

LANDSCAPE DESIGN IN LIMINAL SPACES: UNDERSTANDING HOW THE DESIGN OF
TRANSITIONAL SPACES AFFECTS STRESS LEVELS THROUGH BEHAVIORAL
ANALYSIS

by

SOFI ELIZABETH HOOKS

(Under the Direction of Brad Davis)

ABSTRACT

This thesis reiterates the importance of accessibility, defines how the landscape interacts with mental, physical, and spiritual, and catalogs comfort and discomfort incurred through the experience of two distinct transitional landscapes, located in Athens, Georgia. Participants identified factors of design and site programming that influenced their comfortability levels to address the question: How do environmental stimuli and the design of urban greenspace impact user perceptions of wellbeing and restoration? The researcher employed the Perceived Stress Scale (PSS), the Discrete Emotions Questionnaire (DEQ), a Binary Coding Scheme, and site-specific surveys to conclude that participants exhibited higher feelings of relaxation and happiness in the President's Club Garden as opposed to College Square Plaza, located in Athens, Georgia. This thesis argues the importance of designing for users' overall health and wellness and identifies liminal landscapes as a solution to combat this issue.

INDEX WORDS: Landscape architecture, Designed environment, Environmental psychology, Liminal landscapes, Transitional spaces, President's Club Garden, College Square Plaza

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SOFI ELIZABETH HOOKS

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SOFI ELIZABETH HOOKS

Major Professor:	Brad Davis
Committee:	Sungkyung Lee
	Alan Stewart
	Jennifer Lewis

Electronic Version Approved:

Ron Walcott
Dean of the Graduate School
The University of Georgia
May 2025

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CHAPTER 1

INTRODUCTION

The designed environment is interwoven into every aspect of our lives as humans and therefore holds great value. Memories can be triggered by the environment and can have an influence on our perceptions of space. Factors in design, such as color, form, and texture can cause a conscious (or unconscious) psychological reaction to a space that can impact the user's perception of the space (Jaglarz 2023, 2000). There are also physical factors that influence how the user interprets and utilizes the space such as available seating, flow of traffic, visual appeal, and proximity to other spaces. All these factors influence the comfortability of the designed environment and thus need to be considered when designing outdoor spaces.

Landscape architects spend much of their professional practice curating and developing destinations in the built environment. Whether in the residential sector or the commercial sector, designers must consider form, functionality, beautification, and environmental impact, as well as the designated programming for the space. While many of these destinations are well-designed, not all are accessible to users due to their location and proximity to highly trafficked areas, such as workplaces or neighborhoods. This thesis implores readers to understand the importance of accessibility through the utilization of transitional landscapes. Transitional landscapes (also referred to as liminal landscapes) can include spaces such as: corridors, aisles, pathways, streetscapes, sidewalks, and any other outdoor space that requires movement from one area to another. In this thesis, the researcher references the need for comfortable transitional landscapes by addressing global mental health concerns, current physical health trends, societal

development needs, and the importance of access to nature often referenced in theology. To explore the impact of transitional landscapes on an individual's psychology, the researcher conducted a study utilizing qualitative and quantitative methods to document participants' reactions to the built environment.

This thesis provides information on human reactions to stress by studying participants' comfortability levels to better understand how environmental design impacts mental wellness. This thesis will provide data to determine the amount of stress (identified through levels of comfort/discomfort) imposed by two liminal spaces located in Athens, Georgia. In Merriam-Webster, the word liminal is described as "a word for the in-between. It describes states, times, spaces, etc., that exist at a point of change—a metaphorical threshold" (Merriam-Webster, "liminal"). By designing intentionally to create liminal landscapes, landscape architects can increase focus on 'the journey' rather than just 'the destination'.

The spaces chosen for this thesis are located in the North Campus region of the University of Georgia (the President's Club Garden at Old College, Site 1), and in downtown Athens (College Square Plaza, Site 2). Both spaces have high levels of pedestrian traffic and offer outdoor settings with seating areas available. Each space is close in proximity to offices, classrooms, businesses, residences, and restaurants, and they provide users with connecting pathways to these alternative locations, as well as areas of respite through their utilization of various site furnishings.

However, the site programming measures differ. The President's Garden is utilized primarily by college students and university personnel during the day. It is not usually loud, and it is not adjacent to any roadways. Additionally, the scale of the site is smaller and more defined, thus creating a more intimate and private space. It extends into the University of Georgia's North

Quad; however, it is distinctly realized as a separate space. The site programming for College Square Plaza is different as a much larger demographic of people utilizing that space, in addition to those affiliated with the university. This space is used frequently during the daylight hours, and well into the night. It is loud and less kempt, as opposed to the President's Garden which is regularly maintained and frequented less. The College Square Plaza can also be reserved for festivals, protests, and is a popular place for public preachers. Due to the utilization of this space, and its slightly barren design, it does not provide any privacy.

College Square Plaza, located in downtown Athens, just past the infamous "UGA Arch" is an urban setting with picnic tables and benches inside a corridor, flanked by businesses and restaurants. The President's Club Garden is located on the south face of Old College on the University of Georgia's north campus. This garden contains benches and a placard wall, and is also encompassed by buildings, all academic in nature. These sites were chosen for their similarity in use, but for their difference in design, as well as their proximity to the University of Georgia. Both sites are outdoor spaces that provide connections to existing sites and structures while also offering a place of temporary refuge to passersby, thus fitting the term "liminal landscapes".

In the diagrams below, Figure 1.1 and Figure 1.2 depict the utilizations of each site as transitional spaces and destinations. They provide users with the ability to traverse through a space or enjoy it in a more long-term fashion. Transitional landscapes that address the opportunity for pedestrian enjoyment can successfully become memorable spaces that not only serve users as a means of getting from one place to another but also can begin to serve as a destination. There is also abundant vegetation in this space, with many tiered plantings that provide a sense of enclosure to the space. It is often perceived as natural and well-designed, with much appreciation for the seasonal planting bed.



Figure 1.1: Site 1 information



Figure 1.2: Site 2 information

In response to the COVID-19 pandemic in 2020, Athens-Clarke County Mayor Kelly Girtz and the ACC Commission voted on a pedestrian safety improvement measure that would close the section of College Avenue between East Clayton Street and East Broad Street (Webber 2020). This temporary closure would pilot the use of this former street as a pedestrian space, as well as provide community members with access to the outdoors while still allowing for social distancing measures (Webber 2020). This space, now referred to as College Square Plaza, has become a highly utilized portion of downtown for pedestrians to traverse through, as well as sit and enjoy, and has thus become an integral part of Downtown Athens. The buildings along the perimeter of the space provide a sense of enclosure, however the asphalt on the ground

remaining from its prior usage is not as inviting. The views of this space extend approximately one block before the horizon is lost up hill.

College Square Plaza was temporarily closed to try out this urban park because it was often utilized as a gathering place for humanitarian protests, parking day activities, and city festivals. The success of the College Square Plaza as an urban space has encouraged the city to make it a permanent establishment. Designs for this revitalized plaza were completed by the Smith Planning Group (SPG), and construction is set for 2026. Its proximity to many major businesses and restaurants, as well as the connectivity it allows from the UGA campus to the mixed-use downtown make the College Square Plaza a successful urban space. However, the unfortunate aspect of this space is the user perception of the unhoused population that inhabits the space. People who use the space regularly encounter interactions with unhoused individuals that are unsettling to some. These interactions can be upsetting or cause feelings of unease while using College Square Plaza.

Due to its temporary nature, not many permanent design measures have been utilized. This differentiates College Square Plaza from the President's Garden as it lacks vegetative color, established planting arrangements, and permanent site furnishings. The lack of these design measures is felt tangibly through the space, as it is still predominately viewed as a "blocked of road" by users.



Figure 1.3: College Square Plaza (photo by author)

The President's Club Garden was established in 1973 to honor significant donors to the university (UGA Today 2015). The placards on the wall display the names of the President's Club members. These donors pay more than one thousand dollars to be a part of the President's Club (UGA Today 2015). The planting bed is changed out seasonally to account for changing weather conditions, while still providing the space with interesting color. This area is used constantly throughout the day by students and faculty who are travelling from one class to another, or who want to sit outdoors and enjoy a moment outside. This space offers a sense of enclosure created by placement and scale of vegetation, grade changes, and proximity to buildings. The long views from this site are south towards the UGA Main Library and extend approximately one block, or three hundred feet.



Figure 1.4: President's Club Garden (photo by author)

The purpose of this thesis is to identify the environmental design factors that influence users' perceptions of space, primarily focusing on factors that cause comfort or discomfort in the context of busy, heavily used pedestrian spaces, or liminal spaces. By studying the design factors imposed by each of these landscapes, and cataloging user experience, sources of stress can be identified and help determine the best course of designing similar transitional spaces in the future. Designing for stress reduction is imperative to our overall health and well-being as a society. By designing environments that cater to the mental wellness of individuals, we can provide spaces that encourage peace, reduce mental strain, and prompt site engagement.



College Square Plaza



Site Location in
Athens-Clarke County



President's Club Garden

Figure 1.5: Map of study sites

Research Questions:

1. How do environmental stimuli and the design of urban greenspace impact user perceptions of wellbeing and restoration?
 - a. What factors lead to higher or lower self-reports and directly observable indicators of stress or wellbeing?
 - b. What design features contribute to higher levels of discomfort?
 - c. What external factors contribute to higher levels of discomfort?

CHAPTER 2

LITERATURE REVIEW

Can I get your attention, please?

“For centuries, philosophers, poets, and artists have suggested that people can reduce the stress they feel by escaping to nature” (Jiang, Chang, and Sullivan 2014, 26–36). In modern day, however, many people do not have direct access to a natural space, such as a garden, nature park, or any other outdoor amenity area. In the twenty-first century, many people live in increasingly urbanized environments with daily accessibility to transitional spaces, like sidewalks or pathways, as opposed to larger parks and greenspaces designed as destinations. It is possible that landscape architecture as a discipline has been more focused on the design of destination spaces, like large parks and nature-based green infrastructure.

This is emphasized in the fact that the ASLA Award of Excellence in the Urban Design Category was only recently established in 2020 (Schurch 2019), and since then the award types have varied from hospitals, to parks, and then in 2024 the winner was the Atlanta Beltline design (American Society of Landscape Architects 2024). There seems to be an upward trend in the recognition of the importance of access to greenspaces in the urban environment as described in the categorical addition of the Urban Design Category. Additionally, the Atlanta Beltline, which functions as a transitional environment and establishes the precedent of active travel (as well as its categorization as a destination) is a strong example of a liminal landscape. Furthermore, its recognition as an example of elite design demonstrates the necessity of liminal landscapes in the

built environment that function not only as a means of transit but also as a memorable experience.

Ralph Waldo Emerson is quoted with saying, “Life is a journey, not a destination.” (Emerson).

While it is evident that Emerson was discussing the experience of life as a whole, the same philosophy is still applicable in the physical sense. Designers must begin to consider the average person’s daily route when designing the built environment. Whether it be driving to work, biking to the grocery store, or walking down the street to get a coffee, sometimes these moments are the only time people are exposed to the outdoors before returning to their life indoors; assuming these activities are available to the common person at all. Studies have shown that the exposure to street trees along a road correlates to lower mortality rates among the people that live nearby and those who utilize the road often (Donovan et al. 2022, 107609; Steuteville 2022). These everyday journeys hold immense significance to individuals, especially if it is their only routine opportunity to interact with nature. If the design of these spaces is not beneficial to human psychology, and in some instances even detrimental, then the impact on individual and societal health is significant (Dannenberg, Frumkin, and Jackson 2011).

