to. It is close to two buildings, but only near an entrance of one. The circulation is
difficult. The lawn is not appropriate for conventional physical movement because it is not flat;
yet what is filled with activities in the preliminary observation date. These conflicts between its
function and popularity make the space worth exploring.

4.2.3  Subjective participant-observation reflection of the place
The rolling grass reminds one of the hilly, more natural landscapes. The tree canopies in this site
go beyond the mulch, and can be rested under. The surrounding areas are filled with interesting
looking prairie, and the raised elevation allows one to watch people come and go on West Green
Street from the bus stop towards Brooks Mall.

4.3  Tate Deck Green roof

4.3.1  Brief description of the place and its immediate surroundings
This thin strip of landscape is sitting on the top of the Tate Parking Deck. It is adjacent to the
entrances of Tate Student Center and the main walkway that connects Lumpkin Street to Tate
Plaza. The thin grass is flanked on both sides by planters with seating edges. In the main west
entrance of Tate Center, there is an ornate decorative pavement on the ground.

4.3.2  The reason this site was selected and categorized this way
The site has a simplistic design. The very controlled look makes it differ from other campus
landscape at UGA. This is only one well-known roof garden with grown trees in the university.
The site is categorized in the “other” category because it has several possible uses, but none is
strong enough to be a main purpose. It can be used for reflection, considering the views, but it is
very large and open. It can be used for movement, but it connects to nowhere, and the high steps
make it less accessible on the south side.
4.3.3 Subjective participant-observation reflection of the place

The site is systematic and cold; yet, it supplies great views on both the west side and the south side where there is some daylight near Tanyard Creek. It is elevated up and buffeted by wind and sun, making its microclimate fluctuate rapidly and easily. The site is comfortable during a breezy, sunny day, but otherwise can be too hot or too cold. Small trees on the planters provide a very small amount of shade and little-to-no wind protection. The amount of concrete pavement is high, reflecting heat and light everywhere.
Figure 5.11 Lamar Dodd’s School of Art

Figure 5.12 Pocket Lawn near Odum
Conclusion

In this chapter, the attributes of each site were explored and diagrammed into simpler explanations. These observed attributes will be useful when the behavioral information is added and compared in the next chapter. The results and conclusions in the next and final chapter will show the objective behavioral observation results, the subjective participant-observer notes, and the statistical data pertaining to the use of campus lunch landscapes. These results will also provide some insights for suggesting further study.
CHAPTER 6: RESULTS, DISCUSSION, AND CONCLUSION

This chapter presents the results of the data to answer the three questions in the thesis. To reiterate, the three questions are as follows:

4. How do people spend time in campus lunch landscapes?
5. What spatial qualities or elements in lunch landscapes are people attracted to?
6. How do people with technology act differently from others in such green spaces?

To answer those questions, 8 hypotheses were generated, which were elaborated on in chapter 4. This chapter consists of three sections: the comparing of the results to each hypothesis, discussion, and conclusion. The first section will display the statistical data drawn from the observational study in the form of graphs, and tables, and will also provide comments about whether the data agree with the hypotheses, and some subjective observational notes. The second section discusses some design suggestions derived from the observational study, and the limitation of the study. The last section concludes the thesis, providing a summary of the findings and suggestions for further research.

Results

Objective Observational Data

Question 1: How do people spend time in campus lunch landscapes?

Of the total number of participants collected (508 people), more than half (51.5%) engaged themselves in using electronic devices, for example, by texting, typing on portable computers, and talking on cell phones. The second common activities are reflection and restoration engagement such as daydreaming, watching people, or playing with leaves (42.2%). The third common activities are dining, sipping coffee, and having snacks (35.4%). The least frequent activities found in this observation are physical activities. Less than 10% of the observed activities are physical such as pacing around, training
dogs, and roller-skating. Figure 6.1 represents all the activities observed during the study. Notice that the total percentage goes beyond 100% because a person can perform more than one activity during the observation session. The average length of time of a participant staying in one space is 10.34 minutes.

![Total Sites Compilation](image)

**Figure 6.1: The Comparison of All Activities Under Observation**

*Hypothesis 1.1: The appropriateness of the space discussed earlier in this thesis will agree with the appropriate categories determined by the author.*

This is the only matching data is: the green spaces appropriate for dining will be used primarily for dining activity. The results show that physical activities were not performed much at all in these lunch landscapes. The hypothesis also underestimates the prevalence of the usage of electronic devices in public spaces. More people ate lunch or had snacks outdoors than were estimated, and many participants used the space to do visual and direct interaction with nature such as watching people, lying on the grass, or meditating.
Figure 6.2 compares the activities, with each broken down into percentages among four typologies. The first hypothesis contains both agreements and disagreements with the data. As anticipated, green spaces appropriate for dining activities were used mostly for activities related to dining. The engagement with electronic devices, however, overthrew most of the results of the green spaces described as appropriate for other specific purposes. Another difference noticed is that the restorative activity has a very high percentage in the spaces suitable for circulation and movement. In the spaces appropriate for movement, there were many people to watch, and hence there were more people watching. Another noticeable result is that physical activity, although still low, was the highest in the spaces with other appropriate uses. Maybe this higher level of physical activity is due to the fact that there were too many people and too much movement at the circulation based landscape. Therefore, the spaces that provide an open area but have less crowd traffic are more appealing to users who seek physical activities. The social activities in the reflective spaces are lower than expected, but this finding may mean that people mainly seek peace in such spaces. The comment is enhanced when the higher rate of non-electronic reading in this category’s result is also considered. The landscapes that do not fit any of the three categories have the most physical activities. (See the charts, which display the individual site categories and other detailed information, in Appendix H.

*Hypothesis 1.2: A higher percentage of male participants will sit closer to the crowd, and a higher percentage of female participants will use more electronic devices.*

Of the 508 participants, 228 (44.9%) are male and 280 (55.1%) are female. For the most part there is little difference between the percentage of male and female participants who engaged themselves in the activities. However, in the category of reflective-restorative activity, the percentage of male participants is much higher.

Although the results of the male and the female participants’ activities show very little difference in most categories, those activities with direct interaction, such as watching people, touching landscapes, or sunbathing, are found much more often among the male participants’ activities. The difference in the
position chosen to pursue these activities, as suggested by Whyte (2001), may play a key role in this result. If men choose to sit at the “front stage” they will have more opportunities to watch people and nature. This information can be subjected for further research. Figure 6.3 shows the comparison of the activities performed by male and female participants.

Among the male participants 46.5% were engaged in electronic devices, and 55.7% of the female participants used them. This result shows that female participants are slightly more inclined to use the electronic devices in the lunch landscape. Another part of the hypothesis is also proven true. 72.4% of the male participants selected to sit near the movement of the crowd, whereas 66.4% of the female participants did so. Figure 6.4 displays the comparison between the male and the female participants, in these two activities. Another noticeable result is that male participants were more likely to engage in restorative activities, such as sitting in the grass, watching people, or watching landscapes. This finding might relate to Whyte’s (2001) reference that men prefer being in the open, visible areas. This preference may allow them more opportunities to interact with nature. Another possibly explanation might stem from a cultural difference between men and women, namely their clothing attire. Men’s regular clothing, such as pants and jeans, may allow more movement and access to certain activities, such as sitting on the grass, than women’s clothing does.
Figure 6.2: Comparison of 6 Activities Using Percentages

Figure 6.3: Comparison between Male and Female Activities
Question 2: What spatial quality and elements in lunch landscapes are people attracted to?

*Hypothesis 2.1: In the temperature range provided in the study, people prefer sun more than shade.*

The sun and shade category was determined by calculating the amount of sunlight during the observation time (midday). The spatial qualities and the landscape elements under the sun and shade category are very similar to each other. In the results, 59.1% of the participants stayed in the sunny area, while 40.9% stayed in the shade. This difference may lead to concluding that the participants preferred the places in the sun. However, the average length of the stay in the sun (9.7 minutes) is lower than the average length of the stay in the shade (11.4 minutes). Figure 6.5 displays the differences in the percentages of the people who spent time in the shade and in the sun, and Figure 6.6 displays the average length of time that the participants spent in such spaces.
**Hypothesis 2.2: People prefer to stay near the movement of the crowd.**

The observation suggests that 62.2% of participants chose to stay near the crowd, whereas 37.8% of the participants stayed further away. However, the average length of time that people stayed in the crowd (9.7 minutes) is shorter than the average length of time that people stayed away from the crowd (11.23 minutes). Figures 6.7 and 6.8 display the differences in the percentage and the length of time of the participants in such spaces.

![Sun-Shade Preference](image)

**Figure 6.5: Percentage of People Spending Time in the Shade and the Sun**
Figure 6.6: Average Time People Spent in the Sun and the Shade

Figure 6.7: Percentage of People Spending Time in a Crowd and Away from a Crowd
Hypothesis 2.3: People prefer adaptable seats such as seat walls and grass more than the benches at tables and the benches without tables in lunch landscape.

The observation showed that the benches and the tables, which are quite limited in usage and mobility, had a similar percentage of use (25.6% of the benches and 24.4% of the tables). Grass was the least preferred choice, scoring at 18.9%, and the other seat options that include steps, seat walls, and planters were the most preferred, scoring at 31.1%. The length of stay varied very little among the four types of seating and correlated with the average of the overall length of stay. Hypothesis 2.3 poses an interesting question about grass lawns and interaction with people. It seems to contradict Golicnik’s (2010) and Marcus’s (1998) claims that grass is a popular spot to sit on in many circumstances. However, it is noticeable that during the late fall and the winter the grass may be less appealing to sit on and hence alter the results of this study. The other data agree with the hypothesis that more adaptable seating options will be more popular. Figures 6.9 and 6.10 display the seat preferences and the minutes spent in each area.
Hypothesis 2.4: There will be more people who use the electronic devices outside than those who don’t.

In the results, 51.5% of the participants used electronic devices while 48.5% did not. This finding can imply that there are people who use electronic devices as much as those who do not. The average length of time that those with electronics used their devices is 10.11 minutes, and the average length of those who did not is 9.8 minutes. Figure 6.11 displays the percentage of users and nonusers of electronic devices in the spaces, and Figure 6.12 displays the average number of minutes that people with electronic devices used them during their time in the green spaces.

Figure 6.9: Percentage of People’s Seat Preferences
Figure 6.10: Average Time People Spent in Different Seats

Figure 6.11: Percentage of People Using Electronic Devices Versus Those Who Do Not
Question 3: How do people with technology act differently from others in such space?

