

STRESS AND THE BUILT ENVIRONMENT

Redefining spaces that combat the effects of stress

ANGRY ANXIOUS
AFRAID
JITTERY
FRUSTRATED
NAUSEA
IRRITABLE
HYPERVENTILATING
HEADACHES BLOATING
INDIGESTION
CONSTIPATION
ACHES SWEATING
PAINS
HEADACHES BLOATING
SEXUAL PROBLEMS
INDIGESTION
WITHDRAW FROM PEOPLE
TEARFUL
SMOKING
PAINS
DRUGS
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SLEEP PROBLEMS
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AGGRESSIVE
SLEEP PROBLEMS
INDECISIVE DRINKING

Stress and the Built Environment

Redefining spaces that combat the effects of stress

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Thesis Abstract

Stress is not a new phenomenon in society; we know it can affect our body, along with how we feel and behave. Over 55% of Americans are said to be stressed each day. Throughout the years, psychologists among other professional fields have conducted a variety of studies relating to stress, producing general tactics on how to combat the effects of stress. These tactics focus primarily on the individual with little to no regard for the built environment. This begs the questions of; what aspects of the built environment can increase, sustain, or alleviate stress? Along with how can we transform under-developed spaces within the built environment to combat stress? Through methods of discovery including precedent analysis and research, we can begin to understand this theory. Stress is an extremely complicated subject, a subject where there is no universal answer. Through combined research in a variety of different fields including architecture we can begin to mitigate multiple aspects of stress. This research is relevant today more than ever, with the effects of COVID-19 and the ongoing emphasis on maintaining good mental health. Designing spaces that combat stress should be a staple in new and existing construction.

Introduction

It doesn't matter what age, gender, ethnicity, or religion someone is, stress is an endless burden that can effect someone in all aspects and stages of their life. In the United States of America alone, over half the population is said to be stressed at some point throughout the day. In fact according to a new nationwide Gallup poll conducted from March 21st to April 5th in 2020 that number is exactly 60 percent of the population.

Stress can come in many different forms and can affect everyone differently. Almost anything and everything can be related to stress depending on who you ask or what you ask. Stress can come from personal situations, work related instances, school related instances and so on, to put in perspective of just how many things can cause stress here is small sample of possible stress related circumstances:

- The death of a spouse of loved one.
- Filing for divorce with your partner.
- Buying a new house.
- Hospitalization (of oneself or a loved one).
- Injury or illness (oneself or a family member).
- Being abused or neglected.
- Separation from a spouse or committed relationship partner.
- Conflict in interpersonal relationships.
- Bankruptcy / Money Problems.
- Unemployment.
- Sleep problems.
- Children's problems at school.
- Legal problems.
- Receiving a promotion or raise at work
- Starting a new job
- Marriage
- Losing contact with loved ones.
- Watching a sporting event.
- Taking a vacation
- Holiday seasons
- Retiring
- Learning a new hobby
- Having a child.
- Driving, in general of in a unfamiliar place.
- Moving, in general or to a new unfamiliar place.
- Deadlines, work related or school related.
- Crowded spaces such as concerts or sporting events.
- Gaining or losing weight
- Unsure in yourself or low self esteem.

How can Stress make
you feel?

ANGRY
ANXIOUS
AFRAID
FRUSTRATED
IRRITABLE
SAD
DEPRESSED
AGGRESSIVE

How can Stress effect
the body?

JITTERY
NAUSEA
HYPERVENTILATING
HEADACHES
INDIGESTION
ACHES BLOATING
CONSTIPATION
SWEATING
PAINS
DIARRHEA

How can Stress effect
your behavior?

SEXUAL PROBLEMS
TEARFUL
DRINKING
WITHDRAW FROM PEOPLE
SNAPPING
SMOKING INDECISIVE
DRUGS INFLEXIBLE
SLEEP PROBLEMS

ANGRY ANXIOUS
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INFLEXIBLE SNAPPING
AGRESSIVE

CHAPTER 1

Chapter 1

Stress, what is it?

What is stress? Stress in a short form is our bodies response to pressure. Many situations in someone's life can cause stress as shown previously, but what is the true definition of it? Well, defined by Elizabeth, Scott who has a PhD in stress management, psychology, and family counseling; it is any type of change that causes emotional, physical, or psychological strain. Stress is your body's response to anything that requires attention or action.

When someone's body is experiencing stress the first thing it does is release the hormones cortisol and adrenaline steaming from the adrenal glands. This puts the body into the mode of fight or flight. Your heart begins to beat faster, muscles tighten, breathing seems to be harder and more rapid, palms begin to sweat and every one of the senses becomes sharper.

We've all experienced some

of these sensations at some point in our lives. But, there is also levels to stress. Much like the causes of stress, there are multiple types of stress as well, they can be categorized as acute, episodic and chronic.

Acute Stress

Acute stress is defined as stress that develops from the effects of a specific stressful event or instance in someone's life. In this instance the stress develops quickly but doesn't last too long. An example of acute stress would be having a job interview. With a job interview acute stress can build within the preparation of it. Constantly thinking about what you're going to say or what you're going to wear, how you're going to present and sell yourself, etc. This can be super stressful for some people but this stress is temporary and only present until the actual interview itself. Once the interview has concluded the stress is gone. Acute stress can evolve though and when it does, it is known as episodic stress.

Episodic Stress

Episodic stress is defined as someone experiencing acute stress frequently. An example of someone suffering from episodic stress would be someone that seems to always take on too many tasks. Someone that has trouble saying "no" has a very good chance of experiencing episodic stress. Often times trouble saying "no" leaves them with a lot of responsibilities with limited time to complete them.

A more defined example of this would be a college student trying to balance going to school full-time, working part-time and trying to maintain a social life. In this instance they might feel overwhelmed more often than not, with the amount of school work/deadlines, work responsibilities and social responsibilities. Episodic stress much like acute stress can evolve as well and when it does this is known as chronic stress.

Chronic Stress

Chronic stress is defined as a constant sense of feeling pressure or overwhelmed, throughout a long period of time. Chronic stress is when stress turns into mental disorders such as anxiety and depression, often times ending in medical action. An example of this would be if someone was experiencing excessive stimuli regularly. Someone that grew up in a very small city then moved to a city such as New York would have a good chance of developing chronic stress levels. Due to the sheer fact of differences in their surroundings. Including; amount of people, noises, transportation etc.

In summary, acute, episodic and chronic are the main types of

stress people experience. But, within these stress categories there are instances where the stress someone is experiencing can be good or bad on their body, mind and behavior defined as *eustress and distress*.

Eustress

Eustress means beneficial stress either psychological, physical, or biochemical/ radiological. The term was coined by endocrinologist Hans Selye, consisting of Greek prefix eu-meaning good it; motivates, focuses energy, is short-term, feels exciting and improves performance.

Distress

Distress on the other hand is a state of extreme sorrow, suffering, or pain it causes anxiety or concern, can be short or long term, it is perceived as outside of our coping abilities, feels unpleasant, decreases performance and can lead to mental and physical problems. (see figure on pg. 15-16)