“The conditions of modern life—the built environments, stimuli, and tasks of everyday living—place nearly relentless demands on our ability to pay attention and process information”

(Dannenberg, Frumkin, and Jackson 2011, 110). As a society, we are beginning to see the effects that rapid technological advancements have on our attention span and then subsequently, our mental health. Dr. Gloria Mark, a chancellor’s professor at the University of California, Irvine, has provided substantial data and research on this specific topic. Dr. Mark, who received her PhD in psychology from Columbia University, has been studying attention spans as they relate to technology since 2004 (Mills 2023). By utilizing logging techniques, she has discovered that the

amount of time spent on certain mundane tasks (checking emails, responding to messages, etc.) has decreased, while the frequency has increased. Over the past twenty years, our attention span, on average, has decreased from 2.5 minutes to 47 seconds. Dr. Mark has also discovered that it now takes 25 minutes, on average, to fully concentrate on a task again once distracted (D'Aurizio). This information is provocative as it highlights the detrimental effects of modern technology on our cognitive functions. Yet it provides a means to resolve these issues through distinct awareness and the reduction of distractions.

There are many beneficial aspects to the invention of modern technology, however it is important to understand the psychological effects that this constant access has on our health as individuals, and as a society. This availability of information, combined with the user's constant accessibility, has increased the amount of time spent multitasking (Mills 2023). While this activity has been normalized and often encouraged in the workplace, it is not a beneficial or sustainable skill (Meyer and Kieras 1997, 3–65). By having our attention be spread thin and pulled in multiple directions, it increases blood pressure and other stress responses in the body. However, the lasting effects of the 2020 pandemic's lockdown have shown that many workplaces are pushing towards hybrid or fully remote work, referencing increased productivity and decreased unit costs as the inciting factors (Pabilonia and Redmond 2024). This increased productivity corresponds with Dr. Mark's findings of self-reporting individuals that are indicating higher levels of stress and burnout as they "want to go above and beyond what they ordinarily do to be able to signal to their colleagues, to their supervisors that they're working hard" (Mills 2023). Due to the lack of visual cues in a traditional office setting, remote workers are trying to find other means that display their contributions to the company, even if it is detrimental to themselves. However, the issue of dwindling attention spans is not solely

attributed to the increase of access to technology and the implications of the COVID-19 pandemic. Prolonged cognitive activity increases mental fatigue, which in turn reduces duration of one's attention span (Kaplan 1995, 169-182; Boksem, Meijman, and Lorist 2005, 107–116). In addition to the recent research on attention spans by Dr. Mark, psychologists have been studying ways to comfortably manage attention spans for years.

The notion that “the ability to concentrate may be restored by exposure to natural environments” was first introduced by Rachel and Stephen Kaplan in 1989 (Kaplan and Kaplan 1989). Their book, The Experience of Nature: A Psychological Perspective, details the Attention Restoration Theory which is “concerned with the recovery of the capacity to focus attention” (Kaplan and Kaplan 1989, Kaplan 1995, 169-182). The Kaplans theorize that by utilizing outdoor spaces, and exposing oneself to natural environments, stress levels are reduced. This theory is based on the distraction and redirection of focus from stressful environments, and provides the components included in “restorative environments” (Kaplan 1995, 169–182).

Kaplan identifies the four main components of restorative environments as: being away, fascination, extent, and compatibility (Kaplan 1995, 169–182). The removal of oneself from stressful environments (work, school, etc.) to a more natural environment can facilitate the notion of “being away”. Access to nature and greenspace, removed from the stressor, will satisfy this need to be away and there is no distance requirement between the stressor and the area of respite. The need for “fascination” in natural settings can be remedied through the commonly sighted occurrences that take place in a natural environment, such as: cloud movement, breeze interacting with vegetation, and wildlife. These are described as ‘soft’ fascinations as they “hold the attention, but in an undramatic fashion” (Kaplan 1995, 169–182). The third component cited to have restorative significance can be found in the extent of the natural setting. For a setting to

be “extensive”, essentially it needs not to be confined. As long as the user is free to roam about the space and wander at will, the space can act restoratively. Finally, the fourth concept described in The Restorative Benefits of Nature: Toward an Integrative Framework is need for “compatibility” (Kaplan 1995, 169–182). Here Kaplan describes the relationship between humans and the natural environment “as if there were a special resonance between the natural setting and human inclinations”, which further amplifies the need for accessible restorative environments (Kaplan 1995, 169–182).

Restorative environments can be described as areas that provide respite and can essentially rehabilitate cognitive function. The argument for similar spaces, ones that improve the health of individuals as well as the health of communities, has been identified as the need for more “third places”. Ray Oldenburg, an American sociologist, is credited with defining and identifying this notion of a “third place” in his book The Great Good Place, published in 1989 (Oldenburg 1989). Prior to discussing the importance of a third place, Oldenburg defines the “first place” as an individual’s home and the “second place” as an individual’s workplace, subsequently the area where a person will spend most of their time (Oldenburg 1989). The “third place” can be defined as areas that prompt social interaction and provide means to share community. Following the introduction of the third place, sociologists, psychologists, and many other scholars have emphasized the need for the designation of space as described by Oldenburg. However, with the advancement of technology and the unprecedented impact of the COVID-19 pandemic, we are beginning to see the decline of the second place, which negatively influences the utilization of the instrumental third place (Rao 2024). “With the growing cost of living, the prevalence of social media and the residual social-distancing mentality from the pandemic years, third places, or locations designed for socialization, have largely disappeared” (Rao 2024). This has a

detrimental effect on people as isolation and loneliness levels have increased to the point that the U.S. Surgeon General has declared an epidemic and created an Advisory on the Healing Effects of Social Connection and Community (Muthy 2023).

Many people are beginning to stay in their homes for days on end. If there is no need to leave the house to go to work, then many may not leave the house (Daniels 2021). Through the utilization of delivery services, many people are opting to avoid going to the grocery store or picking up essential items because these items can just be shipped to the house. Online videos and applications have begun to replicate exercising outdoors, so there is no need to run outside when current treadmills have screens that mimic a trail. If there is a wonderful park nearby, but the route to get there is uninviting, then an individual is less likely to utilize this space, especially compounded by the ease of living in the modern day. That is why the design of transitional spaces is so important to the utilization of a destination. If a non-motorized route to a destination is unattractive, lacking in trees or natural elements, and perceived as unsafe, then the intended users will not utilize this transitional space, and it will be wasted. It has been proven that street trees reduce traffic speeds and encourage drivers to heighten their attention to road conditions, and incidentally pedestrians (Donovan et al. 2022, 107609; Steuteville 2022). Common “third space” destinations are often inviting, whether it be a church, park, or café. Destinations are designed to be inviting, and many promote interactions with other individuals. However, if these destinations are not accessible to all, or the route to get to these types of spaces is treacherous, then these destinations are less beneficial to the intended users and society as a whole. It is crucial that landscape architects curate inviting transitional spaces that will prompt users to inhabit a third place, especially when the second places are declining in use. However, if the

future designs of transitional spaces do not take into consideration the health of the individual and the health of society, then these problems addressed above will only become compounded.

Nature and Spirituality

For centuries, the importance of the natural environment has been discussed in spiritual doctrine and then translated to scholastic study (U.N. Environment Programme 2018). The Faith Environment Initiative, a section from the United Nations Environment Program, stated that “all religions agree that nature is an act of divinity and should be treated as such” (U.N. Environment Programme 2018). In a report conducted in 2010, 84% of the world population claimed to be religiously affiliated, while the remaining 16% claimed to be unaffiliated (Pew Research Center 2012).

There is no doubt our relationship to the built and natural environment has significance not only for our mental and physical health, but our spiritual health as well. To ensure the well-rounded health of our society, it is necessary that designers create thoughtful, connected landscapes that encourage participants to utilize the outdoors and revel in the beauty of nature. As landscape architects, it is exceedingly important that we design landscapes that encourage awareness, and act as a refuge to modern day stressors. The idea that our heightened awareness affects our perception of space and our surroundings, has also argued that this clarity will benefit our mental wellness in the long run (Hanh 1987).

While all landscapes should evoke emotion and provide respite, not many readily accessible landscapes do so. As mentioned previously, over half of the population of the United States live in a suburban, automobile-dependent environment that is not conducive to mental, physical, or spiritual growth. Growth can be attained through walkability (and other forms of active travel), immersive landscape design, retention of local ecology, and the provision of third places. Third

places provide a sociological connection between individuals, which is beneficial to one's mental and physical health, not to mention the benefit of building community. Immersive landscape design as well as retention of local ecology can aid in encouraging the awareness of users which can stimulate cognitive function and reduce stress (Kaplan and Kaplan 1989). The benefits of walkability have been mentioned numerous times already, however renowned Buddhist Monk Thich Nhat Hanh described the benefits of walking meditation perfectly. He said, "When we are able to take one step peacefully, happily, we are the cause of peace and happiness for the whole of humankind" (Hanh 1987). If we have accessibility to safe, well-designed transitional spaces, then it will be easier for us to lessen the burden of stress and find peace in the natural and built environment.

Leaving the Concrete Jungle

There is no doubt that the design of the built environment influences our mental and physical health. Our homes, workplaces, and elected "third places" all have the capability to compound stress on the body, or reduce stress on the body (Dannenberg, Frumkin, and Jackson 2011, 106-116). Not only does the health of the individual rely on the built environment, but the health of society can also be linked to environmental design as well (Dannenberg, Frumkin, and Jackson 2011, 109). There are many factors that influence an individual's reaction to "favorable" or "unfavorable" settings, see Figure 2.1 (Dannenberg, Frumkin, and Jackson 2011, 108).

Settings that are favorable and unfavorable to mental health.

Settings	Mental health implications
	<u>Favorable</u>
<ul style="list-style-type: none"> • “Legible” places • Attractive, well-maintained, safe places • Contact with greenspace • Places with privacy • Places with appropriate contact with other people 	<ul style="list-style-type: none"> • Well-being • Life satisfaction • Quality of life • Social support • Ability to concentrate • Creative play in children • Less mental fatigue
	<u>Unfavorable</u>
<ul style="list-style-type: none"> • Crowded places • Noisy places • Dangerous places 	<ul style="list-style-type: none"> • Social withdrawal • Reduced social ties among neighbors • Smaller social networks • Diminished social and motor skills in children • Distress • Anxiety • Irritability

Figure 2.1: Table from Making Healthy Places, page 108.

It is necessary to have access to greenspaces and neutral gathering spaces. This need has become so predominant among citizens in North America and Europe that healthcare professionals have begun to prescribe certain patients a nature experience, or “NE”, when the best course of action for their healthcare plan is to spend time outdoors (Hunter, Gillespie, and Chen 2019).

Researchers have identified that pedestrians within 1100 meters (or about 0.7 miles) of greenspaces are more likely to have higher levels of physical activity and site utilization, with this correlation peaking at 600 meters (or about 0.4 miles) (Cardinali et al. 2024, 117605).

Unfortunately, this study was done in four European cities, and Europe is much more densely populated than the United States, however it provides researchers and designers with a baseline range of beneficial proximity (Baker 2021; Cardinali et al. 2024, 117605). This modern removal from nature has major implications not only for the health of the individual, but it is also influencing abnormal reactions to commonplace issues.

In hopes to reduce the negative elements of the built environment, the World Health Organization started the “Healthy Cities” movement that describes a healthy city as “one that is continuously creating and improving those physical and social environments and expanding those community resources that enable people to mutually support each other in performing all the functions of life and in developing to their maximum potential” (Dannenberg, Frumkin, and Jackson 2011, 150; Duhl and Hancock 1988). In chapter ten of Making Healthy Places, the authors describe the “5 D’s of Development” in relation to the need for healthy cities, they are as follows: density, diversity, design, destination accessibility, and distance to transit. These principles focus on benefits associated with walkability (Dannenberg, Frumkin, and Jackson 2011, 150). From this information, it can be gathered that a healthy city relies more on “active travel”, as opposed to the current automobile dependence.

Dr. Susan Handy, a professor at the UC Davis, describes active travel as “travel from one point to another by nonmotorized means, usually walking or biking, though rollerblading, skateboarding, and nonmotorized wheelchair use would also count” (Handy 2005). It is also important to note that Dr. Handy specifies active travel as travel to and from a destination, not just a destination-less commute utilizing physical activity. The benefits of active travel are immeasurable through their ability to improve mental and physical health. By designing the built environment to incorporate active travel daily (through the commute from home to work or school) the general health of the population in that built environment will increase.