*Hypothesis 3.1: People with visually based electronic activities will need more shade than overall users.*

There are no significant differences between the electronic users and the overall users. 60.2% of the visual electronics users and 59.1% of the overall users stayed in the sun.

Hypothesis 3.1 regarding visual electronic devices is proven false. There is almost no difference in the percentage of how the users of these devices reacted to the microclimate compared to the percentage of how the overall users did. This finding may be due more to the sizes of the portable devices than to the blocking of the light by the user’s shade and direction away from the sun. Figure 6.13 shows the comparison of the visual electronic users and the overall users.

*Hypothesis 3.2: People with cell phone conversations will stay in a less comfortable microclimate and away from the crowd.*
The preference of people on cell phone conversation positively correlates to their overall preferences in both microclimate and crowdedness. However, in both cases the percentage is more extreme. The percentage of the cell phone speakers who stay in the sun adds up to 85.3% compared to 59.1% in the overall preference. Up to 73.2% of the cell phone speakers preferred to stop and talk near the crowd, compared to 62.2% of the participants with the overall preference.

Hypothesis 3.2 posts a more interesting aspect, namely, that the preference percentage does not just agree with the overall crowd but exaggerates the preference even more. This may due to the much smaller sample of cell phone users in the study (n=41) compared to the overall variation (n=508); or that different behavioral factors were involved, since the study that the hypothesis is based on (Turner 2008) refers only to the behaviors and perspectives toward cell phone users indoors and on public transportation. Figure 6.14 compares the cell phone users to the overall users in both sun-shade and crowd-sparse categories.

![Visual Device Behavior Comparison](image)

Figure 6.13: Comparison of Visual Electronic Users and Overall Users.
Subjective Observational Notes

1. *Nobody sits under a tree on the lawn.* Marcus (1998) and Golick (2010) suggest people like to sit on the grass where there is an anchor point behind the back. It is true for the most part for this observation. Many people sat on the sloped grass so that their back could reset against the slope. Some sat with their back close to the granite blocks, and many chose to sit on the ground with their back at the seat wall instead of on the seat wall itself. However, during the study span, very few subjects sat under a tree in an open space, even though both Marcus and Golick recommended this position as a compelling seating option. This infrequent seating spot may also be due to the fact that the trees on the UGA campus are well protected around their trunks with mulch and organic materials to avoid compaction around the critical root distance (Morris 2013). The trees that have seating options around them, as in front of the UGA Creamery, on the Tate Green Roof, and at the MLC are being utilized occasionally. If there is a way to create a seating
option under a tree in a more natural open space, the students might utilize sitting under the trees more.

2. *Nobody sits on the unhealthy grass.* In the additional observation in February 2013, the grasses in some campus landscapes were yellow due to the lack of sun and long exposure to low temperatures. Even though the spatial qualities of the spaces are the same, the observer noticed a change in behavior that meant that nobody sat or walked across those grasses even on a day of perfect weather. They may avoid the grass because the grass is unattractive to them. The author believes that the seasonal factor can be noted as the cause for the behavioral change, even at the University of Georgia which has a warmer climate.

3. *People behave differently in different seasons with the same climate.* This behavior change is also based on the findings from the additional observation in February 2013. The weather in Athens, GA around late fall (November 2012) and late winter (February 2013) have been similar. On sunny days, the temperature in February can go up to 65 degrees. However, the number of people who spent time outside in February in contrast to those in November, dropped drastically about 50%. Some spaces that have strong exposure to microclimate have few or no participants. This absence and infrequency of participants may be due to some vegetation changes, and may also explain the phenomenon that has happened in the areas in which the key characteristics are based on vegetation, such as the food courtyard at the Georgia Student Center that has a giant majestic deciduous tree covering the entire site. However, it is not the case for some spaces, such as Memorial Plaza that has the canopy of crepe myrtles. Even when the leaves were all gone from the tree, the plaza was still actively used by many, although less often than in the fall, with the same temperature and microclimate. It might also be due to the participants’ mental model that suggests the appropriate activities to do in each season.

4. *Users always explore new opportunities to use the landscapes.* The observer always found a surprise in an observation. People found places to sit that never appeared in any design
guidelines, such as on a magnolia branch, on the architectural décor, in a spot hidden behind a vase shaped planter. They also displayed actions that are very uncommon in campus landscape, such as roller skating, dancing, training dogs, and meditating. The architects should design the spaces to make these explorations possible.

5. *In the areas where it feels intimate, people feel private.* In the reflection and intimacy category, the observer found that many students displayed the behaviors that were usually done in more private spaces, such as showing intimate affections, sleeping, dancing to headphone music, or meditating. The observer came to the conclusion that when a space provokes such feelings of privacy and security, participants create the bond and the trust with that landscape that make them feel at home, even in the public spaces.

6. *Table seats are used only when it is necessary.* In many spaces, table seats are important since they can be used to prop up food, heavy books, or electronic devices. However, if the participants do not need the table, they will avoid table seats. People who engage in reflective actions, especially people watching or daydreaming, will not choose table seats unless they are also doing other activities.

**Discussion**

The results are comprised of two parts. The first part offers suggestions, derived from this observation, that agree with the existing guidelines. These conclusions confirm that those guidelines are applicable to the campus lunch landscapes in a modern scenario. The second part contains the new insights derived from this study, which should be taken into consideration when designing a campus lunch landscape.

Suggestions in Agreement with the Existing Guidelines

1. *Provide options for spatial quality in every kind of space:*

   Many people enjoy being in the front and watching people, while others decide to take a back seat and sleep in a spot away from the crowd. As proven in the results, the demographic
characteristics might express differences between group preferences. Providing different spatial contexts would accommodate all kinds of participants to include themselves to the landscape during lunchtime. This suggestion agrees with Abu-Ghazzeh (1999), Marcus (1998), and Whyte (2001).

2. **Suntraps and shadow plays:**

   People enjoy the sun in the temperature range found in this type of garden. The joy of sunshine as an essential component of the landscape is mentioned by Zacharias (2004), Whyte (2001), and Marcus (1998). It seems from the observation that sunlight not only provides the optimal microclimate, but light play made by the contrast between the sun and shade provides an aesthetic beauty to the site. The elaborately planned landscape should use the species and the placements of plants in order to create light and shadow plays that can act as fascinating elements.

3. **More pocket spaces in reflective landscapes:**

   Pocket spaces are important in the landscapes appropriate for reflection and intimacy. They can reduce social interactions and give focus to the activities in small, intimate areas. The users can display actions that they would more likely do only in a more private scenario, such as sleeping or showing intimate affections without being seen. However, there is some security issue to be concerned in this notion. The suggestions agree with the ones made by Kaplan (1997), Ulrich (1999), and Marcus (1998).

New design Suggestions

1. **Physical activities during lunchtime can be encouraged.**

   There were some physical activities that included walking, exploring, dancing, and playing with dogs during the observation, but with very low frequency. However, the highest percentage of the physical activities were found in the areas for other purposes, which have some open spaces but do not connect to many buildings or traffic. This finding may show that such
characteristics of space need to be correlated to the likeliness of physical activities. However, the notion needs to be further explored. Another option that can be further studied includes adding outdoor exercise equipment on the campus landscape.

2. *More alternative seating options for winter green spaces and lawn can be added.*

The University of Georgia is fortunate in terms of its winter climate. The sun shines almost yearlong, and the temperature is moderate during the winter months. However, people are less likely to sit on the grass in the late winter and the early spring due to its unappealing appearance. There are still many opportunities to be exposed to green spaces since most vegetation in the green spaces is still green and active during February. Around MLC Lawn, many options such as planters, seat walls, and verandas were utilized more than the lawn at some observational sessions, and those elements could be encouraged more. The other seating options that may have to be considered are those offered for people who want to sit on the grass with their back to the trees. In sustainable arboriculture practice (Morris, 2013), the area of critical root diameter in most trees must be protected by mulching or fencing it off in order to avoid compaction problems. The solution can be to plant trees that tolerate compaction (UI, Plants 2013) or to design a seating structure that supports weight but does not create a burden to the trees.

3. *The electronic devices are prevalently used outdoors, and their preference does not differ from the preference of other green space dwellers.*

Because technology allows people to use their devices anywhere, the devices are what people pay attention to. However, since people are outside, that factor alone provides some restorative benefits (Abu-Ghazze 1999.) Some further explorations can be made to determine how the restorative benefits of nature can affect the electronic devices users, compared both to those who pay attention to social interactions, food, and non-electronic readings, and to those who pay attention to nature.
Limitations

1. Observational errors: Since this is an observational study, some human errors need to be taken into account, especially when the spaces have some spatial obstructions for privacy or much crowd traffic. However, the errors were minimized as much as possible to ensure the accuracy of the results.

2. Time limitation: It is to be understood that the results of this observational study are rather specific to many factors at the observation time, seasons, and locations, and that these factors can obscure the outcome of the study. To solve this limitation, the time span of research was selected when the weather conditions would vary in great range. The time of the year chosen to make observations was expected to be most popular time for students to enjoy the landscape, for it was not too hot or too cold. The temperature in such a temperate climate at the University of Georgia makes the study applicable to other places with a similar temperature range. Furthermore, the results from the observations are strengthened by the studies that have been done in the past regarding human preference and behavior. The hypotheses were based on previous studies and literature reviews.

3. Variety of spaces: Due to the limitation of the observer’s resources, the data collected only came from a small pool of applicable sites at the University of Georgia. There are larger samples that can be observed and provided conclusions. These sites can be explored using the same method in future studies for more specific results to benefit the University of Georgia.

The Future of the Lunch Landscapes: Recommendations, Suggestions, and Imaginations

Electronic devices demand attention for future design. It has been an excuse that televisions obstructed the opportunity of being outside (Dixon 2007,) now that the technology allows such information to be accessible anywhere at any time; the vision of a landscape architect has to adapt to follow the new paradigm of design. The design of landscapes should be adaptable to multiple uses and can be transformed by people, purposes, tools, and time.
A “Lunch landscape” is a part of the new perception toward space: the landscape that exists anywhere around food vendors and work space. It rather is how a landscape is perceived during a specific time of a weekday. The design of lunch landscapes will not dramatically shift or change, but there might be a subtle elements that can make a more preferred, functional lunch landscape. In the meantime, such elements can be used during the other time. Otherwise, it should be transparent in the other time of the day and to people who seek no use toward such elements.