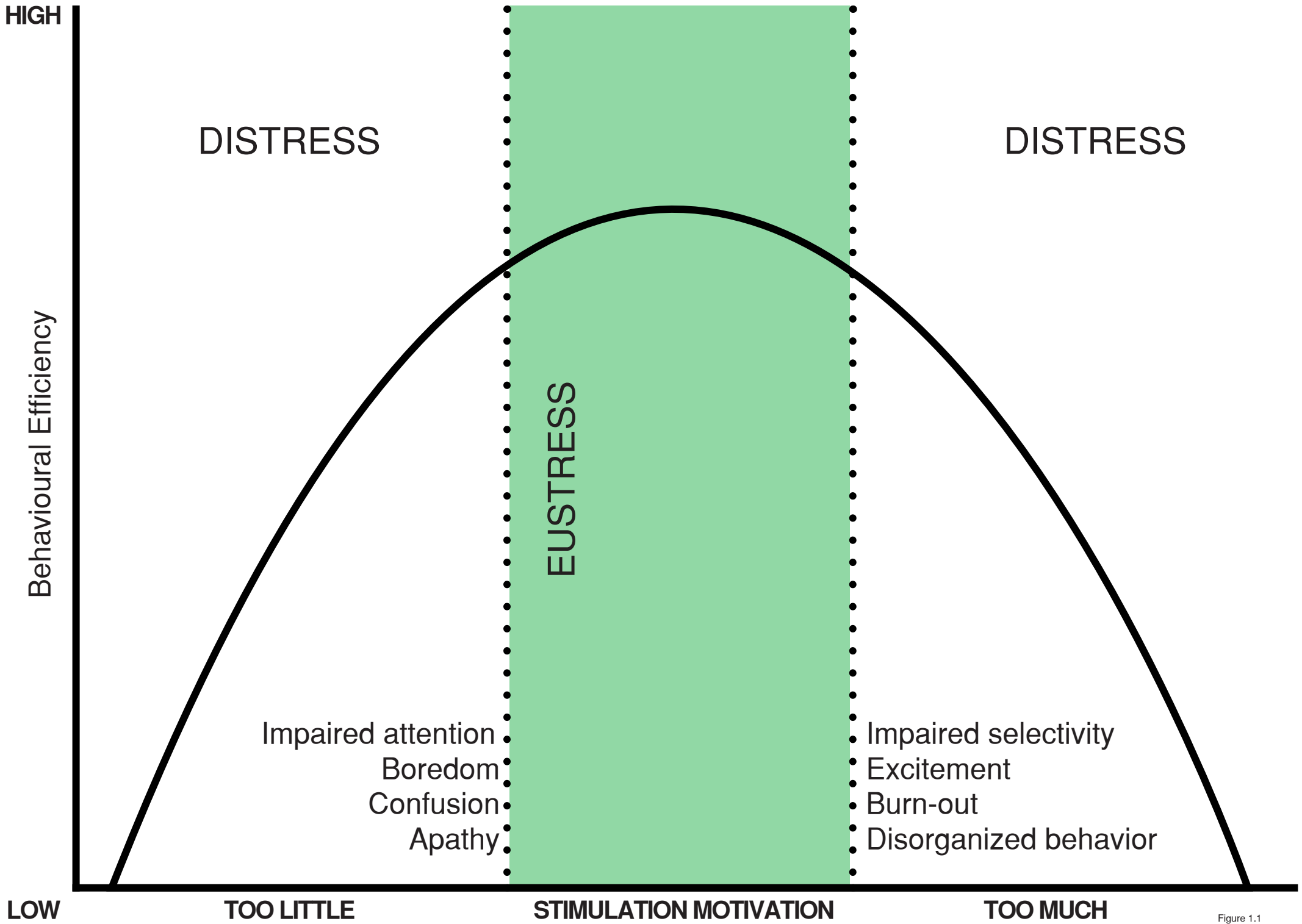


Figure 1.1

ANGRY ANXIOUS
FRUSTRATED
IRRITABLE SAD
AFRAID DEPRESSED
JITTERY
NAUSEA
HYPERVENTILATING
HEADACHES BLOATING
INDIGESTION CONSTIPATION
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CHAPTER 2

Chapter 2

What Do We Know?

With a topic so evolved and advanced as stress there is never going to be a one step solution to the problem. But, there are ways in which we can dissect this problem step by step. As an Architect we don't have the knowledge or experience to solve all the problems regarding this topic. With that being said there are ways in which we can help. This begins and ends with what we know best, the built environment or for people not familiar with the term, everything that is built surrounding us. Such as libraries, banks, houses, schools, offices the list could go on.

There are three main types of spaces when looking at the built environment with regards to stress. These include the school, home and work environments. These three spaces are the most stress inducing spaces on a daily basis for individuals. With in all three of these spaces there are examples of spaces that were designed with the well-being of the occupant as their top priority.

There are also examples where the well-being of the occupant was a priority but didn't come off as prominent. Which is where the real problem lies. Knowing that the built environment can either increase, sustain or alleviate stress levels with in an individual. Leaves us with the question, how can we ensure all spaces existing or new, benefit the health and well-being of each individual that occupies the space, overall alleviating their stress levels?

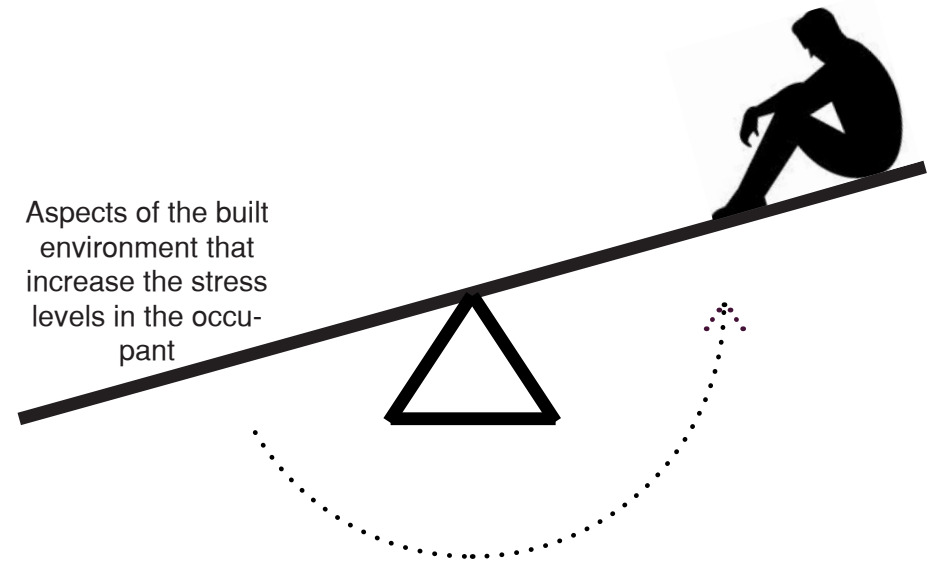


INCREASE

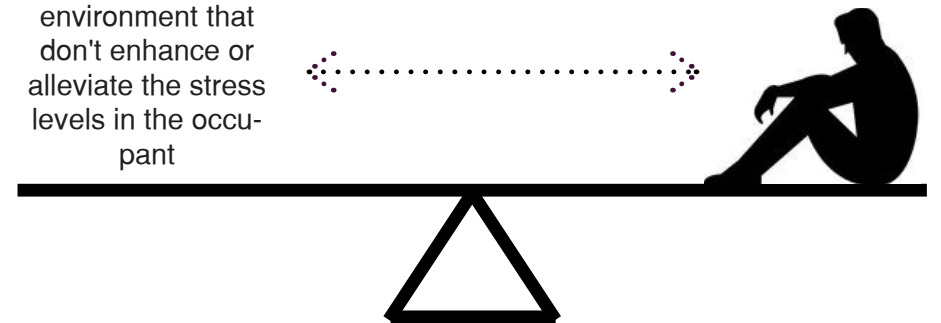
SUSTAIN

ALLEVIATE

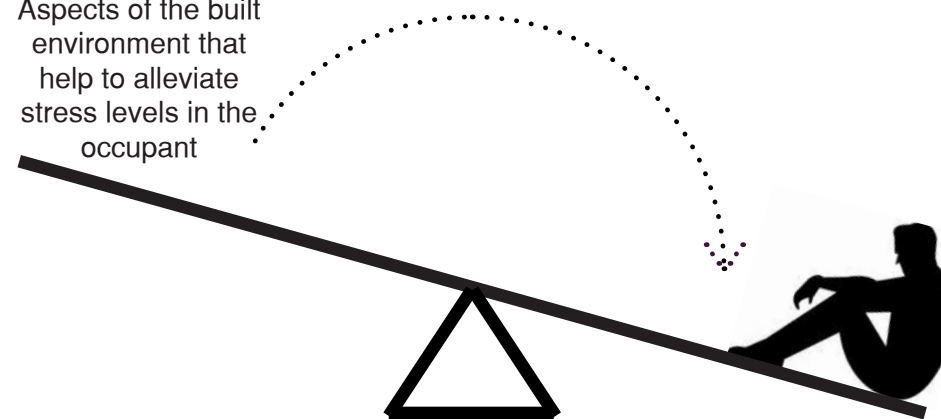
Aspects of the built environment that increase the stress levels in the occupant



Aspects of the built environment that don't enhance or alleviate the stress levels in the occupant



Aspects of the built environment that help to alleviate stress levels in the occupant



Looking at the question; "how can we ensure all spaces existing or new, benefit the health and well-being of each individual that occupies the space, overall alleviating their stress levels?"