Dr. Handy also mentions that research on transitional landscapes and their impact on mental and physical health is a relatively new field of study (Handy 2005). As previously mentioned, the need for a reduction in automobile reliance emphasizes the need for walkable cities and close-knit communities. However, due to the lack of research on the design influences in transitional

spaces, it is not specifically known the factors needed to reduce stress in the landscape and encourage participant utilization. This thesis aims to provide data that addresses this knowledge gap and will be beneficial for designers in the future. Not only can the data be applied to the urban setting in which it was recorded, it will also be applicable across the differing categories of design (public, private, commercial, residential, etc.).

Walkable Cities and Urban Trees

In addition to influencing our conditioned psychology and mental wellness, the design of the built environment also contributes heavily to our physical health and safety. The move to suburban landscapes and the increased utilization of automobiles has impacted the design of the built environment substantially. Because automotive transportation is so common, destinations can be further removed from the home, which in turn increases the amount of traffic to get from one place to the next. “Sprawling communities generate more traffic volume and VMT (vehicle miles travelled) than do compact communities and therefore generate more exposure to risk” (Dannenberg, Frumkin, and Jackson 2011, 158). These risks include car crashes, accidents involving pedestrians, and the road rage mentioned earlier, among other things. The proposed solution to this problem is to create healthy and walkable cities, improve streetscapes, and reduce automotive reliance.

In addition to the social benefits of walkable, mixed-use neighborhoods, there have been numerous health benefits identified as well (Leyden 2003, 1546–1551; Takano, Nakamura, and Watanabe 2002, 913–918). A study from Tokyo, Japan analyzed the survival rates of adults from the ages of 71 to 86 over a five-year period and concluded that “living in areas with walkable green spaces positively influenced the longevity of urban senior citizens independent of their age, sex, marital status, baseline functional status, and socioeconomic status” (Takano,

Nakamura, and Watanabe 2002, 913–918). This association between accessible greenspace utilization and the physical health and increased longevity of individuals should be further emphasized when designing the built environment (Takano, Nakamura, and Watanabe 2002, 913–918).

Multiple studies have shown that participants who spend time in nature reduce their mental fatigue, improve their mood, and increase their attention span along with the physical benefits of utilizing outdoor spaces (Kaplan and Kaplan 1989; Takano, Nakamura, and Watanabe 2002, 913–918; Hartig and Kahn 2016, 938–940; Handy 2005). However, “people in increasingly large and dense urban areas may have few or no contacts with the natural world in everyday life” (Hartig and Kahn 2016, 938–940). This lack of access to the natural world impacts one’s ability to combat the mental and physical stressors of the modern climate. There are many factors that influence the physical health of individuals that do not include access to the natural environment. An example of such includes the shift of occupational related energy expenditure and its impact on weight increase over the last fifty years (Church et al. 2011). The increase in sedentary behavior in the workplace can be attributed to advancements in technology that reduce the need for hands-on labor. “The sharp increase in the prevalence of obesity and associated health consequences over recent decades in the U.S. are well documented” (Church et al. 2011). In the figure below, data is provided that documents these consequences.

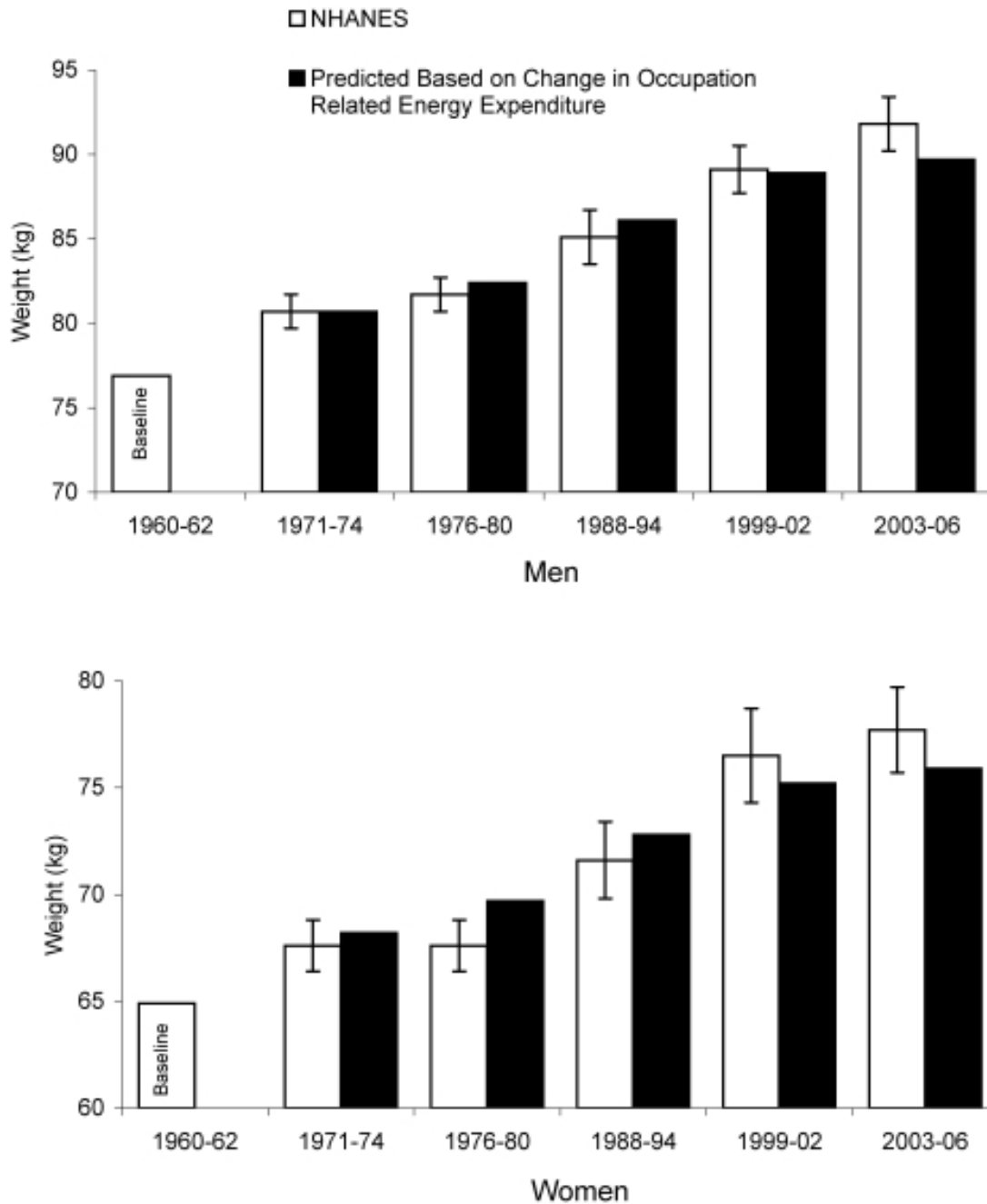


Figure 2.2: Predicted weights and NHANES weights (Church et al. 2011)

Given the figure above that displays the “mean body weight derived from the U.S. National Health and Nutrition Examination Surveys (NHANES)” in addition to the predicted weights following the reduction in occupational energy expenditure, one can visualize the impact that an increased sedentary lifestyle has on ones’ physical health (Church et al. 2011). (However, weight

fluctuation is not the only indicator of an unhealthy lifestyle.) With the described benefits of accessible greenspaces on longevity, the identification of an obesity epidemic, and failing health care systems, the need for accessible greenspaces and routes of active travel to these sites is more prevalent than ever (Hartig and Kahn 2016, 938–940; Church et al. 2011; Hunt et al. 2024).

Not only does the utilization of plantings increase the health of individuals and promote outdoor usage, but it also impacts the local ecology as well as the perception of space immensely. Not only do urban street plantings help manage street runoff and buffer sound, but they can also create habitats for wildlife and improve visual stimulation (Wallington 2021). Additionally, a study recently completed in Portland, Oregon linked the addition of urban trees to lower mortality rates (Donovan et al. 2022, 107609; Nuccitelli 2023). Nuccitelli, a writer for the Yale Climate Connections stated, “Access to trees can also help reduce individuals’ stress, improve mental health, strengthen immune systems, reduce crime, and improve student academic performance, among other benefits,” (Nuccitelli 2023). The benefits of urban trees on health and wellness is immense and, frankly, a seemingly easy issue to address.

Not only has smaller vegetation (like shrubs and groundcovers) been proven to impact a multitude of issues, but access to trees specifically has been proven to manage health and wellness. Overhead canopies can reduce heat and air pollution as well as remove millions of tons of carbon pollution from the atmosphere each year (Nuccitelli 2023). They are also statement pieces in design that extend into the vertical plane, providing a sense of enclosure and privacy. By providing urban and suburban residents with access to abundant, lush vegetation and a plethora of urban trees, designers can have a direct influence on the health of the population.

Translation to Methodology

Increasing attention restoration, addressing modern planning practices, the need for more means of active travel, and the benefit of nature on all aspects of wellness, can be addressed by designing the built environment with liminal landscapes in mind. Access to safe and interesting vegetated environments poses multiple benefits to individual and societal health. By incorporating ample vegetation, canopy trees, and staggering plantings throughout a site, the health benefits for restoring cognition alone are nearly immeasurable. Pair this with naturally mimicked pathways and interesting site furnishings, and an attractive liminal landscape is conceived.

This study aims to identify environmental stressors and levels of perceived discomfort in two liminal landscapes in Athens, Georgia, thus providing designers with concrete data to influence the design of transitional spaces in the future. This conglomeration of participant results and the mixed methods used to obtain them are crucial to consider when designing healthy environments.

CHAPTER 3

METHODOLOGY

Summary

This study seeks to define and understand the factors influencing user feelings of comfort and discomfort in transitional green spaces. This data will be useful in the design of future transition space in both the urban and suburban setting. The sites utilized in this study are predominately urban by design, however the findings are applicable to suburban areas as well.

This study used a mixed methods approach which included the employment of the Perceived Stress Scale (PSS), participant observation through a binary coding scheme, the Discrete Emotions Questionnaire (DEQ), and a user survey to catalog feelings of comfort or discomfort identified in each space. As described in the Cambridge Academic Content Dictionary, discomfort is referred to as “the feeling of not being comfortable, either from a physical cause or from a situation, or something that causes this feeling” (Cambridge Dictionary 2025). Extended exposure to discomfort can foster a stressful environment which can negatively affect mental health and physical well-being.

Site Selection

The President’s Club Garden (Site 1) and College Square Plaza (Site 2) were chosen for their transitional qualities (similarity in size, grade, and hardscape texture), areas for respite (seating options and engaging views), and additionally their proximity to each other (around 1,000 feet), as well as their proximity to the University of Georgia’s campus. Each site is utilized frequently during the day; however College Square Plaza also incurs frequent foot traffic at night. The

researcher began the study in the President's Club Garden and ended in College Square Plaza. This order was the same for every participant.



Figure 3.1: President's Club Garden (photo by author)

Due to its location on a university campus, the President's Club Garden is traversed mainly by students and university faculty. The prime flow of movement is directed from the east to the west and vice versa. There is a secondary flow of traffic that oscillates from the north to the south, mainly to and from Old College, the building directly to the north of the garden. See Figure 1.1. The President's Club Garden is immersed in vegetation and surrounded by academic buildings, classrooms, libraries, and offices. The semi-circle, placard half wall enhances the comfortable, enclosed feeling of the space, while still providing users with visibility from all directions. The

geometry of the wall and the placement of the seating directs the users' focus across the lawn and towards the University of Georgia's Main Library. See Figure 3.2. By directing attention from the inside of the garden outwards, the two spaces (the lawn and the President's Club Garden) feel connected.