An example of these elements includes a charging station. An electronic output outdoor can allow people to stay longer in green environment. Even though the effects of restorative environment is still arguable in current research, the quick glances of fascinating elements such as people and green vegetation once in a while may result in more positive mood and functions than using electronic devices indoor.

Another element that can be designed for modern campus lunch landscape includes the determined locations to use cell phone. If Turner (2008,) is still relevant about people speaking on phone in public being rude, this is an issue that can be addressed. The idea of a phone booth can be applied as a single, movable seat that has visual and audio blocks on certain sides, shielding those people on cell away from public while allowing them to stay next to the crowd movement.

Figure 6.15 Seats with Wall on Two Sides: courtesy of travelunpacked.co.uk
The intentional blocking of electronic devices in outdoor landscape, too, should be tested. Although Abu-Ghazaleh (1999) mentions that the other outdoor activities such as eating or socializing in green spaces should not affect the restorative process, the study did not take electronic devices into account. As the way the mobile electronic devices are set, it demands a lot of attention. These attention-demanding elements can start as different involuntary forms such as vibrating, constant noises, flashing lights, visual pop-ups, etc. Once the attention is given, the contents move to the contents that require directed attention such as long text, conversation, or articles. If the distraction is removed during lunch break, according to this perspective, one may gain more effective restoration. However, the blocking of informatics signals may instead lower the chance of landscape being used as people can be very attached to their devices. (Morris 2012)

Besides the design to respond the present demands and behaviors, the future advances of technology should be considered while designing modern landscapes both as challenges and opportunities. First of all, the new technology will allow people get faster information from far away. Google just invented Google Glasses, which will show the information directly into the user’s eyes. (Google Glass 2013) The challenge might be that it will distract the users from the information immediately around them. However, there might be an opportunities from the devices as well. For example, during the winter when the vegetation are bleak, if there is a software that projects leaves and flowers on trees and landscapes, it might increase the restorative effect of nature stronger.

The issue of sustainability can affect the design of lunch landscape as well. As shown in current designs at the University of Georgia, the trees have mulches around the trunk to protect the critical root distance from compaction. The design solution that allows human comfort (sitting at the trunk) and sustainability (long-living, healthy trees) is still to be addressed.

There is the opportunity with the new LEED architecture for physical activities in lunch landscapes. One of the suggestions to save energy from fuel is to install shower facilities in the academic
and office buildings (Building Green 2013). The shower facilities in the buildings can expand the design options for physical activities in lunch landscapes. There is a possibility to conduct more intensive physical activities during lunch time. However, the preference of people toward these new opportunities will have to be examined.

**Conclusion**

This study explored and observed the behaviors in campus lunch landscapes. University environments can be very stressful for students, faculty members, and staff. The studies show that the exposure to green spaces can benefit health, attention capacity, and work morale. Due to time poverty, the landscape that can be approached during the lunch break is an idea worth exploring. This study set the goals to answer what people do in the landscapes defined as lunch landscapes and what they preferred to do in such settings, and to explore further implications of the modern world, especially what is different when mobile electronic devices are involved in the use of lunch landscapes.

The first part of this study provided a literature review. There are four sections to the background knowledge: green space and health, campus landscapes, lunch landscapes, and the exploration of the use of electronic devices. With the Biophilia Hypothesis, Kellert and Wilson discussed the concept of how humans are involved with nature and will be better when surrounded by nature. With his Psychoevolutionary Theory Ulrich argues that human are healthier with the exposure to nature, and Kaplan offers the Attention Restoration Theory that explains how a human can be more cognitively efficient with recurring dose of nature. These basic principles apply to applications such as Ulrich’s Natural Distraction Elements, Attention Restoration elements, and the Reasonable Person Model. The study raises one health issue, namely, obesity, and correlates it with stress and the exposure to green space to show the relationship between landscape and health.

Campus landscapes are important, for they enhance the ecological system. Using campus landscapes also increases study and job performance, make employees love their jobs, and create better society and environment. The creation of a good campus environment produces a good society and a
setting that can contribute to creating a healthy campus. The lunch landscape is the landscape where a food vendor is less than 0.5 mile, or within walking distance. Among campus landscapes, campus lunch landscapes are integral. There is little history recorded about the landscape as a part of lunch settings. However, having lunch landscapes on campus are important since the lunch time is the time where people take a short break from work. Lunch landscapes can expose natural elements to those who do not have time to receive a regular dose of nature. The study also points out that mobile technology is an integral part of modern technologies. Small devices such as laptop computers, cellular phones, and smart phones can be carried anywhere. The use of these electronic devices can positively influence health decisions and behaviors, and thus should be incorporated into environmental behavior studies.

The University of Georgia is a large campus with many mature trees and healthy policies for caring. However, specific facts and insights can help improve campus landscape architecture and planning in the future.

To understand the methods and the scope of the observational study, eight distinctive studies were reviewed in the case study approach. Among them, some share similar topics and fields of study, which gave very useful information to form the hypotheses as well as basic knowledge about the topics (Matsuoka 2010, Abu-Ghazzeh 1999, Whyte 2001, Lau 2009). Some gave a very insightful and practical methodology (Ivarsson 2012, Golicnik 2010, Marcus 1998, Zacharias 2004). These studies helped towards structuring the methods and forming the hypotheses toward more plausible findings.

The second part of the study involves the observational study to find the answers to three specific questions. From several sites, 12 study sites were selected from 4 campus precincts from the University of Georgia, which contain food vendors. The sites were categorized into 4 categories: sites appropriate for dining, movement, reflection, and other purposes. A site inventory was produced for each site to understand the condition and the movement throughout the site. Each site was observed 3 to 4 times for 20 minutes during the lunch hour. The notes about the movement, the actions, the location, the time, and the crowd were taken into account to produce the results. The observation occurred during October and
November 2012 and February 2013, months with the optimal temperature for behavioral study. The
hypotheses suggested that the functions proposed by the thesis author’s categories would be followed by
the users, that the preferences would follow the literature review regarding other open spaces preferences,
and that the electronic users would have similar results with slightly altered variations.

The results show that the presence of electronic devices is stronger than what was estimated. The
majority of people in public spaces were quite involved with such spaces so that the results differ from the
hypotheses. Dining activities were performed most often in the landscapes appropriate for them, but in the
other three categories, the use of electronic devices took the first place of involvement. Men did not differ
from women in terms of behavioral preferences, but they did tend to explore and interact more with
nature. In the overall study, people preferred using adaptable seats such as seat walls and steps over
mentioned, people loved to be near the flow of people and in the sun, with their back somewhat protected.
People with electronic devices showed no behaviors noticeably different from others. There may be some
limitations to the study, but mostly time constraints and human errors.

Three new and unique notes rose from the study: outdoor physical activity during the lunch hour
is quite underrated, the seating options for the open spaces need to be explored further, and the
importance of studying the susceptibility to natural restorative benefits toward electronic device users.
These can be inspiring topics for future research.

Humans need the exposure to nature, especially in a situation such as the campus environment.
Many studies about how natural exposure benefits human are available. Lunch landscapes can provide
health advantages that can benefit health, job and academic performance, society, and environment. The
study shows human activity patterns towards different type of landscapes and their preferences. It also
explores how the modern use of technology can affect the behavioral patterns studied in former literature.
The results can be useful to produce more productive and effective campus lunch landscapes for better,
healthier, and more ecological Universities in the future.
REFERENCES


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Initiate, U. O. (2013). "Why Tackle Obesity in Georgia." Retrieved January 22nd, 2013. <Query>Check that you have included all you need for this entry.</Query>


# APPENDIX A: Literature Table concluding all restorative benefits of nature by Verde (2007)

Findings from the literature review: categories of landscapes and reported health effects