What does this mean? Where do we start? Well, first of all we have to look at the spaces that are affected most and have the highest chances of being unhealthy for us. Already singling out these by placing schools, homes and work places into this category we now have to look at every aspect within these spaces that could potentially

trigger stress. Due to the fact that stress affects everyone differently, no stone can be left unturned. Meaning that every space must address stress in a different way. We can begin doing this by first looking at aspects of a space with regards to the senses, how can a spaces make-up interfere or effect our touch, sound, feel, sight, taste, and smell.

FREQUENCIES

528 Hz is one of the best Solfeggio frequencies also known as the "Love Frequency" it has a very relaxing effect on the mind and body and listening to music in this frequency during bedtime can help people with sleep disorders by boosting sleep quality, along with reducing stress. It's said to help the body flow in perfect rhythm and harmony.

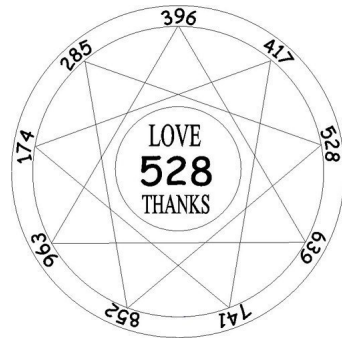


Figure 2.1

DECIBEL LEVELS

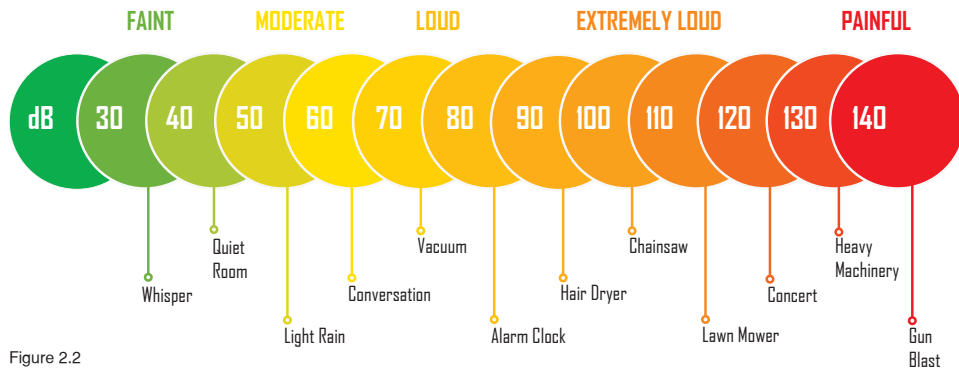


Figure 2.2

COLOR THEORY

An exciting and stimulating color, red is often associated with passion.	A soft tranquil color, pink can inspire a calming sense of peace and balance.	Similar to red, orange is an intense and stimulating color that can make you feel invigorated.	Softer than red and orange, but still sunny and cheerful, yellow can both improve your mood and counteract stress .
Quiet and restful, green is a soothing color that can invite harmony and diffuse anxiety .	A highly peaceful color, blue can be especially helpful for stress management because it can encourage a powerful sense of calm .	In many cultures, shades of violet represents strength, wisdom and peace . Purple can invoke a tranquil feeling that helps reduce stress .	Symbolic of purity and freshness, bright white can inspire mental clarity (on the other hand, dull white can cloud your emotions).

SOUND ABSORPTION

Figure 2.3 CORK - .2	Figure 2.4 POLYESTER - .4	Figure 2.5 FIBERGLASS - .55 FABRIC	Figure 2.6 FOAM - .6
Figure 2.7 MARBLE - .01	Figure 2.8 GRANITE - .01	Figure 2.9 CONCRETE - .01	Figure 2.10 CERAMIC- .02 TILE

Sound absorption coefficient is used to evaluate the sound absorption efficiency of materials. For example if marble has a sound absorption coefficient of .01 it absorbs 1% of sound waves.

Along with sensorial research, in order to introduce multiple effective ways of alleviating stress in the built environment, we need to also take a look at previous studies to determine what is effective and what still needs to be done.

Steelcase leads the way in creating great experiences by offering a range of architecture, furniture and technology products and services designed to help people reach their full potential. They work collaboratively to design spaces that help people work, learn and heal. They achieve this through approaching four main space typologies; personal, collaboration, social, and learning spaces.

The main concept with achieving effective personal spaces comes from allowing individuals the freedom to control how they get work done. They outline the importance of giving people the ability to express themselves and provide a sense of security when prioritizing.

According to Steelcase, an effective collaboration space for the post-pandemic world would be more open. They should provide a sense of safety and flexibility to resize the team based on the need for work to be done. They outline the importance of giving people the ability to express themselves and provide a sense of security when prioritizing.

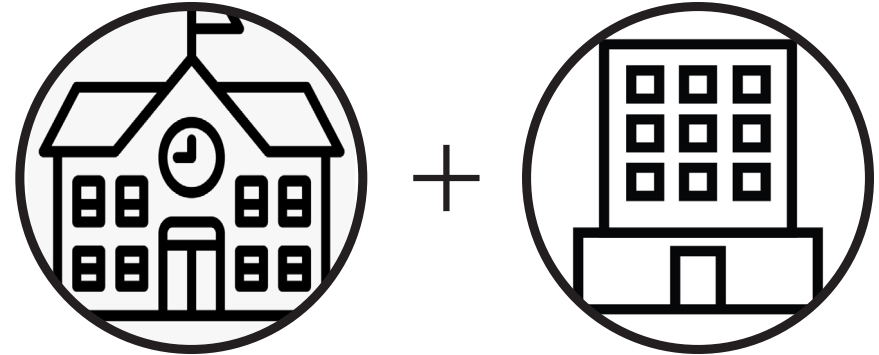
Social spaces will succeed by connecting people in order to help cultivate culture. Meaningful interactions can occur through creating a sense of purpose and belonging. Having access to power, as well as analog and digital tools would promote the use of these settings throughout all

times during the day. This is achieved by giving teams and individuals more options when it comes to developing diverse work.

The key to learning and developing individual and organizational capabilities is key to achieving growth and innovation. Teams and individuals are given the opportunity to experiment and building on each other's ideas through multi-modal spaces that support varying purposes. These spaces can be accessed by both in-person and distributed teams members, as they are designed to be inclusive.

Similarly, Arhaus which is another precedent that focuses on making the workplace more comfortable and effective for their employees outlines how to design a relaxation space to de-stress and unwind. They emphasize the importance of having an area to retreat to during or following a typical workday. It is essential to create positive mental and physical health.