Figure 3.2: President's Club Garden facing south (photo by author)

The vegetation, hardscape materials, and furniture present in the site are well maintained. The coloring present in the site includes hues of brown, green, and black with more vibrant colors located in the seasonal planting beds. See Figure 3.3. This site is utilized most heavily as a transportation route during class changes; however passersby traverse the space at all hours of the day. Additionally, it is used as an area of respite. People can often be found sitting on the benches, along the wall, or even in the stairways of the site. During lunchtime, the President's

Club Garden is almost always fully occupied. As a transitional path and a destination for respite, the President's Club Garden is a prime example of a liminal landscape.



Figure 3.3: President's Club Garden materials (photo by author)

When discussing the use of College Square Plaza in terms of pedestrian traffic and areas for respite, it functions similarly to the President's Club Garden. College Square Plaza is an open space with seating and some vegetation that provides users with access to Broad Street, College Avenue, and Clayton Street. Pedestrian traffic in this space moves predominately from north to south, and then from east to west. See Figure 1.2.

College Square Plaza was initially a section of College Avenue that provided vehicular access between Broad Street and Clayton Street and was then shut down and transformed into a temporary urban park (Webber 2020). It is currently under redesign, as of 2025, and set to begin the construction of a permanent urban space in 2026 (Rigole 2025). College Square Plaza is flanked by multi-story, mixed-use buildings with commercial spaces located on the first floor and residential units in the stories above. The mixed-use component of this site increases the pedestrian traffic flow, as well as the duration of traffic flow. Not only is this site a hub of activity during the day, it is also bustling at night.



Figure 3.4: View of College Square Plaza from the UGA Arch (photo by author)

With its location on the edge of downtown Athens, facing the infamous UGA Arch, College Square Plaza has a different demographic than the President’s Club Garden. While many of the

users that frequent the President’s Club Garden can also be found in the College Square Plaza, there are additional pedestrians that utilize this space. Tourists, businessmen and women, Athens’ residents, retail/service industry workers, and unhoused people use the space as well. The latter is often a source of tension for the other users.



Figure 3.5: College Square Plaza materials (photo by author)

There is not much vegetation located in College Square Plaza, most likely due to its former use. However, there is a much larger variety of color and hardscape materials located in this site which, coupled with the site’s constant activity, provides users with more overall stimulation (visual, audible, olfactory). Its utilization as an urban corridor leaves users feeling exposed and that designation, compounded with the central placement of furniture, makes some users feel uneasy. This will be emphasized later in the Results and Discussion portion.



Figure 3.6: College Square Plaza facing south (photo by author)

Overall, like the President's Club Garden, the College Square Plaza is a prime example of a liminal landscape. It is used by urban pedestrians as a thoroughfare, as well as an area to enjoy the outdoors. However, the urban structure of the hardscape and materials in this site, the lack of thriving/plentiful vegetation, and the difference in site users set this plaza apart from the garden. These sites, the President's Club Garden (Site 1) and College Square Plaza (Site 2), are similar in size, site activity, and utilization, and are close in proximity to one another. These attributes identify these spaces as strong test sites for this study and will allow the researcher to gather data on the feelings expressed and behaviors exhibited in each site.

Perceived Stress Scale (PSS)

Each participant completed the Perceived Stress Scale prior to the start of the study. The Perceived Stress Scale is globally recognized as “the world’s most widely used instrument to measure perceived stress and since its development has been continuously applied in empirical research” (Ribeiro Santiago et al. 2020, 100). The Perceived Stress Scale is comprised of a questionnaire that identifies participants’ stress levels on a regular basis and scores their perceived stress on a scale from 0-56. The score categories are: Low Stress (0-18), Moderate stress (19-37), and High Stress (38-56) (Ezzati et al. 2014, 645–652; Harris et al. 2023, 846–854).

PSS-14 Items	0	1	2	3	4
1. In the last month, how often have you been upset because of something that happened unexpectedly?					
2. In the last month, how often have you felt that you were unable to control the important things in your life?					
3. In the last month, how often have you felt nervous and “stressed”?					
4. In the last month, how often have you dealt successfully with day to day problems and annoyances?					
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?					
6. In the last month, how often have you felt confident about your ability to handle your personal problems?					
7. In the last month, how often have you felt that things were going your way?					
8. In the last month, how often have you found that you could not cope with all the things that you had to do?					
9. In the last month, how often have you been able to control irritations in your life?					
10. In the last month, how often have you felt that you were on top of things?					
11. In the last month, how often have you been angered because of things that happened that were outside of your control?					
12. In the last month, how often have you found yourself thinking about things you have to accomplish?					
13. In the last month, how often have you been able to control the way you spend your time?					
14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?					

Figure 3.7: PSS-14 utilized in study

Through the utilization of this method, participants were able to provide baseline stress data that might influence their reactions to the built environment. Gathering this data provided the researcher with a backdrop of participant stress levels and possible correlation with their self-

reported attitudes about green space as well as directly observable behaviors collected in the Binary Coding Scheme, indicating comfort or discomfort.

Behavioral Analysis (Binary Coding Scheme)

A coding scheme is often utilized in behavioral observation of individuals or groups (Tschan, Zimmermann, and Semmer 2018, 191–207). Coding schemes provide researchers with a means to quantify behaviors observed in a particular setting. Coding schemes can either be nominal/binary (if the behavior is exhibited or not), or they can include intensity ratings (Tschan, Zimmermann, and Semmer 2018, 191–207). For this study the researcher adopted a binary coding scheme to record the observed behaviors of the participants in the President’s Club Garden at the University of Georgia and in College Square Plaza, located in downtown Athens, Georgia. These study sites are described in detail later in the chapter.

The coding scheme identified twenty short-term, visible cues that portrayed internal feelings of discomfort. These visible cues describe common behaviors that are exhibited during uncomfortable situations. The researcher identified behaviors such as: nail biting, foot tapping, and playing with jewelry. See Figure 3.2.

During the study, each participant was observed by the researcher while they inhabited the space for five minutes at each site. The researcher was less than 20 feet away from the participants during the study and out of direct view of the participants. Throughout the duration of the observation, the researcher identified the exhibited cues of discomfort and notated the

appearance of each cue. Frequency of the identified behavior was not mentioned in the results, as binary coding schemes only associate with the presence of a behavior.

Behaviors Exhibited	Yes	No
1. Nail biting.		
2. Skin picking.		
3. Lip chewing.		
4. Hair twirling/pulling.		
5. Foot tapping.		
6. Jaw clenching.		
7. Moving/nodding head.		
8. Seat adjustment.		
9. Mumbling/talking.		
10. Sighing.		
11. Crossing arms/legs.		
12. Touching face/neck.		
13. Playing with jewelry.		
14. Feeling pockets.		
15. Looking at watch.		
16. Bouncing legs.		
17. Tapping/wiggling fingers.		
18. Frequent blinking.		
19. Jingling coins/keys.		
20. Rocking upper body.		

Figure 3.8: Behavioral Coding Scheme utilized in study

Discrete Emotions Questionnaire (DEQ)

The Discrete Emotions Questionnaire (DEQ) was developed in 2016 by Cindy Harmon-Jones, Brock Bastian, and Eddie Harmon-Jones to provide a new tool for the measurement of self-reported emotions (Harmon-Jones, Bastian, and Harmon-Jones 2016). Currently, the most common scale utilized by professionals, the Positive and Negative Affects Scale (PANAS), only assesses emotions based on their positive or negative affect which the authors argue does not encompass the broad array of discrete emotions which include: anger, disgust, fear, anxiety, sadness, happiness, relaxation, and desire (Harmon-Jones, Bastian, and Harmon-Jones 2016). To increase the specificity of the data collected, the researcher utilized the Discrete Emotions Questionnaire to gather emotional feedback from each participant after they utilized the space for five minutes. Participants ranked their experienced emotions on a scale from one to seven, with one being they did not experience this emotion at all, and seven being they experienced this emotion an extreme amount.

Emotions	1	2	3	4	5	6	7	Notes
Anger (Ag)								
Wanting (Dr)								
Dread (Ax)								
Sad (S)								
Easygoing (R)								
Grossed Out (Dg)								
Happy (H)								
Terror (F)								
Rage (Ag)								
Grief (S)								
Nausea (Dg)								
Anxiety (Ax)								
Chilled out (R)								
Desire (Dr)								
Nervous (Ax)								
Lonely (S)								
Scared (F)								
Mad (Ag)								
Satisfaction (H)								
Sickened (Dg)								
Empty (S)								
Craving (Dr)								
Panic (F)								
Longing (Dr)								
Calm (R)								
Fear (F)								
Relaxation (R)								
Revulsion (Dg)								
Worry (Ax)								
Enjoyment (H)								
Pissed off (Ag)								
Liking (H)								

Figure 3.9: Discrete Emotions Questionnaire utilized in study

Survey

A survey was selected as an effective study method for this thesis as it allowed the researcher to ask users questions about their perceptions of the designed environment. The survey included questions about how the environment impacted their senses (hear, smell, feel), what about the space they liked or disliked, how often they utilize this space or spaces similar, and other similar questions. See Figure 3.4.

The purpose of this survey is to identify the factors of design, as well as other elements in the space, that stand out to each individual. By recognizing the items that were remarkable to each individual, the researcher can better understand the mindset of each participant, as well as what elements of the built environment stand out to each of them. The identification of these factors contributes heavily to a designer's comprehension of user experience, and the data gathered provides concrete information for the design of future transitional spaces.

Survey Questions	Notes
What did you hear in the space?	
What did you smell in the space?	
What did you feel (physically) in the space?	
What colors stood out to you in the space, and how do they appeal to you?	
How would you categorize the space? Circle one. Destination Corridor Aisle Pathway Transition	
What about this space do you like?	
What about this space do you dislike?	
Do you consider this a well-designed space? Why or why not?	
What would you do to improve the space?	
Have you used this space before?	
Would you come to this space again?	
What activities could you see yourself doing in this space?	
Do you feel safe in this space? Why or why not?	
Does this space remind you of any other space? Please elaborate.	
Do you have access to an outdoor space within walking distance of your residence?	
How often do you use outdoor spaces like this?	
What factors prevent you from using outdoor spaces like this?	
On a scale from 1-10, how would you rate the influence of outdoor spaces on your well-being? 1 2 3 4 5 6 7 8 9 10	

Figure 3.10: Survey utilized in study.

An Amalgamation of Methods

To comprehend the comfort or discomfort individuals feel in a space, and identify these stressful factors in the environment, a mixed-methods approach must be utilized. The strength of the mixed methods approach has been referenced across many disciplines (Creswell and Creswell 2017; Wasti et al. 2022, 1175–1178). The utilization of both quantitative (Perceived Stress Scale, Discrete Emotions Questionnaire, and Behavioral Coding Scheme) and qualitative (Survey) methods allow for an extensive and diverse data set that provides insight into the discomfort of users in certain designed spaces. By collecting and analyzing both qualitative and quantitative data, the researcher is able to identify visual reactions to the built environment as well as understand the emotional mindset and personal justifications that prompted those reactions.

CHAPTER 4

RESULTS AND DISCUSSION

Summary

The purpose of utilizing these specific methods was to gather data that indicated perceived stress/discomfort, both internally and externally, and then gather information to paint a full picture of the user's observed and reported reactions to transitional landscapes. The first site utilized, the President's Club Garden at Old College, is generally quieter and more surrounded by nature than the second site, the College Square Plaza in Downtown Athens, which is in a more urban setting. Both sites are well designed spaces that provide access to other buildings and establishments, while also having amenities that provide seating, which are commonly used by pedestrians in both spaces. This study examined the levels of comfort or discomfort felt in these transitional environments through behavioral analysis and self-reporting, and this study identified the specific factors that influenced these feelings through the utilization of a survey. The results of this study will indicate stress-causing and stress-relieving factors in the transitional landscape and will thus inform the design of these spaces in the future.

To ensure correct precautions were followed, the researcher submitted the initial thesis proposal to the Institutional Review Board (IRB) under the label of Human Subjects Research. However, the Institutional Review Board deemed this research "Not Human Subjects Research", so there was no review and approval required from the Board.