<table>
<thead>
<tr>
<th>No.</th>
<th>Authors</th>
<th>Categories of landscapes compared</th>
<th>Reported health effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ulrich (1979)</td>
<td>Nature scenes; dominated by green vegetation including cultivated fields</td>
<td>Improved well-being and reduced anxiety: increased positive affect factors and reduced fear arousal factor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Urban scenes; commercial landscapes and industrial areas</td>
<td>Increase in sadness, decline in attentiveness.</td>
</tr>
<tr>
<td>2</td>
<td>Moore (1981)</td>
<td>Rolling farmland and trees</td>
<td>Stress reduction compared to prisoners viewing prison courtyard.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prison courtyard</td>
<td>Prisoners viewing prison courtyard had a 24% higher frequency of sick-call visits, compared to those viewing farmland.</td>
</tr>
<tr>
<td>3</td>
<td>Ulrich (1984)</td>
<td>Natural scene; trees</td>
<td>Shorter post-operative hospital stays, lower scores for minor post-surgical complications, received fewer negative comments in evaluative nurses' notes and took fewer strong analgesics than the patients looking at brick wall.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brick building wall</td>
<td>Longer post-operative hospital stays, higher scores for minor post-surgical complications, higher frequency of negative evaluative comments from nurses' notes, higher number of doses of strong analgesics than patients looking at natural scene.</td>
</tr>
<tr>
<td>4</td>
<td>Laumann et al. (2001)</td>
<td>Nature scenes: forest with lakes and creeks; park with various plant species and artificial creek; sea area with coastline, grass, cows and birds; mountain with snow and ice</td>
<td>Restorative effect: environments with nature elements generally scored higher rating scale measures of restoration than city environments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Urban scene: major pedestrian street, bus/train station, rush hour</td>
<td>Restorative effect: city environment scored lower rating scale measures than natural environments.</td>
</tr>
<tr>
<td>5</td>
<td>Hartig et al. (2003)</td>
<td>Natural environment: tree views/nature reserve (1600 ha of vegetation and wildlife)</td>
<td>Reduced stress and improved mood: reduced stress levels/lower blood pressure. Increase in positive affect and decrease in anger/aggression.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No view/urban environment with medium density professional office and retail development</td>
<td>Increase in blood pressure, reduced positive affect and increased anger/aggression.</td>
</tr>
<tr>
<td>6</td>
<td>Laumann et al. (2003)</td>
<td>Natural environment: waterside/coast environment with grazing cows</td>
<td>Restorative effect: lower heart rate than subjects who watched the urban environment.</td>
</tr>
<tr>
<td></td>
<td>Urban environment: pedestrian street, bus station, streets with traffic</td>
<td>Higher heart rate than the group watching the natural environment.</td>
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<tr>
<td>7</td>
<td>Staats et al. (2003)</td>
<td>Natural environment; dense and open forest, path, no people</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urban environment; inner city, shopping streets, traffic, residential areas, urban park, people</td>
<td>Attentional fatigue gave lower preference for urban environment.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Tennessen and Cimprich (1995)</td>
<td>Natural or mostly natural view (trees, grass, bushes and/or lakes, no evidence of human influence)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Built or mostly built view (city street, other buildings, brick wall)</td>
<td>Built views gave lower scores on directed attention than natural views.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Kaplan et al. (1988, reported in Kaplan, 1993)</td>
<td>View including natural elements</td>
<td></td>
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<tr>
<td></td>
<td>No view or view without natural elements</td>
<td>Fewer ailments and higher job satisfaction with nature in view.</td>
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<tr>
<td>10</td>
<td>Kaplan (1993)</td>
<td>View including natural elements</td>
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<tr>
<td></td>
<td>View without natural elements</td>
<td>Higher number of ailments and lower job satisfaction among workers with no view or view without nature than among workers with nature in view.</td>
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<tr>
<td>11</td>
<td>Grahn et al. (1997)</td>
<td>School playground with high degree of naturalness</td>
<td></td>
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<tr>
<td></td>
<td>School playground with low degree of naturalness</td>
<td>Fewer sick-days, fewer attentional problems, fewer concentration problems, improved motor function.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subcategories of nature (in roman) and urban (in italics)</td>
<td>Higher number of sick days, attentional problems, higher degree of concentration problems and lower motor function than children playing in &quot;natural&quot; playground.</td>
<td></td>
</tr>
</tbody>
</table>
| 12 | Parsons et al. (1998) | Natural scenes; forest (1) and golf (2) | Inter-beat interval: golf more complete recovery than urban (passive stressor).
Blood pressure: forest and mixed more complete than urban (passive stressor).
Golf quicker recovery than urban (passive stressor), urban quicker recovery than golf (active stressor). Skin conductance level: golf more complete recovery than others. Immunization: forest/golf less responsive than mixed/urban. Facial electromyography (EMG) activity; forest greater than others. |
<p>| 13 | Ulrich et al. (1991) | Natural scene: vegetation and vegetation with water | Lower fear and anger, higher levels of positive affects and intake/attention, faster and more complete recovery, greater stress reduction heart period deceleration (non-significant differences between scenes with and without water). |
| 14 | Ulrich (1981) | Nature scenes; dominated by vegetation including cultivated fields | Positive influence on psycho-physiological state; significantly higher alpha; positive influence on emotional state. |
| | Urban scenes with high and low degrees of openness | Lower tranquillity, higher feeling of danger. |</p>
<table>
<thead>
<tr>
<th></th>
<th>Study References</th>
<th>Study Design</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Lohr and Pearson-Mims (2006)</td>
<td>Urban background with trees with varying canopy form (spreading, rounded and conical)</td>
<td>Positive emotional responses to urban with trees versus urban with inanimate object. Lower blood pressure and positive emotional response to trees with spreading shape compared to trees with rounded or conical forms. Positive response and lower blood pressure when viewing dense canopies. No significant differences in skin temperature or blood pressure when seeing trees than when viewing scenes with inanimate objects.</td>
</tr>
<tr>
<td></td>
<td>Urban background with inanimate object</td>
<td>Urban with inanimate object less positive response versus urban with trees.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Staats et al. (1997)</td>
<td>Forest landscapes of different density (dense versus half open) and accessibility (path versus interrupted path)</td>
<td>Higher pleasure for higher accessibility, no significant difference related to density, indication that low density gave rise to more pleasure.</td>
</tr>
<tr>
<td>18</td>
<td>Van den Berg et al. (2003)</td>
<td>Park-like forest area with and without creek</td>
<td>Restoration; higher happiness, lower stress, anger, depression and tension. Improved mood and concentration. No difference was detected between environments with and without water.</td>
</tr>
<tr>
<td></td>
<td>Urban environment: street along a canal with shops on the other side of the street and street with shops on both sides</td>
<td>No affective restoration with respect to overall happiness and stress. Less restoration with respect to depression, anger and tension.</td>
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<td></td>
<td>Landscape (in roman) versus no view (in italic)</td>
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<tr>
<td>19</td>
<td>Heerwagen (1990)</td>
<td>Painting of natural scene; distant mountains, sunset, clustered trees and open grassy areas, path (mystery)</td>
<td>Stress reduction: patients felt calmer and less tense in the mural condition than in the plain waiting room. The restorative benefits of the nature scene were evident both in heart rate data and self-reports of emotional states.</td>
</tr>
<tr>
<td></td>
<td>White wall</td>
<td>Patients watching white wall had higher heart rate increase during waiting period, were feeling less calm and more tense than patients watching landscape painting.</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Nakamura and Fujii (1992)</td>
<td>Hedge</td>
<td>Relaxing effect: the EEG data supported the conclusion that the greenery elicited relaxation.</td>
</tr>
<tr>
<td></td>
<td>Concrete block fence</td>
<td>Watching the concrete block fence brings sensory stress.</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Ottosson and Grahn (2005)</td>
<td>Garden, with old fruit trees and a variety of flower species</td>
<td>Increased powers of concentration after resting in a garden outside the geriatric home, compared to that after resting indoors in their favourite room. The results did not show any effects on blood pressure or heart rate.</td>
</tr>
<tr>
<td></td>
<td>Indoor environment (favourite room)</td>
<td>Lower power of concentration after resting inside (in favourite room) compared to resting in garden.</td>
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<tr>
<td>22</td>
<td>Diette et al. (2003)</td>
<td>Nature scene; mountain stream in spring meadow, plus nature sound</td>
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<tr>
<td></td>
<td></td>
<td>Significantly reduced pain for the participants exposed to nature scene and sound. No difference in mean level of anxiety.</td>
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<td></td>
<td></td>
<td>Without any scene or sound</td>
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<td></td>
<td></td>
<td>Control group reported higher levels of pain. No difference in mean level of anxiety.</td>
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<td></td>
<td></td>
<td>Range of greenery</td>
<td></td>
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<tr>
<td>23</td>
<td>Kuo et al. (1998)</td>
<td>Amount of green vegetation in neighbourhood common spaces (greenness rating 0-4)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Stronger social ties, higher sense of safety and adjustment.</td>
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<tr>
<td></td>
<td></td>
<td>Weak social ties, lower sense of safety and adjustment than residents with higher degree of greenery.</td>
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</tr>
<tr>
<td>24</td>
<td>Kuo and Sullivan (2001a)</td>
<td>Amount of green vegetation in neighbourhood common spaces (greenness rating 0-4)</td>
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<tr>
<td></td>
<td></td>
<td>Less aggressive behaviour, fewer crimes reported to the police (both property crimes and violent crimes) than in areas without greenery.</td>
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<tr>
<td></td>
<td></td>
<td>More aggressive behaviour, more crimes reported to the police (both property crimes and violent crimes) than in areas with greenery.</td>
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<tr>
<td>25</td>
<td>Kuo (2001)</td>
<td>Amount of green vegetation in neighbourhood common spaces (greenness rating 0-4)</td>
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<td></td>
<td></td>
<td>Lower mental fatigue: residents with nearby nature were more likely to be able to deal with the major issues of their lives. Such residents felt more hopeful and less helpless about the issues facing them.</td>
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<tr>
<td></td>
<td></td>
<td>Higher mental fatigue: residents without nearby nature were less likely to be able to deal with the major issues of their lives. Such residents felt less hopeful and more helpless about the issues facing them.</td>
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</tr>
<tr>
<td>26</td>
<td>Taylor et al. (2002)</td>
<td>Amount of window view of nature (0-4 scale)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Improved self-discipline in inner city girls: For girls, view accounted for 20% of the variance in scores on the combined self-discipline index. For boys, view from home showed no relationship to performance on any measure.</td>
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<tr>
<td></td>
<td></td>
<td>Lower self-discipline ratings for girls with less greenery in the window view.</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Stigsdotter (2004)</td>
<td>Workplace greenery; four levels from no view of and no access to garden to view of and access to garden at workplace</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>View or access to garden gave improved comfort, pleasure and well-being (trivsel in Swedish) and lower stress levels.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>No view or no access gave lower values of comfort, pleasure and well-being (trivsel) and higher stress levels than employees with access to or view of garden.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Study Reference</td>
<td>Description</td>
<td>Result</td>
</tr>
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<td>----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>28</td>
<td>Maas et al. (2006)</td>
<td>Amount of green space within a radius of 1 km and 3 km from residence</td>
<td>Better perceived general health and higher amount of green space.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worse perceived general health and lower amount of green space.</td>
</tr>
<tr>
<td>29</td>
<td>Leather et al. (1998)</td>
<td>Percentage of the view from window with rural elements (trees, vegetation, plants, and foliage)</td>
<td>A view of natural elements was found to buffer the negative impact of job stress, intention to quit and a marginal positive effect on general well-being.</td>
</tr>
<tr>
<td>30</td>
<td>Wells (2000)</td>
<td>Amount of nature in window view (different rooms in the house) on a naturalness scale 1-5. Yard material; 4 naturalness categories</td>
<td>Higher naturalness score post-move gave better cognitive functioning.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower naturalness score on the view from the window related to lower cognitive functioning.</td>
</tr>
<tr>
<td>31</td>
<td>Kuo and Sullivan (2001b)</td>
<td>Varying levels of nature (trees and grass) surrounding public housing (scale 0-4)</td>
<td>Residents in buildings with nearby nature had lower levels of mental fatigue and reported less aggression and violence.</td>
</tr>
</tbody>
</table>
APPENDIX B: Detailed Reviews of 8 Studies


**Purpose.** This article is based on an observational study in which information was collected by videotaping different open spaces across New York City through the Urban Street Life Project. Its purpose was to examine the behavior of social life in urban spaces and explain it in a simpler manner.

**Methodology.** The data was collected by videotape. The time-lapse filming and video recorded the activities from 8 a.m. to 6 p.m. The data on the map overlaid by the analysis and the conclusion.

**Measurement.** Several observers looked for people whose behavior differed from that of the commuters, and wanted to see how they reacted in certain ways. The characters were noted to be categorized and simplified for information. The thesis’s author only extracted the information from the anecdotes told in the chapters of the study. The process of data collection remained unwritten in the book.