BASIC KNOWN STRESS RELIEVING CONCEPTS REGARDING HOME, SCHOOL & WORK ENVIRONMENTS



-Bring Outside In

-Get Rid Of Clutter

-Create Common Spaces

-Create Private Spaces

-Motivate Through Art

-Encourage Movement

-Maximize Natural Light

-Bring in Color



-Incorporate More Plants

-Get Rid Of Clutter

-Create An Area Of Peace

-Use Calming Colors

-Reduce Electronics

-Clean Frequently

-Maximize Natural Light

-Make Your Bed Everyday



PRECEDENT: STEELCASE



BRAIDING DIGITAL + PHYSICAL

Increase video use in "me" and "we" spaces

WE + ME

Equally support large groups, small groups and individuals

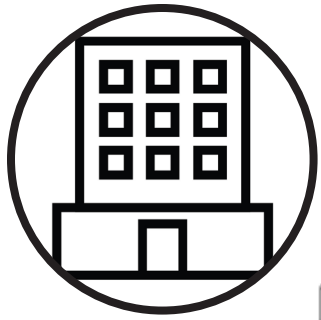
FIXED TO FLUID

Multimodal spaces support multiple purposes and pedagogies

OPEN + ENCLOSED

More shielded "me" and activate more open "we" spaces

Figure 2.11



PRECEDENT: STEELCASE



BRAIDING DIGITAL + PHYSICAL

Enhance the human experience through technology

WE + ME

Equally support individual and team work

FIXED TO FLUID

Design for greater flexibility and mobility

OPEN + ENCLOSED

More enclosed "me" and more open "we" spaces

Figure 2.12

ANGRY ANXIOUS
FRUSTRATED
IRRITABLE SAD
AFRAID DEPRESSED
JITTERY
NAUSEA
HYPERVENTILATING
HEADACHES BLOATING
INDIGESTION CONSTIPATION
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CHAPTER 3

Chapter 3

Narrowing Research

Stress is a very complicated subject matter that can effect everyone differently. We also know that the built environment can be a leading factor when regarding stress. In understanding the overall effects of the built environment on stress levels and how other experts are tackling this issue, we can begin to apply these ideas to our personal lives. According to previously conducted research, there are three main types of environments that cause the highest levels of stress within the built environment. These include work, home, and school. Since there are a variety of factors that would go into studying the effects of all of these environments, pinpointing one specific environment will allow a more thorough analysis. From my personal experience, the Warren Loranger Architecture building on the University of Detroit Mercy campus inhibits many stress inducing qualities.

This chapter outlines an examination of existing conditions of the chosen space, including its

purpose and its users. Applying sensorial methods used in previous research to the existing conditions of the building, allows researchers to understand efficiency levels in regards to stress within different spaces.

By using different sensorial methods including color theory, sound absorption, visual appearance and comfort levels we can begin to analyze certain spaces as to whether they increase, sustain, or alleviate stress. Overall, this gives us a starting point from which we can begin to identify problems and develop solutions.

Understanding that **44.9%** of college students experience "more than average" levels of stress daily, has helped gear the main focus of this research to the school environment. Along with that 44.9%;

As of 2020, **87%** of young adults aged 18-23 say education is a significant stress source.

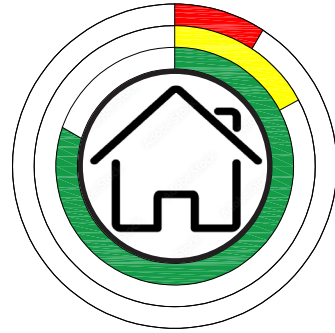
36.5% of students claim stress is the biggest reason for poor academic performance.

40% of college students in the US report feeling well rested for only two days a week.

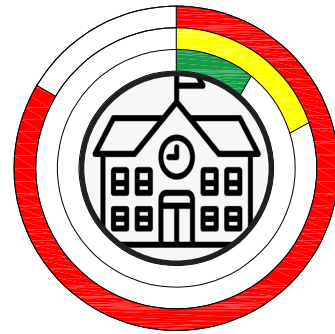
70% of students stress about their financial situation.

85% of college students experienced increased stress and anxiety during the COVID-19 pandemic.

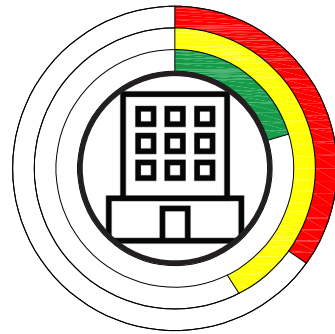
Images to the right including page 36 show how these percentages can be represented in diagrammatic form. These graphics are solely based off a single student so the data isn't 100% reflective to students across the country but, it does give a sense of when and where students may experience a majority of their stress throughout the day.



HOME LIFE



SCHOOL LIFE



WORK LIFE

These diagrams represent stress levels of Andrew while in these spaces. Red represents that the space increases stress, yellow sustains stress and green alleviates stress.

Day in the Life: Andrew Miller
(Graduate Student)

7:30 am -
Wake Up

8:00 am -
Leave Apartment

8:05 am - 8:20 am -
Commute to Work

8:30 am -
Work Starts

12:00 pm -
Leave Work

12:00 pm - 12:15 pm -
Commute Home

12:20 pm - 12:50 pm -
Commute to School

1:00 pm - 6:00 pm
School

6:00 pm - 6:30 pm -
Commute Home

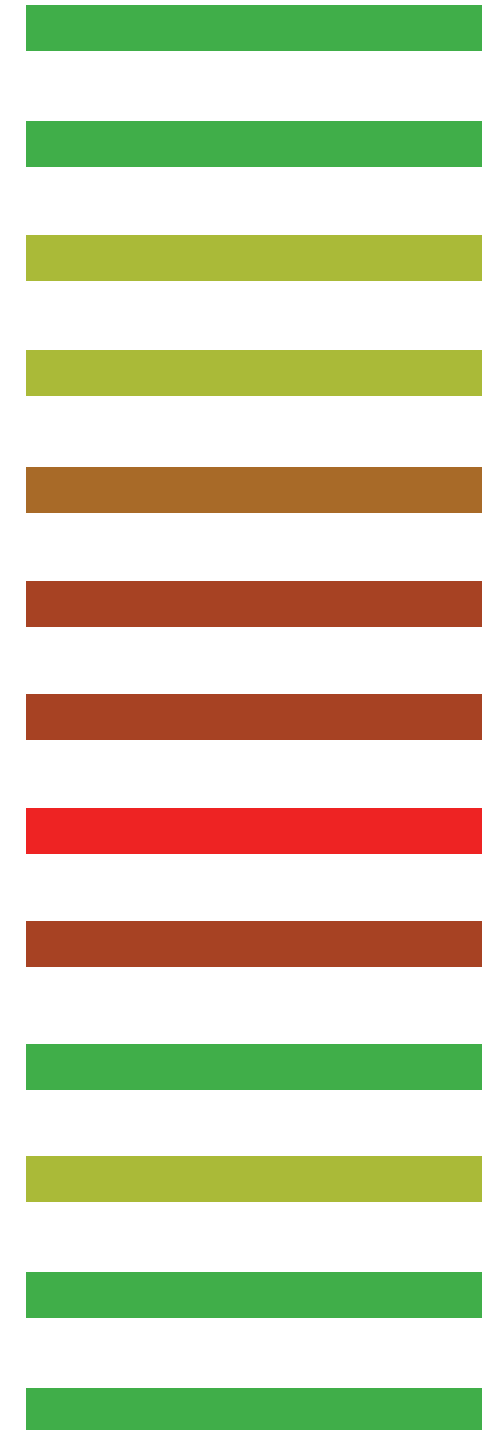
6:30 pm - 8:00 pm -
Eat Relax

8:00 pm - 10:30 pm -
Homework

10:30 pm - 11:30 pm -
Relax

11:30 pm -
Sleep

Stress Level



Detroit, MI is home to the University of Detroit Mercy, where over 100 undergraduate and graduate programs are offered but, for some reason there is only one program where the students never seem to leave campus. UDM's school of Architecture and Community of Development is home to some of the brightest young designers in the country.

Architectural students are asked repeatedly to create, floor plans, 3D models, physical models, and hand drawings along with countless other projects. A majority of these projects

can only be completed with the help and resources the school provides. Along with projects, architectural students have a mandatory five hr studio three days a week. Resulting in these students spending a majority of their time on campus.

As we know spending an extended amount of time in one space can increase someones stress levels, which is why the University of Detroit Mercy's School of Architecture and Community Development is the perfect case study for this research. Within the Warren Loranger Architecture Building

there are two spots considered "hangout" spaces by the students. One is an exterior space just outside the back entrance of the building. Whereas the other is an interior space adjacent to the main entrance. These spaces are indicated on the map of the school on page 38 and could potentially be the site of further development from this research.