Prior to the start of the study, participants were asked to complete the Perceived Stress Scale (PSS). This method provided the researcher with baseline data on each participant and supplied

the researcher with initial, self-reported stress data. The results can be found in Figure 4.1 and Figure 4.2.

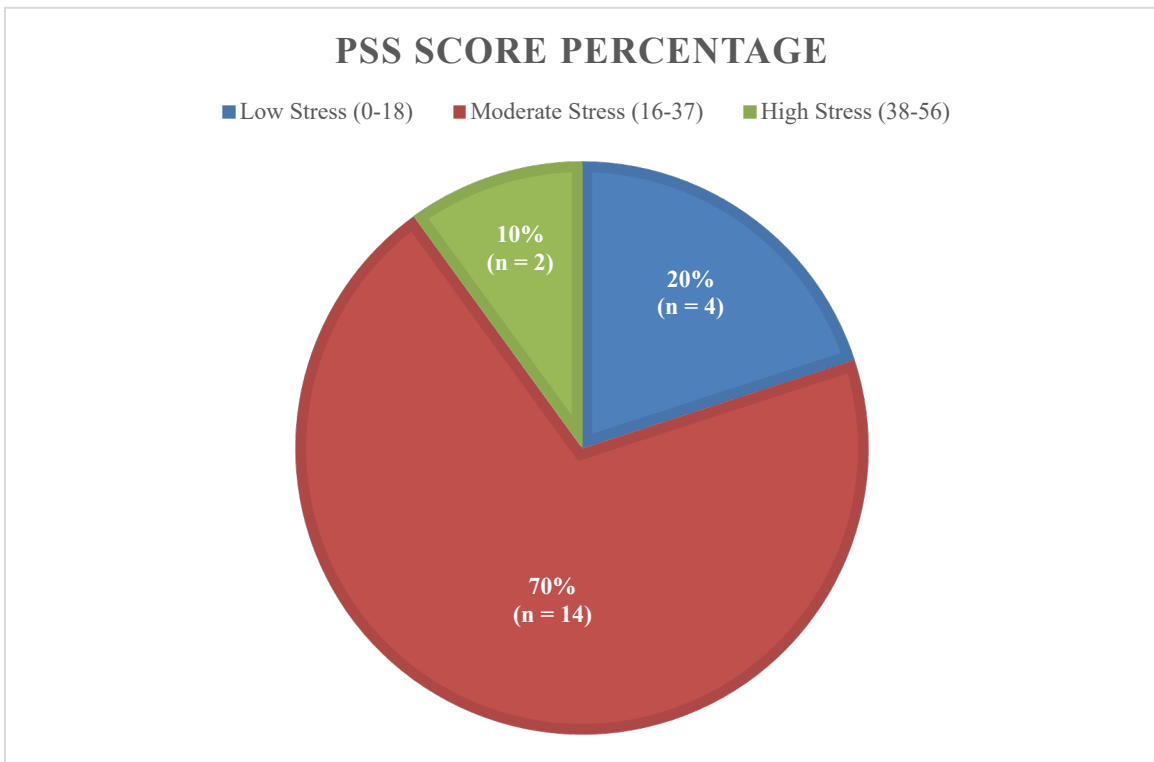


Figure 4.1: Perceived Stress Scale (PSS) percentage

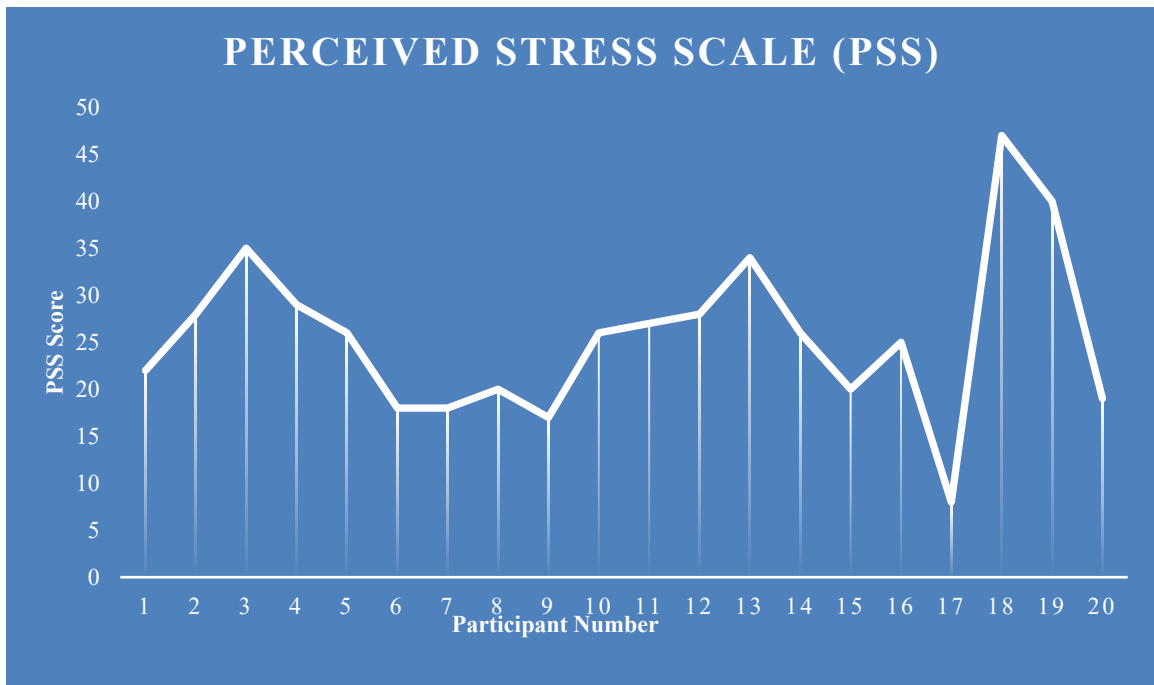


Figure 4.2: Perceived Stress Scale results

Twenty people were recruited by word of mouth to participate in this study which took place from Sunday, January 5th to Monday, January 13th, 2025. Due to inclement weather on Friday, January 10th and Saturday, January 11th, no studies took place on these dates. Out of the 20 participants, 10 identified as female, 8 identified as male, and 2 identified as non-binary, as shown in Figure 4.3. The ages of the participants ranged from 19 years old to 57. 60% of participants were students (35% undergraduate students and 25% graduate students), 35% were working full-time, and 5% were unemployed. See Figure 4.4.

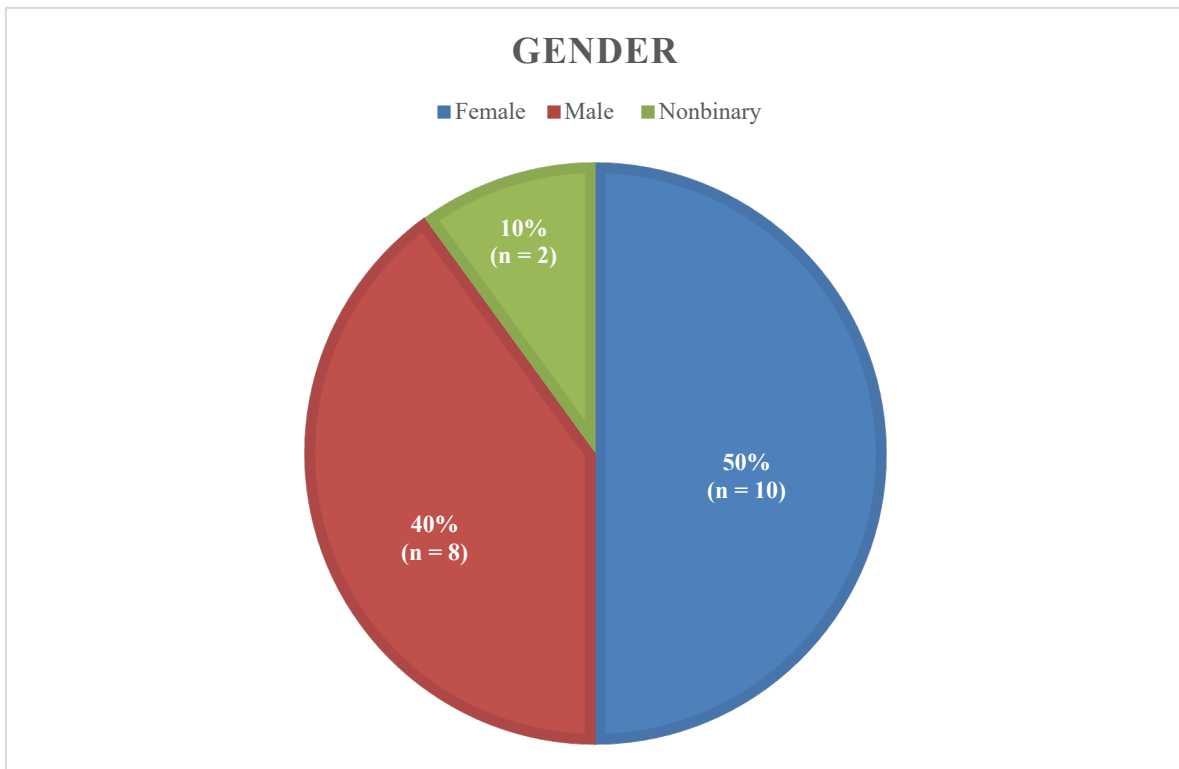


Figure 4.3: Participant gender demographics

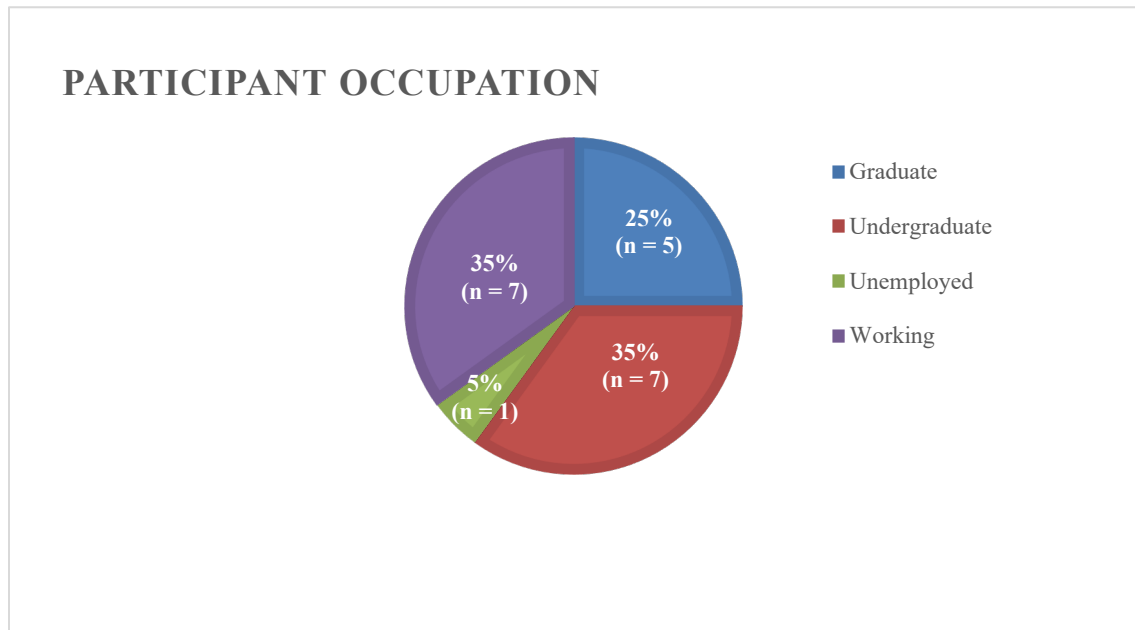


Figure 4.4: Participant occupation

Interpretations

The benefits of accessibility to nature were described numerous times in the literature review. Whether the benefit reduces mental fatigue, increases attention span, provides spiritual assurance, or encourages physical movement, it is necessary for these natural spaces to exist; and for there to be safe and ample options to access them. When studying the transitional landscapes selected for this project, the initial goal was to observe participants in each space, without the bias of design preference.