**Results.** The raw results of the study were not published in the book. However, Whyte generated the guidelines and categorized them into different topics. Its topics that relate to the author’s thesis include social interaction, seating, natural elements, food, transition, undesirable elements, effective capacity, and triangulation.

In social interaction, Whyte suggests that people are attracted to people. The area where social interaction happens is not in the middle of the space. He suggested that designers should select the site for social interaction near the traffic line. The seating area should relate to the pedestrian flow. The design of the building, according to Whyte, does not affect the characteristics of the space, but it can contribute to the openness of the space that affects social behaviors.

More seats tend to attract more people in some spaces, but the trend is not consistent across the sites. People will sit where there is a place to sit. The height of comfortable seating runs from 7 in. to 44 in. The extra space or lengths of seats provide buffer and social comfort. People like to sit in the corner or the area where there is foot traffic. Benches, as Whyte suggests and Marcus agrees, do not work. Movable chairs are liked much more in New York City.
Access to the sun should be provided for the users. A suntrap is important for warmth and comfort. Wind protection will allow people to enjoy a space longer. Trees must relate closely to the seating space and should be in planters in a group. Water is great for urban settings since it creates a great look, provides a great sound, and has fascination for users.

Whyte briefly mentioned food in his study. Food attracts people who will attract more people who will attract more food. It is a warm, welcoming cycle. The food sources of New York City are small vendors. The vendors should be versatile, transparent, and near foot traffic to serve both passersby and plaza users.

A good plaza starts at the street corner. Transition is key to the success of urban plaza designs. People should not be able to tell where streets end and plazas begin, so that the impulse users will feel more compelled to stop by. The sight line should be equal, and the open spaces should not be sunk unless there are some really good reasons and countermeasures for it.

As Whyte noticed positive human behaviors in the spaces, he also observed the undesirables. Homeless people can make the space look less attractive or less compelling for people to stay. However, according to Whyte, the designs that try to drive away homeless people also drive away others. Instead, Whyte suggests one should design the spaces so attractive that everyone uses it. The “undesirables” will disappear as the spaces become packed.

The effective capacity can be flexible. When an urban plaza is really attractive, people do not mind the crowding. A study on Southledge shows that three quarters of all users during the lunch hour stayed more than 15 minutes. With this information, Whyte suggested that the design should allow people to stay a while during its full capacity and make them feel comfortable.

The element that will allow strangers to interact with each other can be called ‘triangulation.’ People who have never known each other need some topics so that they can generate conversation with each other. The external stimuli can be physical objects, visual arts, street performances, or a really unique planting feature.
Discussion/Analysis/Application. The analytical process is unclear, but the application has been made in the guidelines, which are mentioned in the result section. The study has been done in New York City, which has many people in a small urban space. Thus, applying the information to the campus space of the University of Georgia requires careful assessment.

Relevance to the current thesis. The directional guidelines mentioned in this article can be used to evaluate the sites used in the thesis study. The results can be compared with those of the thesis study for further analytical results. Again, the difference in setting needs to be considered in the analytical approach using this case study. However, this specific observational study is one of the oldest and has the most detailed results, providing data which could be used to model the study further.

“Campus Outdoor Spaces” by Claire Cooper Marcus (1998)

Purpose. In a part of her book, Urban Places, Marcus gave her guidelines and suggestions to design campus landscapes. The book itself derives from a similar principle and purpose: to address the design issues and suggestions for a variety of outdoor social spaces. In this chapter, the guidelines for the design of social landscapes around a campus are discussed in length.

Marcus perceived that when the designers addressed the needs and preferences of the users (1998). most assumed in their studies that the users would be able-bodied, relatively young adult males, and those who mostly reside in the United States. In her guidelines, she tried to address the issues of every possible kind of user.

Methodology. The guidelines shown in that chapter, as well as in the other chapters of the book, are collective analyses derived from an evaluating method called Post-Occupancy Evaluation (POE.) Post-Occupancy Evaluation is the process of evaluating spaces after they have been occupied for some time in order to create better settings in the future. The evaluation helps the designers decide the effectiveness of the space beyond visual impressions and aesthetic beauty. Marcus mentions some useful results from applying Post-Occupancy evaluation. The process can be used in education to learn the
working component in a landscape, in the professional world to redesign a place, or in designing a new place that has similar attributes to the existing one. The Post-Occupancy Evaluation Method can also be very useful for staff development during downtime. Marcus also indicates that even though Post-Occupancy Evaluation can be very useful in designing public spaces, it cannot replace public participation. The public participation would be the evaluating process that provides the most well-rounded and in-depth information for public space design. However, it may take plenty of time and resources.

Post-Occupancy Evaluation consists of using several independent steps in order to fully understand a space. These steps are defined below.

1. Participant observation: Participant observation can be done by having the observer use the space as a participant. Experiencing the space can give general insight and a better understanding about the space.

2. Sketch plan and initial site observation: The plan of the site and the notes about it can help generate ideas about its circulation and see the site thoroughly, as a unity.

3. Indicate functional subareas of the sites: Each site has different subzones or programming. Like the site analysis used in the design procedure, bubble diagrams that indicate the existing functional usage of the site can be crucial in understanding the space and the behaviors occurring within each subzone.

4. Look for messages from the administrator: A part of design success can be seen in the communication between the users and the administrator. The sign such as “no fishing” or a path directing foot traffic in a certain way will explain the uses and behavioral pattern to a certain extent.

5. Investigate behavior traces: Human leave traces as they use the open spaces. The foot traffic on the grass can create a new path that is not paved. Littering can indicate the lack of trash can, for example.
6. **Produce activity map**: The activity map will show where people are in the subzones. Along with the note of what the individuals are doing, the activity tables and the map can allow important information to emerge. The reoccurring pattern can be seen through this visualization.

7. **Interview**: Interviews and interaction with the users of the spaces give direct feedback about their preferences. In some circumstances, it also indicates the reasons they use a space in certain ways.

8. **Data Summary**: Data summary is the step where the researcher brings the data together to apply it in usable information suitable for the purpose of the evaluation.

**Measurement.** The data was recorded in a certain manner by answering the following questions: Who are using the spaces? How are they using them? What traces do they leave behind and what do they indicate? What did the designer and the administrative think when they first designed the space? What works? What does not? The data collected seems to be most qualitative, but the quantitative data could be derived from the organization of the behavioral mapping. The number of people appearing in the subzones could statistically provide the information which then could be shown in graphs and be analyzed further.

Since the book is the collective consortium of several studies, Marcus does not show much transparency about how the collected data on each Post-occupancy Evaluation got translated into several guidelines. The thesis’s author might explore in other literature how this process could be conducted.

**Results.** The results from Marcus’s study are vast and very critical to campus open spaces. These guidelines are divided by the function of the spaces themed in “home,” including front porch, backyard, front yard, mall, and study area. According to the research, the students in college campuses have a building that they call a “home base,” and the notion of home makes them react to the space differently. This section will summarize the finding of the study accordingly.
Before discussing particular rooms, Marcus indicates in the beginning of the book some attributes that all of the open spaces should have. The information is applicable to this thesis; hence it should be further explored. According to Marcus, any space should be located where it is visually and physically accessible to the public, and should convey that the space is available. The site has to be engaging both on the outside and the inside while it supports the most desired activities. It should provide the feeling of security, reduce stress, enhance emotional well-being, and be geared toward the target user group while encouraging other subgroups to use the space too. Its size and arrangement should be comfortable at the peak time and be accessible to the disabled, the elderly, and children. The area should support community programs and contain elements that users can change or choose from. The space should also be easily maintained and balanced well between a visual statement and a social setting.

The mall or quad refers to the large, central space between rows of buildings. According to Marcus, the mall should contain the attractive natural elements with various arrangements of tables and chairs. The trees could form natural boundary. People tend to attach themselves to the edge of the islands, and these edges are the perfect locations to provide shade. The quad provides major circulation, thus the design should have that as priority, along with adequate lighting. The central plaza of the quad will meet the high degree of uses throughout the day. It should be located where the major flow passes. The choices of seating forms and the locations for them must be provided to accommodate needs. Bike racks, affordable food, and fascination elements must be provided.

The front porch refers to the area where the building wall stops, but the area still extends further out. The porch is usually partially enclosed. This area is perfect for creating a suntrap space as well as a breezeway. Marcus suggests that the designers provide seating with backs for private and group use. Tables are important for eating options, and food vendors should be located nearby.

The front yard must give the notion of a welcoming feeling. Lawn should be provided in both full sun and partially shaded areas. The trees that offer shade can provide seating; hence the species must be
carefully selected not to create disturbance. Bench and seat walls should be given at the edge. Grass should be watered in the evenings so it dries by lunch time.

The backyard should stay away from the major path. It must be designed to meet ADA standards. People who use and walk past the backyard area should have the building as the destination, so that the people whose “home” is in the building can feel relaxed. Materials should be warm and inviting, and seating should be provided around the edges or the islands. The areas should be large enough to accommodate the events, but not too large that the users feel exposed.

The study room should be close to food with an open lawn. To be effective, it should be secluded and small, located away from main traffic. The semi-enclosed patio or terrace work very well in such cases. Large trees and blank walls are popular for people who seek serenity. Comfortable seats and tables should be provided. Marcus also mentions the visual connection to indoor study areas, if possible.

The problems that Marcus observed in campus designs include crime, but mostly at night. Well-lit landscapes can solve the security issues. Walking, biking, and the reduction of automobile use should be encouraged to reduce traffic noises and pollutions. Ways for finding buildings such as maps and signs should be provided to help avoid getting lost and to decrease confusion.

**Discussion/Analysis/Application.** The results of these studies are already applied to the guidelines. The cultural context of the design is the coastal area of California. However, according to other studies, these guidelines can be applied to designs in different contexts if the factors are carefully examined.

**Relevance to the current thesis.** The study of Clare Cooper Marcus, as well as the rest of the book, is a great inspiration and a very good example for this thesis and other studies that have conducted observational studies in campus design such as Abu-Ghazzeh, Lau, and Ivarsson. The methodology is clearly laid out and easy to follow. How the data collection can be turned into the results lacks some clarity; however, that vagueness is due to the study being comprised of many studies.
Although this thesis has a time limitation and could not prolong the study by admitting the permit process required for interviewing, the thesis author used a methodology similar to that of Marcus’s study. The results and the guidelines as explained will help the thesis’s natural generalization produce a solid conclusion that can be used in other designs. The guidelines provided were also useful when the author made primary observations and concise evaluations about each site.