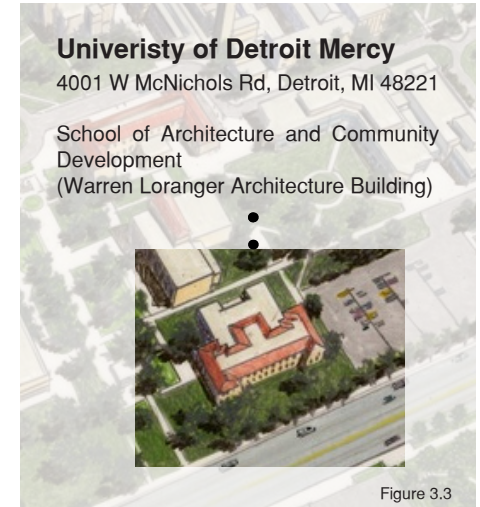


Figure 3.3



Potential Re-Design Site A

Figure 3.1



Potential Re-Design Site B

Figure 3.2

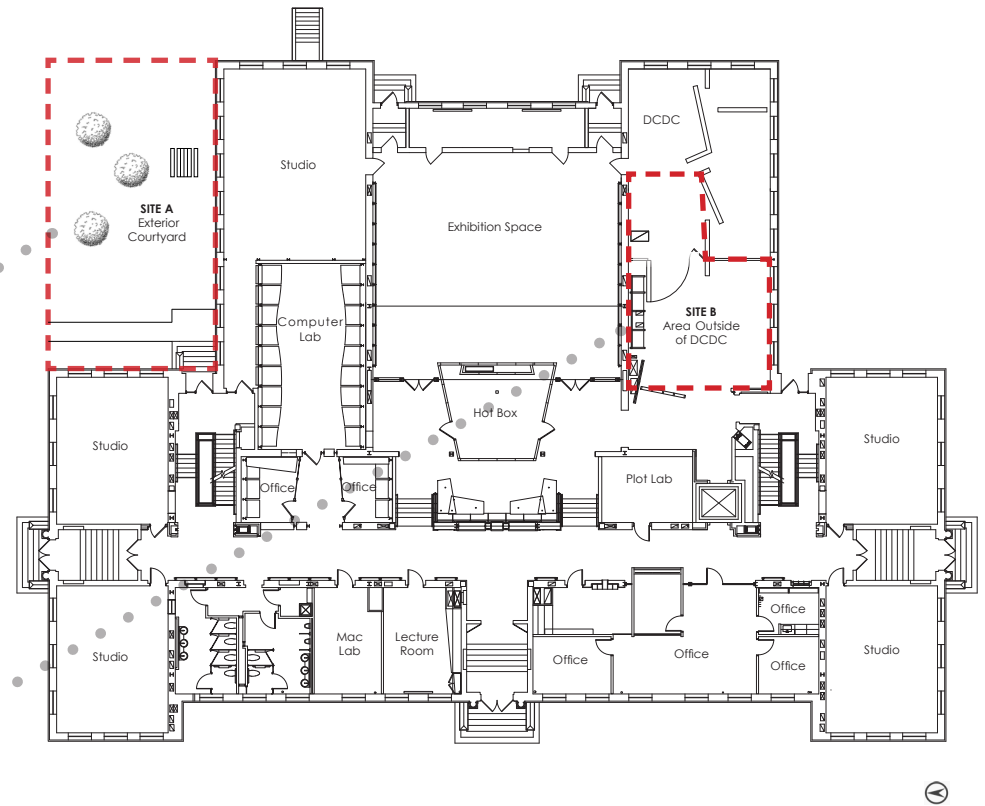


Figure 3.4

UDM Architecture Building Main Floor

Once the University of Detroit Mercy's School of Architecture and Community Development was confirmed as the case study analyzing the existing conditions with regards to stress was the first priority.

Using what we know about senses and how they play a key factor in our stress levels and how the built environment can either increase, sustain or alleviate stress. I went through and documented some of the existing spaces that could potentially increase the stress levels within the occupant.

Once these spaces were defined I used my new knowledge of color theory to distinguish if the spaces according to the theory were increasing, sustaining or alleviating stress.

Most of the colors were neutral which did not affect the occupant's stress levels. With that being said, shades of red were found as well. Red is an exciting and extremely stimulating color which is positive in some aspects but in attempting to reduce stress, excess stimulation should be avoided.

Yellow was the only color that

was found that alleviates stress. Yellow can both improve your mood and counteract stress.

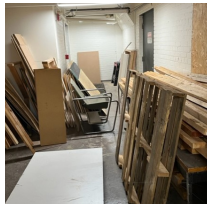


Figure 3.5

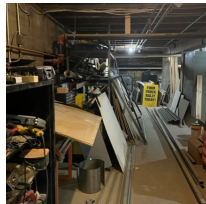


Figure 3.6



Figure 3.7



Figure 3.8



Figure 3.9

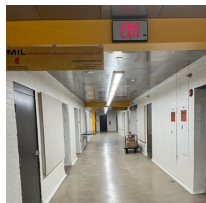


Figure 3.10

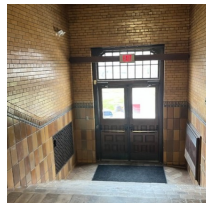


Figure 3.11

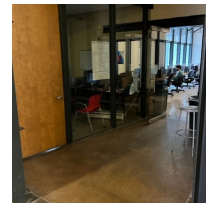


Figure 3.12

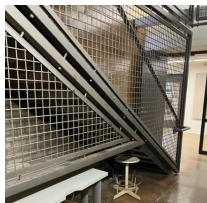


Figure 3.13

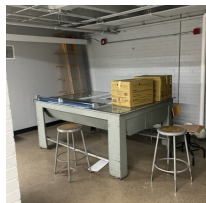


Figure 3.14

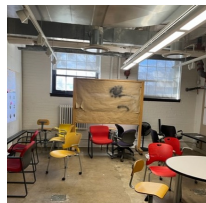


Figure 3.15

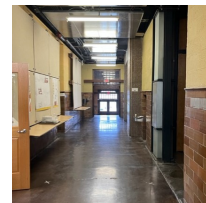
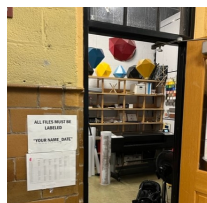


Figure 3.16



39

Figure 3.17

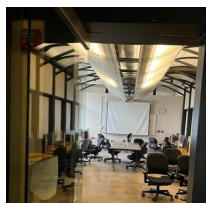


Figure 3.18



Figure 3.19

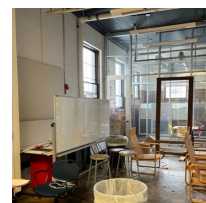


Figure 3.20



From defining the spaces to analyzing them with the help of color theory, I then took into account the sound and sight aspects of the senses. Everyday sounds are assigned with pictures of the spaces they occupy.

This sketch problem sheds light on the sounds we zone out on a daily basis, which are critical to the feeling and ambiance of a space. These sounds over time can turn from acute stress which is defined as a stressful event that happens quickly but doesn't last long to episodic acute

stress or in other words when someone experiences acute stress frequently. In this state the occupant will begin to develop symptoms including uncontrolled anger and irritability, rapid heart rate and possible panic attacks.

To get the full effect of this study and immerse yourself in these spaces use the QR code to the right to add sound to the pictures below.