The results of the study are interesting and, through the theories discussed in the literature review, they are expected. The participants generally felt more comfortable in the President’s Club Garden, and therefore more uncomfortable in the College Square Plaza. The qualitative data from the binary coding scheme, compounded with the data gathered from the Discrete Emotions Questionnaire, reinforced this statement. The survey identified many of the factors that the participants enjoyed, as well as the factors that increased discomfort and stress in the space. In the President’s Club Garden, when participants were asked “What do you like about the

space?”, many mentioned natural aspects such as: trees, flowers, and nature. When the same question was asked about College Square Plaza, the answers were similar to: ample seating, available food, and people watching. Alternatively, when participants were asked what they disliked about the President’s Club Garden, they mentioned items like: the misalignment of the garden with UGA’s Main Library, disagreement with the placard design and bench selection, and some participants stated that they had no dislikes about this space. When participants were asked to share their dislikes of College Square Plaza, the items discussed included: the temporary nature of the space, the current selection of hardscape materials, and the apprehension of being unwantably approached.

The likes and dislikes of each space address differing aspects of each site. Due to the location of the President’s Club Garden, which provides significant access to nature, many comments address the natural aspects of the site. While the College Square Plaza is more removed from nature, the comments addressed more of the hardscape elements and the businesses available nearby. This distinction between places may be attributed to how the participants personally categorize each space, see Figure 4.5.

A majority (35%) of participants categorized the President’s Club Garden as a ‘Transition’, while 30% categorized it as a ‘Destination’ and 25% categorized this space as a ‘Pathway’. On the other hand, the categorization for College Square Plaza was ultimately a ‘Corridor’ with 50% of participants identifying this space as such. The next closest identification for the College Square Plaza was ‘Transition’, as indicated by 25% of the participants. The researcher believe the variation in identification of the President’s Club Garden can be attributed to decreased familiarity with the site. Prior to the study, 20% of participants had never utilized the President’s

Club Garden, while only 5% of participants (a single participant) mentioned they never utilized College Square Plaza prior to the study.

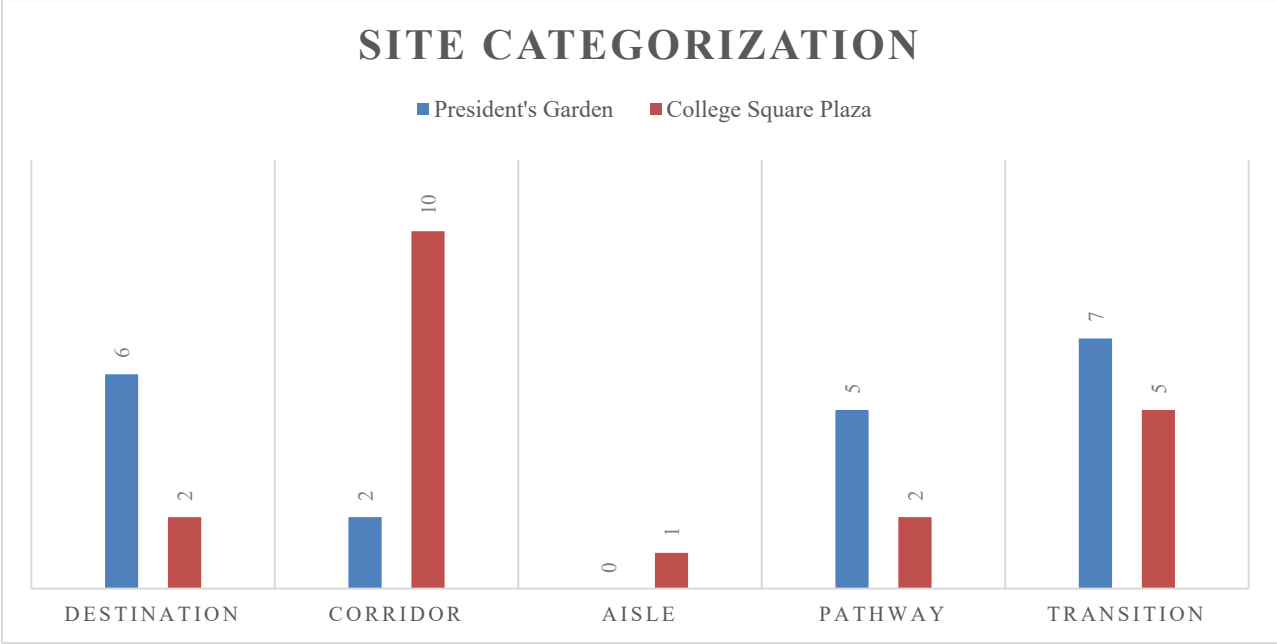


Figure 4.5: Site categorization

Relevance

A significant number of studies have concluded that access to greenspace and natural settings are beneficial to our health as individuals, and as a society (Kaplan and Kaplan 1989; Takano, Nakamura, and Watanabe 2002, 913–918; Hartig and Kahn 2016, 938–940; Handy 2005). However, many of the studies focus on active utilization of a space, for example walking, biking, or running; or they focus on the utilization of a specific park or other similar designed space (Takano, Nakamura, and Watanabe 2002, 913–918; Handy 2005). During the research of this thesis, no studies specifically addressed the need for well-designed transitional spaces as they relate to mental and physical health. There were studies that focused on the need for transitional spaces as they relate to active travel (Handy 2005) and there were studies that emphasized the need for access to nature to improve physical health (Handy 2005; Hartig and Kahn 2016;

Church et al. 2011; Hunt et al. 2024). In addition, the importance of greenspaces on mental well-being was discussed at length (Kaplan and Kaplan 1989, Kaplan 1995; Mills 2023). However, there were no studies available that combined all of these notions and identified the factors that benefited or negatively affected the experience of a transitional space.

To encourage pedestrians to utilize the outdoors, there must be ample access to modes of active travel. Whether it be an urban corridor like College Square Plaza, a scenic transition like the President's Club Garden, or a common sidewalk offset a major road, it is important that these spaces are inviting and safe. Streetscapes and transitional landscapes must be designed more intentionally so that they become a part of the traversed experience, and pedestrians can begin to build relationships with these spaces (Spooner 1997). By designing these areas with only functionality in mind, the experience of using the space as a pedestrian decreases. If transitional landscapes catered to the individual rather than the automobile, then the utilization of those spaces as means of active travel would increase, thus providing people with access to all the benefits encompassed with using active travel and accessing the natural environment.

Practical Applications

Ultimately, the goal of this thesis is to bring attention to non-motorized transitional spaces and enhance the design of these areas to benefit a user's experience and provide a place of respite outdoors. By implementing the positive factors identified in this study, designers can create welcoming, safe spaces for pedestrians to utilize without vehicular reliance. This will improve the overall health of our population and will encourage people to pursue active travel to get to a destination, rather than relying on a car. The benefits derived from applying the results of this study will be immeasurable, and will include benefits associated with physical, mental, and spiritual well-being.

As identified in Figure 4.6 below, participants identified themselves as feeling substantially happier and more relaxed in the President’s Club Garden, but angrier, disgusted, fearful, and anxious in the College Square Plaza. These results were compounded by the increase in discomfort exhibited by the participants. On average, the stress-indicating behaviors exhibited by participants increased by 122.6% in College Square Plaza when compared to the President’s Club Garden. See Figure 4.7. To understand the reason for the increase in general agitation and emotional distress in College Square Plaza and the reduction of stress and amplification of happiness in the President’s Club Garden, the researcher reviewed the results of the surveys.

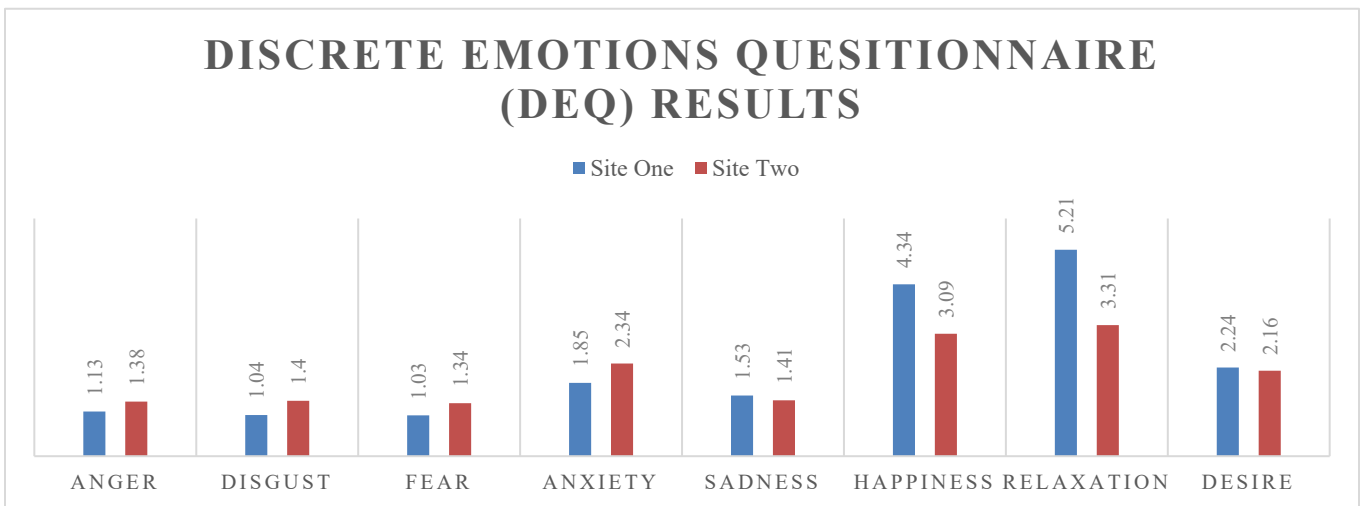


Figure 4.6: Discrete Emotions Questionnaire results

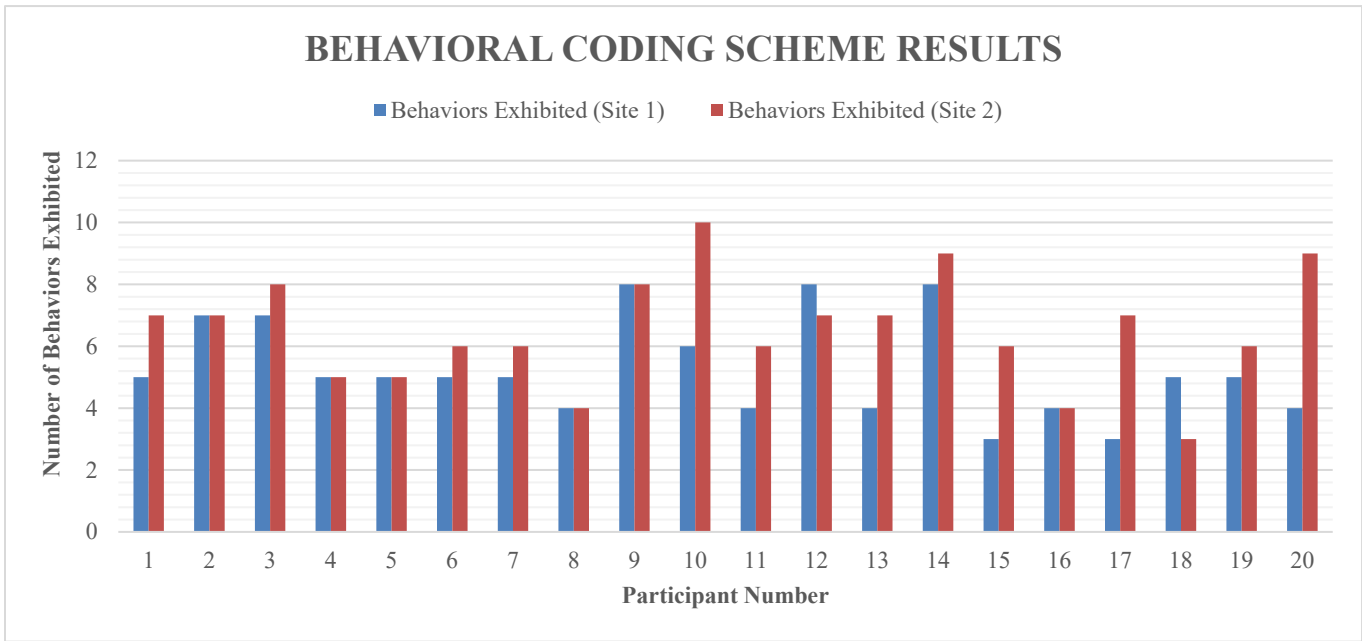


Figure 4.7: Behavioral Coding Scheme results

In addition to the number of behaviors presented by each participant at each site, the specific behaviors were also recorded. Figures 4.8 and 4.9 present the data collected during the behavioral coding scheme and display the information below.