“Communicating Behavioral Research to Campus Design: Factor Affecting the Perception and Use of Outdoor Spaces at the University of Jordan” by Abu-Ghazzeh (1999)

Purpose. The goal of the study was to assess the user’s perception and the behavioral pattern of outdoor space, use and to determine whether there are some significant relationship between the user’s behavior and their perception about the landscape. The author specified 3 categories of recognition in the attributes of a place: the objective attributes of the place, its effective quality, and the behaviors that occur at the space. He mentions that researchers have found the behavior aspect as the least interesting one, despite its significance. “What one can do” is the important information. The implication of the existing behavioral study, at the author’s time (1999), is mostly focused on explanation, policy, and planning. He claimed that there was a lack of explanations on the use of small, intimate spaces.

Abu-Ghazzeh conducts his study in order to examine how individuals perceive campus outdoor spaces at the University of Jordan and how such spaces can support activities. The study claims that the results are based on the context used, but expect them to contribute to developing methods to study how people use green spaces in other contexts. That is, the results coming from the study may not be applicable to places whose people have cultural preferences, climates, or architectures that differ from the University of Jordan, but the process that the author uses to conduct the study can be referred to and used when a researcher conducts a similar method to study how individuals perceive green spaces.

The author assumes that the users’ needs on the campus should be a deciding factor in how the design of the space is made. He looked at the meanings and values that people associate with outdoor
spaces, the quality of the space that infuses a sense of place, and the importance of the perception of green space to everyday’s experience

**Methodology.** The study’s methodology consists of several parts: observational study at 10 sites, surveys, and photograph pairing.

Observational study at 10 sites: In the first part, the author reported that he spent 3 months during the summer months for the observation in order to determine the sites for the observational study and then to create the data. The observation was unobtrusive and conducted briefly at times randomly picked between 11 a.m. and 3 p.m. The observational data was transcribed into a description that would be used later in the study.

Surveys: The researcher recruited 140 subjects from 14 different colleges with the distribution of 60% undergraduate and 10% graduate students, 20% faculty members, and 10% staff. They completed the questionnaire divulging whether they came from an urban or a rural area. Given context of the country of Jordan, the urban area lacks natural features, and the rural areas are accessible to green spaces and fields. These questionnaires were completed to see whether the experience with green spaces during childhood could affect the perceptions and the preferences of landscape later in life.

Photograph pairing

The subjects completed a photographic survey by selecting the landscape they preferred from a pair of photographs while explaining the reasons. The subjects recognized the sites and referred to the real places while answering the survey. The author explained that the decisions made about the site by using photograph can give the same results at the physical presence of the site.

Interview

After picking the location, the subjects were interviewed about the behavior they planned to perform there, the relationship of use based on pedestrian traffic, landscape arrangement, seating, shade, visual access, and privacy.
Measurement. Since the data from this experiment came from interviews, the researcher had to transfer words into the text databases, which provided insights about the sites, choice pairs, and subject numbers. The data such as the sentences were simplified and reconstructed into uniform data. Then the data were translated into the factors that affected the choices.

Results. The decision making seemed to come from the actions they wished to perform within the space, and their previous experience in similar spaces. The actions that were the most common in the interviews included socializing, sitting, people watching, and studying.

Among the 10 sites, the researcher found the interest in a site called Milk Bar Street that has been mentioned often in the paper. The student subjects reported the site as exciting, attractive, and entertaining, while the faculty members disliked it because it was too crowded and lacked sufficient seating. The researcher mentioned that fondness for the site may due to the ability of students to find places to sit in an unconventional place that is, on planters and steps. All 100% of the subjects agreed that the social setting in an open space is important. Most feel that greenery helps improve the experience even though they did not directly focus on them or intended to interact with nature.

Some reoccurrence in trends occurred among people from certain backgrounds. People from rural areas made their preferences on the basis on the presence of greenery, while the ones from urban areas made their decisions because of the size of the areas, the seating availability, and the circulation. Most graduate students tended to aim for quiet places. The author has concluded that one’s social background can have an effect on one’s perception and preference of a particular landscape.

Discussion/Analysis/Application. Abu-Ghazzeh took the result and applied it by using the guidelines that Claire Cooper Marcus (1998) had proposed. He categorized the landscape into 3 different rooms that were related to the behaviors made in such spaces. These three rooms are the front porch, the front yard, and the backyard. He then explained how his findings applied to those types of landscape; however, this part of the discussion offered very little information beyond what had appeared in Marcus’s original study. However, it can be noted that the observational research done in the coastal area of
California gave results similar to the ones found in Jordan. This similarity may show that the information from different contexts can be generalized into some a specific capacity. He also mentioned that the differences discovered might derive from the climatic difference between California and Jordan.

The author then moved on to discuss Milk Bar Street, which is the promenade leading to the campus. He described the importance of such spaces and how many subjects preferred them. One of the reasons is the presence of large trees. The trees and their characteristics factor greatly into personal preferences. The abundance of tables is another reason that the space became very popular. Many campus landscapes, according to the author, do not have tables, obstructing the student from using the areas for eating or studying. The author then concluded that the sense of space is not derived from recreation alone, but from the retreat, the social interaction, and the restorative activities. Furthermore, on one campus, the designers or planners should provide both urban and plants-oriented landscape to increase the variety of users.

The author suggested implications and recommendations for further researches by recite three approaches to evaluate landscapes: the physical and ecological quality, the behavioral and functional quality, and the visual quality. These three need to be combined to make an effective open space. For behavioral quality, which is the focus of this research, the designers need to keep with researches in perception. Behavior is an important factor that the designers cannot exactly expect, but they can collect the data, make assumptions, and create possibilities.

**Relevance to the current thesis.** Abu-Ghazzeh’s study focused on the behavioral aspects of landscapes in a campus context, which is what the thesis’s author is focusing on. Abu-Ghazzeh also drew his application from Marcus’s findings (1998) and applied them to his results in order to develop his insights and recommendations. The process of examining the implications and insights from the discussion can be further explored and applied to this thesis.

His methodology, while it includes behavioral observation, differs from the thesis’s direction. The factors that derived from the study such as the behaviors that the author had observed, the important
factors that affected the decisions, and the ways that the subjects perceived certain spaces nevertheless are interesting. These contributions can be used to shape the observational study of this current thesis.

As mentioned earlier, the author’s findings mostly match what Marcus (1998) offered and thus suggest that besides slight cultural and climatic differences, the results appear very similar and applicable. This similarity can be a good insight that an observational study conducted at the University of Georgia can be generalized to a certain extent.


Purpose. The study observed plaza-user behaviors in San Francisco. The observation of the behaviors was conducted to determine whether the behaviors were similar across different microclimate regimes. In this study, certain social behaviors that may affect others, such as smoking, were examined.

Zacharias referred to his previous study on the microclimate in Montreal, Canada, in 2001. The results showed that people preferred more sunlight and less wind. The condition was true up to the temperature of 22° C (72 F). The questions that Zacharias wanted to answer in this study included:

1. Are the responses to the microclimate condition the same across different microclimate regimes? The previous study measured the spatial behavior in Montreal. It would be compared to the results from San Francisco to determine the differences.
2. When the spatial supply is limited in preferred environmental conditions, will people move to less preferred conditions or respond by crowding? Do certain behaviors, such as smoking, constrain the choices of other plaza-users?
3. Can environmental design (seating availability, inviting sense, etc.) of the space mitigate the preference set by microclimatic conditions? This part of the study was addressed by examining the behavior before and after redesigning a plaza.

Methodology. Seven privately owned plazas in downtown core of San Francisco were examined in 30 minute temporal periods randomly picked from 11 a.m. to 3 p.m. The observational study focused on
whether a person was sitting, standing, or smoking. The temperature was taken in the shade at the center of each plaza. Three levels of wind were recorded: none, slight, or strong. The observation would not be conducted in the rain.

Afterward, the behavioral data was transferred into the GIS and processed through a single regression equation. Human density was calculated for sunlit and shaded areas over space and time.

Measurement. The effects were interpreted by measuring the length of time for sitting or standing in the sun and the shade. A head count was conducted to calculate density. The information was processed through multiple regression analysis.

Results. Each question that Zacharias asked was answered.

1. The behaviors observed in San Francisco were found to be similar to those observed in Montreal. The hotter it was, the more people sat in the space. However, it was difficult to determine the length of the stay.

2. In terms of social factors, smoking behaviors did not affect non-smokers in San Francisco. This finding may have been due to the fact that the smokers moved to the less desirable spaces and grouped among each other. The survey Zacharias conducted also showed that the general impression of the plaza, whether it was “welcoming” or “depressing,” was generated by the levels of sunlight, not the size.

3. The amount of seating space or the alteration of the environmental design had only a modest impact on the user compared to the existing microclimate. This small impact may be due to the fact that the redesign of the space was focusing mainly on putting in more available seats without any attempt to alter the microclimate itself.

Discussion/Analysis/Application. The study disproved the conventional beliefs that people in different climate will differ in their preferences in microclimate conditions. Social factors and design factors have been considered differently for quite some time, but this study shows that two social behaviors will not disturb each other as long as there are available zones for each one. Designing seating
and effective social setting cannot replace the thermal comfort or sunlight, which the designers have to truly bear in mind.

**Relevance to the Current Thesis.** This study mentions that the outdoor temperature that people prefer falls around 60–69°F, a finding that reinforces the seasonal selection that the thesis’s author used for his observational study. The study shows that as long as the microclimates are similar, the behaviors in different overall climates are invariant. This finding supports that the observational study done at the University of Georgia can be generally applied, to a certain extent.

The methodology of this study is very well documented, and hence can be highly useful in considering on how to conduct the thesis observational study. The analytical process was very transparent and clearly explained that it would demonstrate how the observation can come to its conclusions and what could be further studied.

“Introducing Healing Gardens into a Compact University Campus: Design Natural Space to Create Healthy and Sustainable Campus” by Stephen Lau (2009)

**Purpose.** The purpose of Lau’s study was to explore the application of the concept of the “healing garden” to the compact university campus design and its renovation. The objective of Lau’s study was to seek understanding and to provide a proposal for creating natural spaces on campuses and potentially creating campus environments with supportive roles.

The term “healing garden” referred in Lau’s study means an area with plentiful natural elements such as plants and water, which can have therapeutic or beneficial effects to the majority of users, and is a healing setting designed to make people feel better. Lau refers to Dooris (1998) to explain why a healing garden can take an integral part in creating a healthy university campus. The healing garden would contribute to creating a health-promoting physical environment.