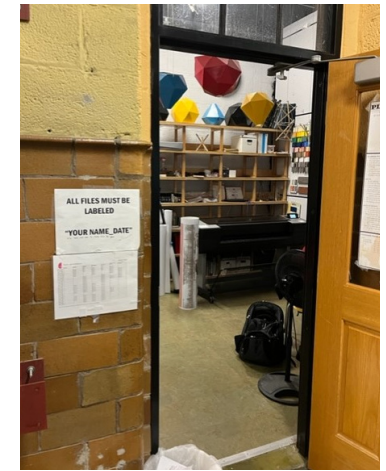
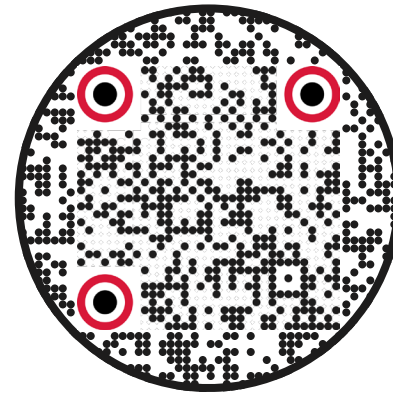


Figure 3.25



Figure 3.21



Figure 3.22

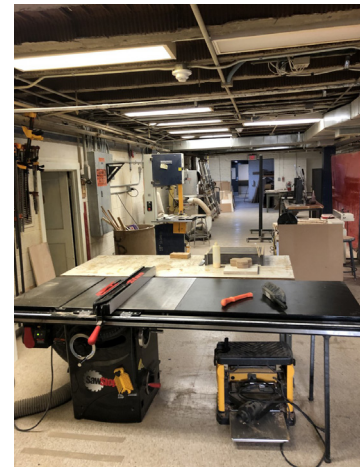


Figure 3.26

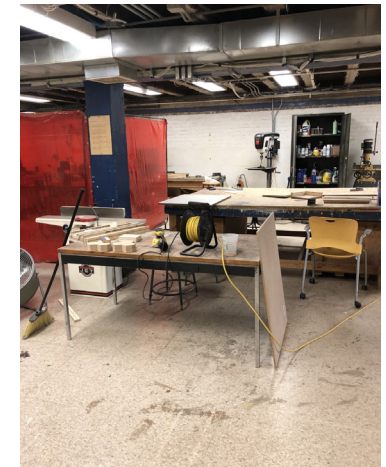


Figure 3.27



Figure 3.23

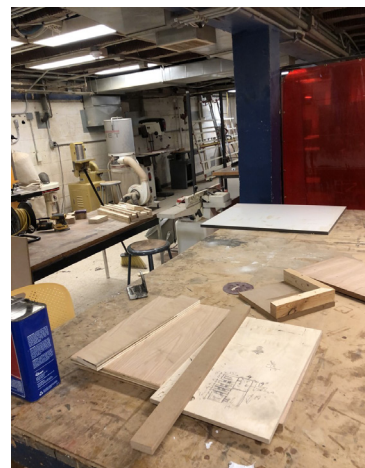


Figure 3.24



Figure 3.28

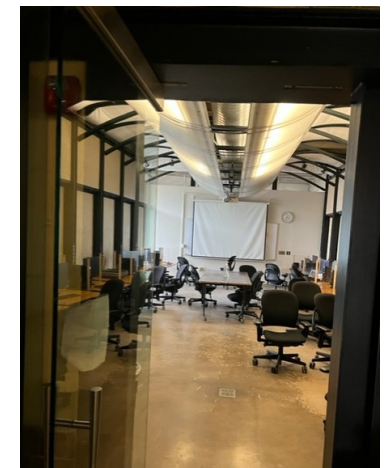


Figure 3.29

ANGRY ANXIOUS
FRUSTRATED
IRRITABLE SAD
AFRAID DEPRESSED
JITTERY
NAUSEA
HYPERVENTILATING
HEADACHES BLOATING
INDIGESTION CONSTIPATION
ACHES SWEATING
PAINS DIARRHEA
SEXUAL PROBLEMS
WITHDRAW FROM PEOPLE
TEARFUL SMOKING
DRUGS
SLEEP PROBLEMS
INDECISIVE DRINKING
INFLEXIBLE SNAPPING
AGRESSIVE

CHAPTER 4

Chapter 4

Stress Alleviation Model

Once we identify the problems related to stress within certain spaces, we can apply different factors to a scale to determine how they behave relative to stress levels. These factors include; proportions, senses, perception, way finding, psychology, and time.

Proportions

Human scale can be compared to the physical proportions of a space to create a certain feeling. For example, ceiling height can have a huge impact on the feeling of the occupants inside that space. Taller ceilings make us feel small and insignificant, which can be positive or negative. At the same time, low ceilings can create a feeling of claustrophobia or comfort. Both of these features can alleviate or enhance stress depending on other proportional variables.

Senses

Humans have five basic senses; touch, sight, hearing, smell, taste. According to Live Science, the organs associated with each sense send information to the brain to help

us understand and perceive the world around us. Each of the five senses can trigger stress in some way, such as the response to the smell of burnt toast or to the sound of a clicking pen. It is through sensorial factors like these that amplify the stress level of the occupant.

Perception

Perception of spaces occurs through the process by which humans become aware of the relative positions of their own bodies as well as objects around them. Space perception provides us with cues, such as depth and distance, that are crucial for movement and position in the environment. We can analyze this idea through winding narrow hallway that seems never-ending. One might feel overwhelmed or lost, which would enhance stress.

Way-finding

Way finding refers to the process or activity of ascertaining one's specific position by planning and following a certain route. The absence of direction or lack of signage in a space can enhance stress levels. Orientation in a space can be lost due to physical obstructions or dead-ends.

Psychology

This refers to adjustment reactions to the novelty of being in a space, which can lead to transient anxiety or discomfort. Congested or dark spaces can create a negative feeling, and familiarity can greatly effect stress levels as well. For example, when entering a new space, we tend to feel overwhelmed. These feelings can often lead to physical symptoms that are out of character.

Time

The length of time and how we spend our time can vary in different spaces. Factors, as discussed previously, will affect the amount of time we spend in a space.

All of these are factors that can either enhance, sustain or alleviate stress of an occupant in the built environment.

KEY ASPECTS OF A SPACE RELATING TO STRESS

1

PROPORTIONS

Size,Scale

2

SENSORIAL

*Sound,Sight,Touch
Taste,Smell*

3

PERCEPTION

Visual,Color

4

WAYFINDING

Circulation, Orientation

5

PSYCHOLOGICAL

*Familiarity,Meaning
Intimacy*

6

TIME

Time spent in a space



To determine if these two educational environments combated the effects of stress or not the stress alleviation model will be used to analyze the spaces. As stated previously this model consists of aspects such as proportions, sensorial, perception, way-finding, psychological and time.

Analyzing Figure 4.1

Proportions - effective due to high ceilings, flexibility of the space, and lack of disturbances.

Senses - Ineffective due to loud close spaces, hard surfaces and materials, uncomfortable temperature ranges.

- 1
- 2
- 3
- 4
- 5
- 6



Figure 4.1

Perception - Ineffective due to a dull color scheme, poorly lit, and a lack of privacy

Way-finding - Effective due to it's familiarity to it's occupants

Psychology - Ineffective due to lack of opportunity for psychological release (no relaxation zones)

Time - Ineffective due to excessive time spent in the space

Analyzing Figure 4.2

Proportions - Effective due to high ceilings, with drop down elements relating to human scale

Senses - Effective due to separation of

spaces, reducing noise pollution

Perception - Effective due to calming color scheme, adequate lighting and meaningful material changes

Way-finding - Effective due to a clear separation of program

Psychology - Effective due to a variation of spacial functions, providing opportunity for work and relaxation

Time - Effective due to ability to spend time in a variety of ways (ie. work and relaxation) and time management



Figure 4.2



To determine if these two home environments combated the effects of stress or not the stress alleviation model will be used to analyze the spaces. As stated previously this model consists of aspects such as proportions, sensorial, perception, way-finding, psychological and time.

Analyzing Figure 4.3

Proportions - effective due to recognition of human scale and flexibility of the space

Senses - Ineffective due to lack of stimulation and uncomfortable temperature ranges.