Behaviors Recorded in the President's Club Garden (Site 1)																				Frequency of Behaviors:	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Nail biting.																					0
Skin picking.				X		X						X						X			4
Lip chewing.	X									X		X	X						X	X	6
Hair twirling/pulling.																X			X		2
Foot tapping.		X	X											X			X		X		6
Jaw clenching.					X			X	X											X	3
Moving/nodding head.	X		X	X	X	X		X		X	X	X	X	X	X	X	X			X	15
Seat adjustment.		X	X		X	X	X		X	X		X	X	X	X	X		X	X		12
Mumbling/talking.		X				X				X			X								4
Sighing.			X				X		X												3
Crossing arms/legs.	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X		X	16
Touching face/neck.		X			X					X		X	X	X	X	X		X	X	X	9
Playing with jewelry.							X														1
Feeling pockets.			X						X					X							3
Looking at watch.																					0
Bouncing legs.	X	X										X									3
Tapping/wiggling fingers.				X					X		X	X	X	X					X		7
Frequent blinking.				X	X	X				X											4
Jingling coins/keys.																					0
Rocking upper body.	X	X	X				X		X		X			X							7
Total Behaviors Exhibited:	5	7	7	5	5	5	5	4	8	6	4	8	4	8	3	4	3	5	5	4	

Figure 4.8: Behaviors recorded in the President's Club Garden

Behaviors Recorded in College Square Plaza (Site 2)																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Frequency of Behaviors:
Nail biting.																					0
Skin picking.				X								X								X	3
Lip chewing.	X	X		X			X			X		X	X		X	X	X			X	11
Hair twirling/pulling.							X			X			X	X					X		5
Foot tapping.	X	X	X	X		X		X	X		X				X		X		X	X	12
Jaw clenching.						X															1
Moving/nodding head.	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X			X	17
Seat adjustment.	X	X	X		X				X	X	X		X	X	X					X	11
Mumbling/talking.													X								1
Sighing.					X				X	X							X				4
Crossing arms/legs.	X	X	X	X		X	X		X	X		X	X	X	X	X	X	X	X	X	17
Touching face/neck.	X	X	X		X		X			X		X		X			X			X	10
Playing with jewelry.										X				X						X	3
Feeling pockets.			X			X				X	X	X		X	X	X		X			9
Looking at watch.																					0
Bouncing legs.	X	X	X			X			X		X	X					X			X	9
Tapping/wiggling fingers.					X			X	X	X			X	X				X	X	X	9
Frequent blinking.							X			X									X		3
Jingling coins/keys.																					0
Rocking upper body.			X					X	X		X			X							5
Total Behaviors Exhibited:	7	7	8	5	5	6	6	4	8	10	6	7	7	8	6	4	7	3	6	9	

Figure 4.9: Behaviors recorded in College Square Plaza

To further understand the correlation between the results of the data collected and the participant profile, see Figure 4.8 below.

Participant Number	Gender	PSS	Behaviors Exhibited (Site 1)	Emotional Intensity (Site 1)	Intense Emotions Experienced (Site 1)	Behaviors Exhibited (Site 2)	Emotional Intensity (Site 2)	Intense Emotions Experienced (Site 2)
1	Female	22	5	6 : Very much	Easygoing (R), Happy (H), Chilled out (R), Calm (R), Relaxation (R), Enjoyment (H)	7	6 : Very much	Anxiety (Ax), Nervous (Ax)
2	Male	28	7	7 : An extreme amount	Easygoing (R), Chilled out (R), Calm (R), Relaxation (R)	7	5 : Quite a bit	Easygoing (R), Happy (H), Chilled out (R), Enjoyment (H)
3	Male	35	7	5 : Quite a bit	Calm (R)	8	4 : Moderately	Calm (R), Relaxation (R)
4	Nonbinary	29	5	5 : Quite a bit	Enjoyment (R)	5	4 : Moderately	Anxiety (Ax), Worry (Ax)
5	Male	26	5	6 : Very much	Chilled out (R), Calm (R)	5	6 : Very much	Easygoing (R), Craving (Dr)
6	Male	18	5	7 : An extreme amount	Easygoing (R), Chilled out (R), Desire (Dr), Calm (R), Relaxation (R)	6	7 : An extreme amount	Happy (H), Enjoyment (H)
7	Female	18	5	7 : An extreme amount	Relaxation (R)	6	5 : Moderately	Liking (H)
8	Female	20	4	6 : Very much	Chilled out (R), Longing (Dr), Relaxation (R), Enjoyment (H), Liking (H)	4	4 : Moderately	Desire (Dr), Calm (R)
9	Male	17	8	6 : Very much	Easygoing (R), Chilled out (R), Calm (R), Relaxation (R)	8	5 : Moderately	Easygoing (R), Chilled out (R), Lonely (S)
10	Female	26	6	5 : Quite a bit	Easygoing (R), Satisfaction (H)	10	3 : Somewhat	Relaxation (R)
11	Male	27	4	4 : Moderately	Happy (H), Calm (R), Relaxation (R), Enjoyment (H), Liking (H)	6	5 : Quite a bit	Grossed out (Dg)
12	Female	28	8	5 : Quite a bit	Easygoing (R), Desire (Dr), Relaxation (R), Liking (H)	7	5 : Moderately	Desire (Dr)
13	Female	34	4	7 : An extreme amount	Easygoing (R), Calm (R)	7	3 : Somewhat	Dread (Ax), Grossed out (Dg), Chilled out (R), Mad (Ag), Calm (R), Worry (Ax)
14	Male	26	8	7 : An extreme amount	Chilled out (R)	9	5 : Moderately	Happy (H)
15	Male	20	3	7 : An extreme amount	Easygoing (R), Calm (R)	6	5 : Moderately	Wanting (Dr), Anxiety (Ax), Pissed off (Ag)
16	Female	25	4	6 : Very much	Chilled out (R)	4	4 : Moderately	Happy (H), Anxiety (Ax), Calm (R), Relaxation (R), Enjoyment (H)
17	Female	8	3	7 : An extreme amount	Happy (H)	7	5 : Moderately	Happy (H), Satisfaction (H), Calm (R), Relaxation (R)
18	Female	47	5	7 : An extreme amount	Chilled out (R), Longing (Dr)	3	6 : Very much	Chilled out (R), Desire (Dr), Craving (Dr), Enjoyment (H)
19	Female	40	5	5 : Quite a bit	Easygoing (R), Anxiety (Ax), Nervous (Ax), Satisfaction (H), Liking (H)	6	5 : Moderately	Anxiety (Ax)
20	Nonbinary	19	4	7 : An extreme amount	Happy (H), Chilled out (R), Calm (R), Relaxation (R), Enjoyment (H), Liking (H)	9	5 : Moderately	Chilled out (R), Calm (R)

Figure 4.10: Participant/data correlation

The data in the graph above depicts significant trends between the gender of the participants and their responses to their perceived stress. Female participants reported the highest levels of perceived stress with the average female scoring a 26.8 on the Perceived Stress Scale (PSS), while the male participants reported an average of 24.6, and the nonbinary participants reported the lowest perceived stress with an average score of 24. Not only did the female participants score higher on the perceived stress scale, but they also included the recorded outliers with a scores of 8, 40, and 47.

Additionally, the Discrete Emotions Questionnaire (DEQ) prompted the participants to rate their feelings of emotion at each site on a scale of 1 (not at all) to 7 (an extreme amount). The researcher discovered that at Site 1, the President's Club Garden, participants rated their emotions more intensely than they did at Site 2, College Square Plaza. On average, participants rated the intensity of their emotions as a 6.1 in the President's Club Garden and a 4.9 in College Square Plaza. Subsequently, the type of emotions expressed in each site varied. The Discrete Emotions Questionnaire (DEQ) breaks down the eight most expressed emotions into more distinct variables. Anger, desire, anxiety, sadness, relaxation, disgust, happiness, and fear are the categories of emotions exhibited in the DEQ. In the President's Club Garden (Site 1), participants' most intense emotions were predominately categorized by relaxation, happiness, and desire; while in College Square Plaza (Site 2) participants exhibited a similar emotion, but also included higher mentions of anxiety, as well as mentions of disgust, and anger.

This graph also depicts the variation in behaviors exhibited in each site by each participant. On average the number of behaviors exhibited increased in Site 2, as opposed to Site 1. In Site 1 (the President's Club Garden), participants exhibited an average of 5.3 behaviors while at Site 2 (College Square Plaza) the average amount of behaviors exhibited was 6.5. By notating the

subconscious reaction to discomfort expressed by the behaviors in the Binary Coding Scheme and reviewing the categorization of the most intensely felt emotions in each site, an indisputable relationship between the comfortability of the sites is realized. Participants felt more comfortable and at ease, and were more convicted in these feelings, at the President’s Club Garden. On the other hand, participants felt more uneasy, exhibited a broader range of emotions, and were less sure of their emotional state at the College Square Plaza.

In addition to the results discussed above, the survey was employed as a way to gather specific data from the participants and the results of some of the questions are listed below.

Immediately following the utilization of the President’s Club Garden participants were asked, “what about this space do you dislike”. Participants responded with:

Participant number	Survey question: What about this space do you dislike?
1	“Visible trash cans.”
2	“Glass on side of low building.”
3	“The last time I was here was for a protest, odd to be back in a different context but being in a university, that will happen.”
4	“Not many things going on, kinda boring.”
5	“Asymmetrical and no seating variety.”
6	“There needs to be some pressure washing done.”
7	“Benches don’t have backs, feels exposed to the front lawn.”
8	“Nothing.”
9	“Not enough to do here, just sit and lay down, not aligned with the main library.”
10	“A little dreary in the winter.”

11	[I dislike] “That it is open to the elements like sun and wind.”
12	“Bench arrangement could be better.”
13	“Not a lot.”
14	“Not much. Road and construction are too close.”
15	“The shade makes me very cold, and it is out of the way for me.”
16	“Curved wall.”
17	“I miss the plantings from the spring/summer. The pansies just aren’t as vibrant/lush.”
18	“No backs on the benches.”
19	“The sun was in my eyes but that’s entirely my fault.”
20	“Traffic noise from downtown but even this is not too severe.”

Figure 4.11: President’s Club Garden dislikes

Immediately following the utilization of College Square Plaza participants were asked, “what about this space do you dislike”. Participants responded with:

Participant number	Survey question: What about this space do you dislike?
1	“Feels dirty, everything is hard and cold and city-like, feels dangerous-ish.”
2	“Homeless. It’s like a band-aid on a bad wound – Tables just set on road – Is it a road or a hang out area?”
3	“I can’t spend too much time here without spending money – not a true “3 rd ” place.”
4	“No pattern or coherence, feels too open.”
5	“Folks coming and going that make me feel unsafe or weird.”