**Methodology.** Lau completed a case study at the Hong Kong University, which is a compacted campus by his definition. His questionnaire survey was given to 33 participants.
**Measurement.** The survey had three parts: the perception and usage patterns, the natural view, and the preferred areas to sit in a natural space. Besides asking for background information, the survey was based mostly on asking multiple choices questions, which could be processed into quantitative data.

**Results.** Lau’s study showed that people enjoyed green spaces for an escape from stressful environment, but they preferred more urbanized settings for socialization. Most participants visited the green space once a week. Half of the participants stayed in the space for 10–20 minutes. The reasons they made the visits were to take a break from work and just to get outside. Time seemed to be among the strongest factor that inhibited the subjects from visiting the green spaces. 94% of the participants had visited and enjoyed the views at the green space. Most people stayed less than 5 minutes. The participants indicated that visual access is important and wanted the view from their windows to be a green space.

**Discussion/Analysis/Application.** Since the results were from a multiple-choice survey, the analysis for application was straightforward. The green spaces at Hong Kong University were better used than Lau had expected. The interesting finding is that in a compact scale, a green space will provide retreat but become less accommodating for a group interaction. The reasons that prevent people from visiting green space include time issues, climate, insect problems, and the size and the distance of the green spaces.

The analysis shows that in order to create an effective healing garden for a university campus that has limited space, one needs to address four topics of concern. These topics are the following.

1. Enhanced visual connection of natural space
2. Space morphology must be coherent to its function, and microclimate control is to be highly analyzed.
3. Choice of plants that allow fascination while ecologically friendly
4. The vertical spaces such as green walls and green roofs should be highly considered.

**Relevance to the current thesis.** The methodology of this study differs vastly from the thesis’s intention, but it shows a different approach to study human perception and preferences toward green
spaces in a campus setting. The information from the result is very valuable, especially when the data supports the Post-Occupancy Evaluation done by Marcus. The results seem to reflect on Abu-Ghazzeh’s studies also, affirming that the urban areas like the Milk Bar Street are more open to a social setting than a small secluded area preferred by graduate students who seek solitude. This can mean that there are connections across cultures in human preferences and perceptions in natural exposure.

“Student Performance and High School Landscapes: Examining the Links” by Rodney H. Matsuoka (2010)

**Purpose.** In this study, Matsuoka examines the roles that the availability of nearby nature played in high school student academic achievement and behavior. He believed that the exposure to natural elements in high school students would be associated with higher test score, better behavior, and better attention capacity. The study is an exploratory study that utilized the existing theories to apply to school setting.

**Methodology.** Four hypotheses were explored in this study. They are listed as followed.

1. The higher level of nature in view, the better the performance will be
2. The higher level of nature in campus, the better the performance will be
3. The greater ability to view and contact the nearby nature during lunch time will lead to better performance
4. The larger windows on the classrooms mean more views and hence mean better performance.

These hypotheses were tested in 101 high schools around the state of Michigan, making correlations between the performances according to those four hypotheses.

**Measurement.** Matsuoka used Chimprich’s rating to assess the views of nature in each school. The naturalness in the campus’s cafeteria and classroom was measured and rated. The level of the campus vegetation and the student’s potential access to it, determined by such as factors as the classroom and
cafeteria window sizes, policies that allowed students to eat lunch outdoors, and the length of lunchtime, were recorded to compare with student performances.

In term of performance, Matsuoka looked at the measurable results from records. These results include Michigan Merit Awards, graduation rate, and future four-year college plans. The negative behaviors were examined through reviewing the records of disorderly conduct and criminal acts. The information was analyzed through linear and non-linear regression analysis to find results.

**Results.** The four hypotheses received responses in different ways. Higher visual access to nature and higher performance are highly correlated. The views that contained trees and shrubs had more positive effects on the students’ performance and behavior than those with grass and parking. The vegetation rate had positive effects on performance and behavior. The higher performance was correlated with the ability to physically make contact with natural elements. However, the size of the window generates no difference.

**Discussion/Analysis/Application.** The discussion allows four relatable points to emerge. More contact with nature during lunch can lead to a higher performance. Landscapes without nature brings stress. Green spaces can affect important decisions in students. Nature in campus landscape is not just for beauty.

There is a strong correlation between the school policies that allow students to eat lunch in the natural area and their performances. Matsuoka suggests that this finding may be due to the Attention Restoration Theory. Even in the classrooms with windows, students need to pay attention to the teachers and cannot get the full effect of restoration. Hence Matsuoka suggests that the exposure to nearby nature during lunchtime is very important.

Matsuoka states that landscapes without trees and shrubs have a negative impact on students’ performance. The landscapes with large flat areas are less preferred and offer little to no restoration. The immediate views that the students can see will be beneficial if they are adorned with diverse vegetation.
The exposure of nature measured in this study significantly correlates with future four year college plans, which goes beyond previous studies that examine just a short-term outcome. Matsuoka states that in pivotal moments where such decision are important, natural exposure can have connections to academic and career accomplishments in students.

Trees and shrubs on school campus have been proven in this study that they are not just a beautifying element but a performance enhancer for the students. Their part can be influential for students’ performance and a school’s success.

Matsuoka states that there are some limitations to the study. The ratings are done objectively by the principal researcher, and only single are taken to overall school vegetative state. There is no way to know how students really use the space in each activity and what elements students react to.

Relevance to the current thesis. This study is highly related to the thesis. The notion of the lunch landscape is mentioned to correlate with academic accomplishment. The significance of decision making in late adolescence is discussed and proven to be important. The academic setting, although at a different level, has been used as a focus area in the study.

The methodology is highly different. The information about policies, architectural features, and student awards proves the importance of having access to green spaces. In referring to his limitations, Matsuoka mentions that even though his way of study is tangible, it lacks specific information about which activities in nature the students interact with and with what element the interactions happen. These notions opens up the need for using another approach, such as the observational study used by the thesis’s author.

“Emerging Relationships between Design and Use of Urban Park Spaces” by Barbara Golicnik (2010)

Purpose. The study is conducted in order to describe the pattern of use in public green spaces and indicate the relationship between the design and the use of urban park spaces, particularly focusing on
the parks in European cities, which have an abundance of open lawn area. The questions that directed the study were: how well do designers predict the use of the space they have created, and how confident can they be that the design responds to the users’ needs?

Golicnik proposed the use of the GIS in this study. She used the study to explore the effectiveness of the GIS for spatial annotation and visualization in the analytical process of observation and in the mapping of the behavioral data. The principle in her study is that she does not judge these designs based on beauty and form, but on people in the act. The statement somewhat resembles Clare Cooper Marcus’s purpose in using the Post-Occupancy Evaluation.

Methodology. Golicnik states that the usual observational study divides mapped environment into zones and matrices to separate people across each zone. The more accurate results can be drawn by the geographic information used in the GIS.

Three Parks were selected in the study to be examined. The parks are comparable in size, context, and function as urban cores of green spaces. The observation were recorded on the map by using graphic notes with very detailed descriptions and were programmed into the GIS.

May is the month selected for the study. The time of each observation was 10 minutes. The researcher walked through each park, made visual scans, and recorded the data on the map. Each park was examined in 4 time periods: 10 a.m. to noon, 12 noon to 2 p.m., 2 p.m.to 4 p.m., and 4 p.m. to 7 p.m.

Measurement. The data was measured by using symbolizations of common activities, such as sitting in a pair, walking in a pair, fishing, skateboarding, and lying down. These symbols were drawn on the map at the location as each activity occurred. The data being examined includes the gender and the number of people doing such activities.

Results. The study shows a very specific set of results at the three parks. Each finding consists of specific distances and measurement and refers to several terms by Lynch’s Image of the City.

Landmarks and edges can create attractive seating. The active use of the lawn depends on the buffer zone and the inner edges of the space. Perfect seating is against a solid edge at least 5 m (15 ft)
from the pathways. The size of a lawn will accommodate activities that can be performed in the inner buffer. If the character of the space becomes an island, that is, one with no solid edge, then people will not stay there. Trees can be anchor to solve the island issue. Personal space between strangers is 3.7 m (11 ft.). The general ideas of buffers are 2 m (6 ft) from the inner edges of the park, 16 m (50 ft) from the outer open area, and 7m (21 ft) from the outer solid area.

Solid areas, according to Golicnik, are the areas that back up against plants or walls.

Discussion/Analysis/Application. Golicnik concluded that the GIS helps develop effective analytical data, and recommends it to be used in further observational research. She admits that there might be some human error in the observation, but such subjects can be improved in further studies.

Relevance to the current thesis. This study shows a quite wonderful visualization of the spatial analysis created by the GIS. Several images in plain view can be used to evaluate the exact form of the human preference in the green spaces and how a group interacts with other groups. The analytical process may be further researched to see whether it is applicable beyond the research of this thesis.

The observational part of the methodology is clear, detailed, and precise, and may be used as an example to develop the thesis’s own list of items to observe. The knowledge shown in the results can be kept in mind while evaluating the use of the sites in the thesis’s observations.


Purpose. The study aims to deepen the knowledge about the environment-behavior relationship needed for gardens, parks, and open spaces designs, while focusing on the behaviors observed in a therapeutic garden. The paper explores how patients use and interact with the therapeutic settings by looking at the behavior of the patients and their location in the settings. This can be improved to create a qualitative evaluation for further designs. The author states that the study focuses on walking, which is a therapeutic action and a measure of physical activity. The literature review discusses walking from a
historical perspective, the relationship between walking and health, and the relationship between physical activity and the environment.

**Methodology.** The observational site was located in a rehabilitation center in Sweden, where patients underwent a long therapeutic rehabilitation program. The rehabilitation could be emotionally exhausting. The author claim that the garden had been laid out by an evidence-based design that uses the theories from landscape architecture, environmental psychology, psychiatry, and occupational therapy.

The time of observation was between 9 a.m. to 12 p.m. Originally, the paper stated that the observations were during 9 a.m. to 12 a.m., but the thesis’s author assumes that 12 p.m. better fits the context of observation. During those times, the rehabilitation center allowed the patients to access the site and to participate in the horticultural therapy from Monday to Friday.

The observation lasted 7 months. The data of 17 patients was collected consistently. The process used is called participant-as-observer, meaning that the observer joined the space as a user and did not interact with the subjects. The types of data collected included the results from taking notes and asking questions about who, where, what action, with whom, and how long.