- 1
- 2
- 3
- 4
- 5
- 6



Figure 4.3

Perception - Ineffective due to a dull color scheme and poor lighting

Way-finding - Effective due to it's simplicity and familiarity to it's occupant

Psychology - Effective due to variation of spacial functions and sense of comfort

Time - Ineffective due to excessive time spent in the space

Analyzing Figure 4.4

Proportions - Effective due to open floor plan and subtle differentiation of spaces

Senses - Effective due to strategic separation of spaces, biophilia and

variation of textures

Perception - Effective due to calming color scheme, adequate lighting and meaningful material changes

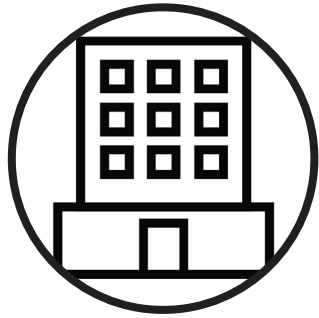
Way-finding - Effective due to it's simplicity and familiarity to it's occupant

Psychology - Effective due to a variation of space functions (balcony), providing opportunity for psychological release

Time - Effective due to ability to spend time in a variety of ways



Figure 4.4



To determine if these two work environments combated the effects of stress or not the stress alleviation model will be used to analyze the spaces. As stated previously this model consists of aspects such as proportions, sensorial, perception, way-finding, psychological and time.

Analyzing Figure 4.5

Proportions - Ineffective due to a compact space and repetition of elements

Senses - Ineffective due to lack of stimulation, closed corridors and noise pollution.

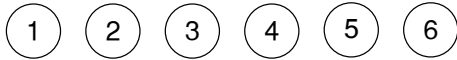


Figure 4.5

Perception - Ineffective due to a dull color scheme and poor lighting (sense of claustrophobia)

Way-finding - Ineffective due to repetition of spaces and lack of materiality changes

Psychology - Ineffective due to no other purpose other than work (no sense of release)

Time - Ineffective due to no change in scenery throughout the day (environment is constant at all times)

Analyzing Figure 4.6

Proportions - Effective due to open space and subtle differentiation of

programmatic elements

Senses - Effective due to strategic separation of spaces and biophilia

Perception - Effective due to calming color scheme, adequate lighting, variation in shape of programmatic elements and meaningful material changes

Way-finding - Effective due to shift in materiality between different elements of program, and clearly defined paths

Psychology - Effective due to variation in space functionality (room for work and relaxation)

Time - Effective due to ability to spend time in a variety of ways



Figure 4.6

After applying my initial alleviation model to different existing environments, it became obvious that there were holes in it. There were many overlapping elements between the different aspects of analysis. For example, it was difficult to distinguish between elements that fall under "senses" and "perception." Also, "psychology" and "time" often produced similar outcomes. This resulted in a lack of critical results, and instead gave repetitive outcomes.

Upon the realization of these findings, I was forced to reassess my analysis of the previous research along with my own alleviation model. This led me to the creation of a more accurate and thorough model that will gather more meaningful and relevant results.

The principles discussed in the previous model--proportions, sensorial, perception, way-finding, psychological and time--are not the main overarching concepts, but are rather aspects of grander concepts that must be recognized.

After careful consideration, I determined that there are three main concepts when evaluating stress and the built environment. These concepts are variation, convenience and regeneration. These concepts formed from extensive amounts of research related to stress, the human body and the built environment along with data I've gathered on my own, including; failures from my previous model and personal experiences within different spaces. Variation, convenience and regeneration are constructed with multiple specific aspects that work together to provide a proper model that accurately assesses any environment with regards to stress.

UPDATED STRESS ALLEVIATION MODEL REGARDING THE BUILT ENVIRONMENT

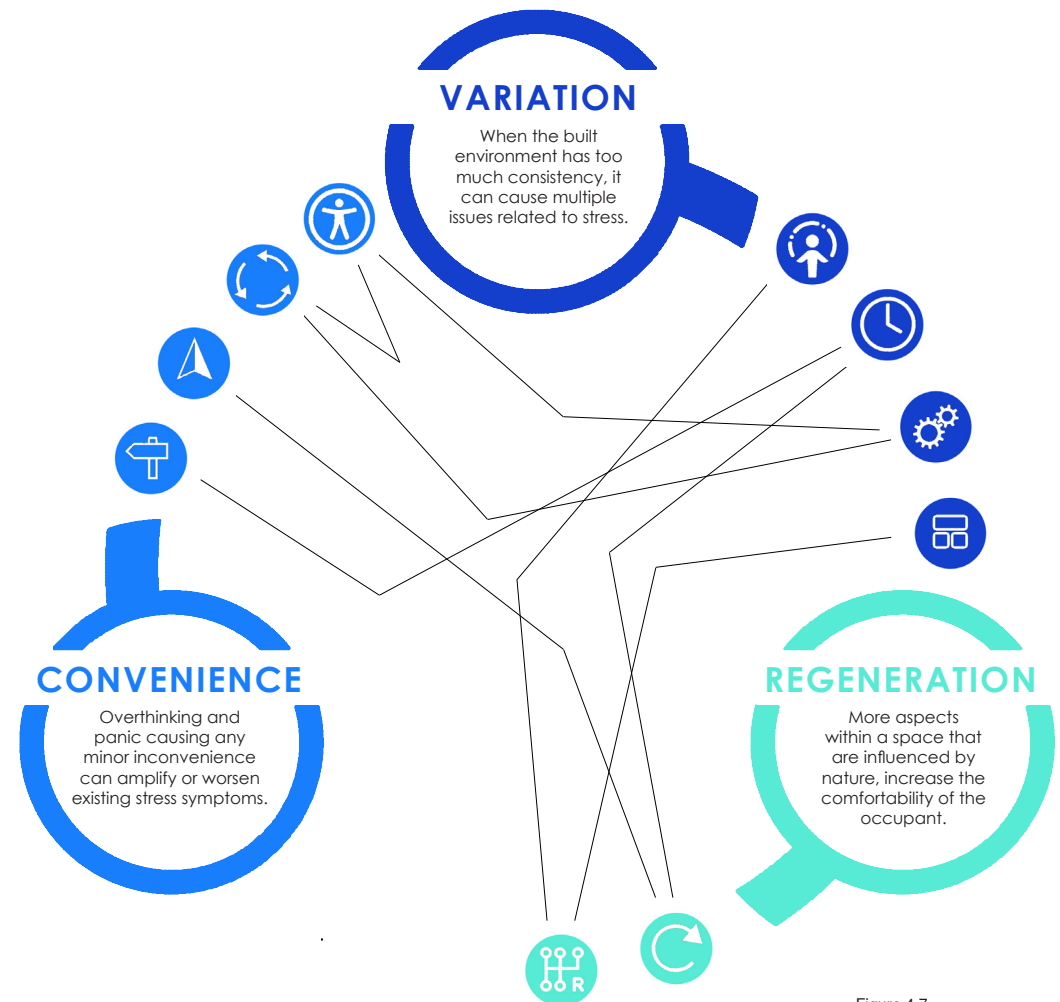


Figure 4.7

VARIATION

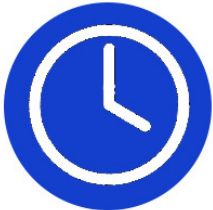
When understanding this concept, need to know information is that when the built environment has too much consistency it can cause multiple issues related to stress. If a building has the same features throughout, it makes it more difficult for the user to have different experiences throughout the various spaces within the building. Humans tend to attach memories with objects or places. Whether those memories are positive or negative, a lack of variation could cause spaces to blend together, which could potentially result in an overall feeling of distress for the user.

ASPECTS OF VARIATION:



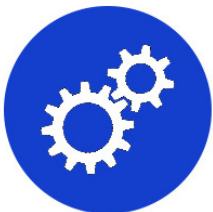
SENSORIAL VARIATION

Includes the use of colors, frequencies, materiality, textural qualities, familiar/soothing smells, creating views, sound management.



TEMPORAL VARIATION

Includes the amount of time spent in an area, changes in the space throughout the users duration in the space.



PROGRAM VARIATION

When the space includes multiple programs within a single space, offers flexible seating, multi-purpose rooms, cross pollination of users.