6	“The loudness.”
7	“Not enough plants, windy.”
8	“Nothing seems open, feels empty.”
9	“Cold. Few good spots to sit in. Not enough shade/rain protection, feels temporary.”
10	“Not protected from wind.”
11	“Smells and sounds.”
12	“Food smells, loud noises.”
13	“I hate people being scary.”
14	“Unpainted road with random tables... feels somewhat unwelcoming to a pedestrian.”
15	“People, cars, noise.”
16	“Loud, isolated.”
17	“How it feels haphazardly thrown together (closed road and put picnic tables in).”
18	“No sun at this time of day. (Unavoidable.) Surrounded by trashcans.”
19	“Lots of concrete and asphalt.”
20	“Not a lot of greenspace. Not a lot of color. The ground is just old road concrete. Feels too exposed in an uncomfortable way.”

Figure 4.12: College Square Plaza dislikes

By understanding the factors that the participants disliked, the researcher can begin to understand the design aspects that encouraged this discomfort or would provide more comfort if added. In the President’s Club Garden, many of the factors include easily remedied grievances. For

example, by moving trashcans out of the line-of-site, or by installing a large shrub in front of the eyesore, that dislike could be addressed. A couple of the participants mentioned their dislike of the bench styles, which can be removed and altered to make a more comfortable seating environment without much hassle. Additionally, the weather was not the most suitable for an outdoor experience during this time, as the study took place in January, and that contributed to some of the dislikes mentioned. Overall, the dislikes of this space that contribute to the feelings of discomfort are minor and can be easily adjusted to make it more comfortable and inviting. In addition, many of the participants liked the nature present in the President’s Club Garden and addressed that multiple times throughout their surveys.

On the contrary, many of the grievances associated with the College Square Plaza would require redesigning, and potentially reprogramming. The unattractive hardscape materials mentioned, in combination with the lack of vegetation, contribute to the influx of noise and smell of the space. In addition, the open space and connection to busy traffic make people feel uneasy and vulnerable. By installing alternate hardscaping and proposing more planting installations, the uneasiness felt in this space would decrease and it would prove to be more enjoyable. When asked what participants would do to improve the space, the addition of natural materials was commonly addressed.

As pertaining to the President’s Club Garden, when participants were asked “what would you do to improve the space”, here are some of their responses:

Participant number	Survey question: What would you do to improve the space?
1	“Move trash cans or better camouflage them.”
2	“Some more bushes/perennials.”
3	“A water feature.”

4	“Bigger variety of seating options.”
5	“Have more comfortable seats or maybe a table.”
6	“Make it bigger.”
7	“Add higher shrubs between library and plaza space.”
8	“Add more plant-life. Have the grass be taller.”
9	“Align it to the library, more screening plants, better benches, perhaps some cool art to look at in the center of the bricks.”
10	“More color. Picnic tables.”
11	“Maybe add a pergola.”
12	“Better seating, central focal point.”
13	“I wish the plaques were more interesting.”
14	“Uh... I don’t know a water feature.”
15	“Add benches and more interesting flora.”
16	“Not metal seating.”
17	“I would try to pick more interesting winter plantings.”
18	“Backs on benches. Possibly a water feature on the periphery.”
19	“Maybe fill in open brick space in front of benches with a fountain or planter.”
20	“Make the benches more organic looking maybe? More whimsy could be added. I love the sundial and wish there were other details like that. Also, could use some benches in the back sections for spread out seating.”

Figure 4.13: President’s Club Garden improvements

As pertaining to College Square Plaza, when participants were asked “what would you do to improve the space”, here are some of their responses:

Participant number	Survey question: What would you do to improve the space?
1	“Break up the road, plant grass and trees, help disguise traffic.”
2	“Tear out road – put in more plants, bricks. Stop homeless begging.”
3	“I would love to see more local restaurants or public water fountains.”
4	“Make rooms and spaces and utilized the interior more.”
5	“More seating and things to do; this could even be a small park.”
6	“Make more blocked off roads for pedestrians.”
7	“Add an overhead structure, add more plants.”
8	“I think the space needs to be readapted. The sidewalks seem crowded, need to bring the greenspace to the center.”
9	“Redo hardscape, more seating, more trees, lights, canvas covering, get rid of temporary planters and plastic signs. Create a destination.”
10	“Keep it cleaner.”
11	“Make it more inviting and less noisy with a different planting design.”
12	“More buffer from street.”
13	“Maybe more tables?”
14	“Make the road not a road, more art, more murals, more spots to chill.”
15	“More interesting plants and flora.”
16	“I don’t know.”

17	“Make it level, add more plantings, make road and sidewalks a cohesive material.”
18	“Public drinking fountain. Big string bulb lights between buildings.”
19	“More planters.”
20	“Add more color through umbrellas, murals on the trash cans, change the ground material, add more greenery, add trees along E. Broad St.”

4.14: College Square Plaza improvements

Similarly to the grievances described by participants, many of the site alterations proposed for the President’s Club Garden mention the need for additional natural materials, change of seating types, and the incorporation of more artistic features (like a water feature or “more whimsy”).

This would enhance the experience of the space through additional visual interest and more comfortable seating. These alterations, particularly a water feature and additional plantings, would offer users low-level stimulation, which is necessary to reduce mental fatigue (Kaplan and Kaplan 1989).

On the other hand, the alterations described by participants for the College Square Plaza include more vigorous changes like: removal of the existing hardscape, installation of planters and street trees, and public art. There were also mentions of necessary cleanliness and unwanted interactions with other users, which would need to be addressed through city programming and administrative alterations. Though overall, the majority of the identified work necessary to improve comfortability in the spaces includes the installation of natural elements and the reduction of hardscape materials. As described by participants, in correlation to the results of the methods described above, a variety of comfortable seating and more greenspace would allow users to enjoy the experience of the spaces more. The data collected by the study in the

President's Club Garden further reinforces this notion through the emotions reported and the behaviors exhibited.

Limitations

The limitations of this study come from the small sample size, the weather, and many of the participants' familiarity with the field of landscape architecture. It must be recognized that many of the participants in this study are familiar with both spaces and may have preconceived biases towards each. The familiarity effect, or the mere exposure effect, is a theory that states that the unconscious mind favors familiar experiences, people, or places, above the unfamiliar. This could be an influential factor in the participants' appreciation of each space, and their comfortability in each space.

In addition, many of the participants were familiar with the researcher, which may have influenced the specificity of the survey data. For example, many of the participants wrote multiple sentences to answer questions that needed only a few words. In addition, the duration of time to complete this thesis influenced the study as well. Students enrolled in the BLA + MLA 5-year combined degree have three semesters to conduct a study following the first research strategies course. This is a limited amount of time to design and conduct a study, write, and keep the study within the warmer months of the year. Unfortunately, this study was conducted from Sunday, January 6th to Monday, January 13th of 2025. The participants set to partake in the study on Friday, January 10th and Saturday, January 11th were postponed due to inclement weather, as the University of Georgia was closed on the 10th due to a snowstorm and the road conditions on the 11th were still dangerous. The limited timeframe provided only the winter months available for the study to take place. Additionally, the timeframe limitation impaired the number of participants available for the study. Because the study duration could only last about a week,

there were only so many participants that could fit in that time period. Future studies should aim to utilize a larger pool of participants with a broader range of demographics, while keeping the study within the warmer months.

Additionally, the site order may have introduced site bias as each participant started in the President's Club Garden and ended in College Square Plaza. The President's Club Garden ranked more favorably and utilized more relaxation techniques, as opposed to College Square Plaza, so participants may have felt more comfortable for the duration of the study.

Application to Research Question

1. How do environmental stimuli in urban greenspaces impact user perceptions of wellbeing and restoration?
 - a. What factors lead to higher or lower self-reports and directly observable indicators of stress or wellbeing?
 - b. What design features contribute to higher levels of discomfort?
 - c. What external factors contribute to higher levels of discomfort?

The findings of this study have addressed the predominant research question of: How do environmental stimuli in urban greenspaces impact user perceptions of wellbeing and restoration? Through the utilization of a mixed-methods approach, the researcher were able to gather data and site-specific information that addressed user's perceptions of their wellbeing in space.

The factors identified addressed the indicators of stress through observation of behavior. The open space, lack of vegetation, and hardscape details provided users with a sense of unease and discomfort in College Square Plaza. By implementing alternative design choices, many of these grievances would be addressed and would in turn make the space more inviting. Unfortunately,

the external factors mentioned during this study are harder to address without larger community-wide efforts. The discussion of homelessness was mentioned numerous times in the survey, as well as verbally, during the study. The feelings of discomfort brought on by panhandling is not something that can be addressed morally through design. Anti-homeless architecture and site design reduces the accessibility and longevity of time spent in the space for all users, however many believe that anti-homeless design interventions are immoral.

CHAPTER 5

CONCLUSION

By understanding the impact of environmental design on an individual's health and wellbeing, and incorporating the natural factors identified in this study, designers of the built environment can assist in the improvement of the health and wellbeing of the general public. By creating accessible spaces through the utilization of transitional landscapes, designers and planners can provide the public with means of active travel, intentional respite and improve overall access to nature. Implementing these alterations could provide designers and planners with the opportunity to structure the urban environment in ways best suited for human health and development.

The health implications addressed in the Literature Review describe the necessity of access to nature in the modern day. Rapid development of the built environment, compounded with the reliance on automobiles and constant access to technology, has provided significant benefits to the economy. However, scientists are beginning to realize the detrimental effects these advancements have on the health of individuals, and on society as a whole. In America, obesity rates are on the rise (Church et al. 2011) and mental health is on the decline (Dershowitz and Berger 2024). For over three decades, battling mental fatigue has been a topic of interest among environmental psychologists (Kaplan and Kaplan 1989) and, with the introduction of social media and short-term content, mental health issues and attention spans have only worsened (Mills 2023, Center for Humane Technology 2022).

Many of these issues can be reduced by spending time outdoors and in natural environments (Kaplan 1995, Mills 2023). By providing accessible environments through the utilization of safe

and inviting transitional spaces, landscape architects can have a significant impact on the health and well-being of society and can aid in improving the mental and physical health crisis Americans are facing today. The softer factors appreciated in the President's Club Garden (and desired in College Square Plaza), as depicted by participants further emphasize this need for accessible natural areas. The appreciation for design aspects such as natural materials, shade, and trees/shrubs noted in the President's Club Garden can be easily incorporated into other urban environments.

This thesis highlighted the impact of nature on overall well-being, addressed the lack of accessibility to natural environments, and emphasized the importance of well-designed transitional spaces. By conducting a study using two sites that are utilized both as transitional spaces and destinations (liminal landscapes) and identifying the various levels of comfortability through quantitative and qualitative measures, the results reinforce the influence of the built environment on health and wellbeing. The participant demographics yielded interesting information that insinuated women have higher levels of stress and were more uneasy in an unpredictable environment with a larger variety of site users. It also correlated higher levels of relaxation and happiness with higher amounts of vegetation, higher levels of anxiety with a less vegetation, and more people. By identifying measures to incorporate into future designs, such as: high levels of planting, natural/colorful materials, comfortable seating, and noise buffers, the researcher implores designers to consider these methods when designing transitional spaces because the route to a destination matters. By creating transitional landscapes that are viewed as enticing destinations, participants will be more likely to use these spaces and in turn they will hold a higher social value, thus emphasizing the need for liminal landscapes.

In the future, it would be interesting to gather a larger and more diverse group of participants, and have the study take place during the other seasons (spring, summer, fall) to see how much weather impacts perception of the space. Additionally, the data gathered by exposing a participant to only one site, as opposed to both could yield interesting results. The comparison of sites may have led participants to unconsciously prefer one over another, as opposed to relaying unbiased opinions of the sites.

Emerson's quote suggests that the journeys taken throughout life are more important than the intended destination. By transforming traditional transitional spaces into exciting liminal landscapes, designers have the opportunity to create a narrative that promotes the health and wellness of a community while also creating miniature destinations along the way. This promotes endless opportunities for user socialization, active travel, and extensive respite.

Creating liminal landscapes is not only a strong design move, but it has the potential to change users' lives for the better.

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