**Measurement.** The author looked for the behavioral patterns that occurred during the observation. Maps were used to identify the locations and to comment on events occurring in one spot of the garden. These data were then systemized into several themes. Afterward, the common behaviors and the spatial characteristic of the sites were compared and related.

The author generalized that although the patients were exhausted from the therapy, the ideas and the finding from this study can still be generalized and applicable to most space designs. The author referred to Yin (2003), stating that case studies can be generalized to ‘theoretical propositions,’ but will need more information in order for them to apply universally. The study used the naturalistic generalization, which occurs when is a conclusion is formed from several similar cases. The new study can be generalized since if it is similar to those cases but with slight modifications that answer new, specific questions.
Results. The research found that walking was the action that occurred the most in such therapeutic gardens. The researcher categorized the types of walking into two main themes as introvert walk and extrovert walk. People take the introvert walk when they need to focus on themselves by focusing or reflecting on internal thoughts. The subtypes of this type of walk include the walking therapy session, when the persons recharge their minds and exchange their therapeutic experiences with others. For the introvert walks, the study shows that they enjoy the areas where someone can really focus on themselves. The simplicity and coherence would be in dominance with the landscape gently keeping track of the patient’s movements. There might be some restorative elements, but not so many that they distract the patients from the reflective experiences.

In the other hand, extrovert walks focus on the physical activation and engagement with the environment around them. The patients who go out for the extrovert walks walk in the more demanding parts of the garden. The three subtypes of extrovert walks include catching up with the surroundings, looking for interactions, and following guidance such as that of signs or trails. The extrovert walk, according to the author, takes place around the active parts of the garden. The trails and the botanical signs along with other interactive elements keep the walkers interested. The plant materials that change form overtime, such as ones with seasonal interests, work well for the walk. The interactive activities which require engagement, such as gardening or playing with a fountain, are the popular spots for the patients who seek an extrovert experience in walking.

Discussion, Analysis, and Application. The author stated in this section that the observation was not made to investigate walking, but different types of walking that emerged from the data collected, thus allowing the author to link the physical attributes of a space to the behavioral pattern from the patients. The author suggests that since walking is the main activity in which the patients engage during therapeutic sessions, the designs should be made to respond to those activities. A design should contain certain elements that offer availability for both introvert and extrovert walks. While one is simple and coherent to allow the mind to rest, the other must spark passive interest. No analytical procedure is
explained about how to apply the emergent knowledge into the designs, but the author presents it as part the description of the result and as a possible application derived from such results.

**Relevance to the Current Thesis.** The study is related to the current thesis by showing an example of the observational process. The observation extended for seven months, while the time was limited in this thesis. However, the behavioral mapping and the questions asked during observation are common occurrence in the field of study and can be further explored. The simple analytical process and the generalization are briefly explained in the paper, but seem simple and time-efficient. There are some limitations for applying the results to the data group in this thesis, since the user group of the studied therapeutic garden differs from this thesis’s focused user group, even though Ivarsson mentions that it should apply to most future parks and open space designs. The activity of walking does not come to focus in other studies with a similar topic, such as the studies of Abu-Ghazze, Marcus, Whyte, or Zacharias, but may offer some explanation for the behavior recorded in the observational study of this thesis further on.
APPENDIX C: Preliminary site observation notes

Preliminary Field Observation Log

**Time started:** 12:15  **Time End:** 13:15 Friday, Oct 5th

**Weather:** Sunny, warm breeze, approximately 70-80 F

**Locations:** Tate Center and Bulldawg Café, Miller Learning Center lawn and cafeteria, Tate Center Green Roof, University of Georgia Creamery, Brooke Mall, Ecology School Circular Lawn, Warnell Garden, Georgia Center Café, Lamar Dodd School of Arts.

**Bulldawg Café:**

The outside is packed with people sitting in the dining seats and talking. A girl is reading a book. Two girls are lying on a bench facing toward the entrance of the café, talking leisurely. Many groups of eaters come and go. The voices were inaudible. Several people are on laptops/electronic equipments. Once in a while, people glance out in the green lawn, but most pay attention to their conservational partners, books, or electronic devices.

The inside is similar with a lot of people and noises. There are a lot of students with their headphones, studying on the provided spaces. A lot of students are conversing and eat. The circulation is fast and there are always movements.

**Miller Learning Center:**

The outside of the lawn is more informal. A man is eating on a bench facing the lawn, then, after finish eating, he pulled out his laptop and work. Two college students laid down studying on the grass with papers and books surrounding them. There was no evidence of their lunches. Two ladies had their lunches early on, and was seen on the corridor looking down to the lawn, but they both had their laptop and headphone on. On the opposite side toward the entrance of Tate Center, two men and a woman were sitting on a stone railing of the stairs next to the entrance, conversing and watching people. A young man was standing, partially hidden in a shrub next to the entryway but below the stair case, eating hamburger while watching people in the lawn.
The inside was packed with people. It was similar to the Bulldawg Café that everyone was either talking to friends or focusing on their electronic devices. Some were watching a football game. The difference is that there was a lounging portion that was surrounded by an open windows led to green spaces. Not many people were eating there, but many were studying and relaxing with their electronic devices.

Tate Center Green Roof:

There are only a few people in the space. Two of them are talking on the phone in the proximity of the building’s entrances. The other three are throwing football at the lawn area. The sun is really strong to the entire site.

University of Georgia Creamery:

A lot of people are engaged with their electronic devices. A group of people are doing a team project. They had food containers next to them. None of them seem to pay most attention to the surrounding environment, but they picked the spots next to interesting plants, or the overlooking decks.

Brooke Mall:

Only one person was seen at the Brooke Mall during observational period. He was lying down on the shaded area with his bicycle next to him. There was no evidence of lunch being consumed at the time.

Ecology School Circular Lawn:

There are surprisingly many activities going on in this very small lawn. Many students, in two to three groups, sat down and had lunches on the bench. Two people were sitting in a shaded area in the lawn, taking lunch while engaging in their electronic devices. Two or three more just sat down and watch people. A few people walked pass the space when I sat down and took the observation.

Warnell Garden:

Warnell Garden is a small, intimate space. There are only two people in the garden, having lunch, but at a time of observation, they are staring to the water fountain [and each other’s eyes.]

Another person was found in the other far end, engaged in electronic devices.
Georgia Center Café:

The inside of Georgia Center Café was regular. People are watching television, conversing, or engaging in electronic devices. Some of them looked at the arts on the wall or took a glance outside to the courtyard.

The courtyard is almost fully occupied, but most of them did not seem to pay any particular attention to any surrounding environment. Their seat selections are set around the green edge, and nobody sat in the lower deck at the center of the courtyard, even though the seatings at the upper deck are full. One gentleman, in particular, was sitting directly in the sun, but seemed to be content of doing so because he did not change his seating angles although he is in a movable chair. He was conversing with the other man.

Lamar Dodd School of Arts:

There are two pairs of middle school children having lunch at the plaza on the hill top. A lot of children are running around and playing actively in the event that resembled a field trip.

Near the main entrance of the school, several college students were sitting on the bench facing the rain garden, some staring in to the creek, and some are engaged in their electronic devices.

Note from the Primary Observation:

The observation was not going the way I was expecting. Apparently, they are not engaging to any outside environments when they eat. Most of them are engaged in the conversation or works they brought. The rest pay attention in their devices [cell phones, laptops, tablets.] However, there are some interesting choices of seating observed when there are multiple seating alternatives. Some people really use their time to observe nature and people, but most seemed that they did not eat lunch in the spaces. Seemingly, the groups that stay in the spaces longest are the groups that have social partners. Besides the Georgia Center courtyard areas, only one professor was found eating outside. More females are found eating outside, while more males are found being outside with non-eating related activities. MLC Plaza,
Founder garden, and library lawn are added to cover the categories that are missing, completing all twelve sites to be examined in this observational study.

**Preliminary Field Observation Log**

**Time started:** 12:10  **Time End:** 12:35  **Tuesday, Oct 16th**

**Weather:** Sunny, warm breeze, approximately 65 F

**Locations:** Founder’s Garden, Memorial Plaza [MLC Plaza], and Library Lawn

  **Founder’s Garden:** A man is sitting in a far bench at the northern most part of the garden, having lunch. Two teenagers are sitting in the grass. One of them has a book; the other has a set of papers. They were socializing and studying together. People walked pass the bamboo trail, and some cut across the pond. The garden was quiet. One young man walks up to the bench on the area overlooking the lawn and starts using his smart phone.

  **Memorial Plaza:** Memorial Plaza is bustling with people. Two young girls are sitting on the planter seat against the sun, talking. Four students sit on the granite blocks underneath crepe myrtle trees, using their laptop. Many people walk right in the middle of the space. The small, sloped lawn has many people sitting in the grass, studying, listening to music, and taking naps.

  **Library Lawn:** Not many people stop at the library lawn, but many of them are moving about. There are a couple young adults sitting at the bench in front of Peabody Hall. One older man sits at the bench in front of the library, eating bag lunch. A woman smokes in front of the law library, and another man using the garden area at the far end, talking to his cell phone.

**Action noted in observation**

- Sitting, day dreaming
- Eating
- Talking
- Reading a book
- Talking on cell phone
- Using laptop, smart phones
- Watching people
- Watching the grass
- Walking a dog
- Laying in the grass
- Playing throw football
- Working on team project
- Lying under the tree
- Napping
- Displaying intimate affection
- Sunbathing
### APPENDIX D: Primary Observation Timeline

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Central Campus Precinct Inventory
East Campus Precinct Inventory
North Campus Precinct Inventory
South Campus Precinct Inventory
APPENDIX G: Site Photographs

Landscape Appropriate for Dining Activities
Top left: Bulldog Café
Top right: UGA Creamery
Bottom: Georgia Center Courtyard
Landscape Appropriate for Movement/ Circulation

Top left: Library Quad
Top right: MLC Lawn
Bottom: Brooks Mall
Landscape Appropriate for Reflection and Intimacy

Top left: MLC Plaza

Top right: Founder’s Garden

Bottom: Warnell Garden
Landscape Appropriate for Other Purposes

Top left: Lamar Dodd’s Rain Garden
Top right: Odum’s Pocket Lawn
Bottom: Tate Green Roof
APPENDIX H: Percentage of activities in different landscape categories

Green Space Appropriate for Dining

Green Space Appropriate for Circulation and Movement