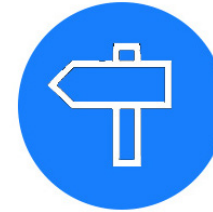
SPATIAL VARIATION

When the space includes proportions whether they're consistent or contrasting, height of walls, size of individual spaces.

CONVENIENCE

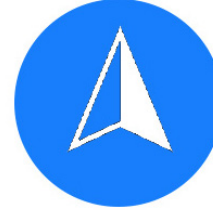
The book definition of convenience is "the state of being able to proceed with something with little effort or difficulty." Stress is typically caused by over stimulation within the body and mind. When in this state, the mind and body are overwhelmed with worry, overthinking and panic causing any minor inconvenience to amplify and worsen existing stress symptoms.

ASPECTS OF CONVENIENCE:



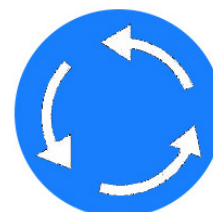
WAY-FINDING

When there is an undeniable route between spaces, incorporation of colors, signage, materials and textures.



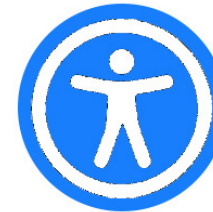
ORIENTATION

Includes how the space is laid out along with how the user is positioned in the space and the location of the space/building itself.



CIRCULATION

Includes different ways the user moves throughout the space, use of subtle but defined routes between different programs.



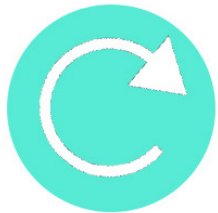
ACCESSIBILITY

Includes ease of access for all users.

REGENERATION

It is important to mimic the natural environment in its ability to restore and refresh. An important part of relieving stress with architecture is to connect the occupants to nature. By simply viewing nature, anger, fear and overall stress are reduced, leaving user with a pleasant feeling. This is why strategically placed views along with other biophilia design moves are critical in architecture. The more aspects within the building that are influenced by nature, the more comfortable the occupant feels.

ASPECTS OF REGENERATION:



REFRESH

Includes the use of earthy tones, materials, and textures, bringing the outside in, vegetation, natural light, comfortable temperature.



SHIFTS IN PSYCHE (MIND, BODY, SOUL)

Includes providing spaces that convert distress (bad stress) into eustress (good stress). A space that stimulates motivation, allowing the user to become their most productive self and creates an opportunity for psychological release.

ANGRY ANXIOUS
FRUSTRATED
IRRITABLE SAD
AFRAID DEPRESSED
JITTERY
NAUSEA
HYPERVENTILATING
HEADACHES BLOATING
INDIGESTION CONSTIPATION
ACHES SWEATING
PAINS DIARRHEA
SEXUAL PROBLEMS
WITHDRAW FROM PEOPLE
TEARFUL SMOKING
DRUGS
SLEEP PROBLEMS
INDECISIVE DRINKING
INFLEXIBLE SNAPPING
AGRESSIVE

CHAPTER 5

Chapter 5

Applying the Stress Alleviation Model to Existing Spaces

To understand fully if the stress alleviation model displayed in the last chapter is going to work, it needs to be field tested. In order to do that it needs to be tested on the three most common stress inducing environments, which include the home, work and school environments. Not only does it need to be tested on all three of these environments, it also needs to be tested on interior and exterior spaces along with spaces that are said to be designed with the health and well being of the occupant in mind. I Created this model to be a universal guideline for future and existing construction meeting these factors are key to making that happen.

In this chapter I will analyze three separate spaces as stated previously, these will include a home environment located on a lake shore, an exterior courtyard on a college campus and a newly renovated interior

office space. Each one of these spaces features will be critically analyzed based on the new model with regards to the overarching concepts of variation, convenience, and regeneration.

If these spaces are indeed designed with the occupants health and well being in mind, they should in theory include every aspect of the stress alleviation model.



To determine if this home environment combats the effects of stress or not the stress alleviation model will be used to analyze the space. As stated previously this model consists of concepts: variation, convenience, and regeneration.

Analyzing Figure 5.1

Variation

Sensorial Variation - Effective due to a combination of materials, textures, views, sound buffers and soothing sounds of the water.

Temporal Variation - Effective due to

changes in the space, creates the user to manage their time in more than one space avoiding excessive amounts of time with no environmental change.

Program Variation - Effective due to a variety of different areas providing different uses, such as a bedroom for sleeping, porch for relaxing and loft for possible work.

Spatial Variation - Effective due to alternating floor heights and human scale features including door sizes and ceiling heights.

Convenience

Way-finding - Effective due to

undeniable routes between spaces such as color or texture changes makes it easily navigable.

Circulation - Effective due to a variety of transitions from space to space such as stairs to the loft, step down to the space below and even elevation to the porch.

Orientation - Effective due to the openness of the space it makes it easy for the user to always know where they are at in the space.

Accessibility - This space is both effective and ineffective when it comes to accessibility, it is effective when entering the space but turns to ineffective when trying to access the lower level space along with the loft

Regeneration

Refresh - Effective due to the abundance of natural light entering the space, earthy tones such as wood, rock and vegetation, views to the water and flexible features to regulate the temperature inside the space.

Shifts in Psyche (Mind, Body, Soul) - Effective due to the variety of different spaces that allow for the opportunity for psychological release.



Figure 5.1

REGENERATION
Refresh

VARIATION
Spatial Variation

VARIATION
Program Variation

VARIATION
Temporal Variation

CONVENIENCE
Accessibility

REGENERATION
Shift in Psyche

CONVENIENCE
Orientation

CONVENIENCE
Circulation

VARIATION
Sensorial Variation

CONVENIENCE
Wayfinding



To determine if this exterior school environment combats the effects of stress or not the stress alleviation model will be used to analyze the space. As stated previously this model consists of concepts: variation, convenience, and regeneration.

Analyzing Figure 5.2

Variation

Sensorial Variation - Effective due to a combination of materials, textures, views, sound buffers, fresh aroma and wildlife sounds.

Temporal Variation - Effective due to

circular paths to maximize the time spent in the stress alleviating spaces, along with multiple paths locating to different spaces overall limiting the time spent in a single space.

Program Variation - Effective due to a variety of flexible seating options increasing the chances of cross pollination of users.

Spatial Variation - Effective due to variety of different plant life overall creating a lot of similar spaces feel very different.

Convenience

Way-finding - Effective due to

undeniable walk ways throughout the design and plant life being mostly flowers and bushes maintaining a sight line.

Circulation - Effective due to a very defined circulation route throughout the design and wide enough pathways to maintain personal space while passing bystanders.

Orientation - Effective due to the openness of the space it makes it easy for the user to always know where they are at in the space.

Accessibility - Effective due to the fact there is no elevation changes, every aspect of the design would be accessible by foot, wheelchair or crutches.

Regeneration

Refresh - Effective due to the abundance of natural vegetation, fresh air and 360 degree views.

Shifts in Psyche (Mind, Body, Soul) - Effective due to the variety of different spaces that allow for the opportunity for psychological release and by simply viewing nature, anger, fear and overall stress symptoms are reduced.



Figure 5.2

REGENERATION
Refresh

CONVENIENCE
Accessibility

REGENERATION
Shift in Psyche

VARIATION
Program Variation

CONVENIENCE
Circulation

CONVENIENCE
Orientation

CONVENIENCE
Wayfinding

VARIATION
Spatial Variation

VARIATION
Sensorial Variation



To determine if this interior work environment combats the effects of stress or not the stress alleviation model will be used to analyze the space. As stated previously this model consists of concepts: variation, convenience, and regeneration.

Analyzing Figure 5.3

Variation

Sensorial Variation - Effective due to a combination of materials, textures, views, sound buffers, and exterior views.

Temporal Variation - Effective due to

changes in the space, creates the user to manage their time in more than one space avoiding excessive amounts of time with no environmental change.

Program Variation - Effective due to a variety of flexible seating options along with multiple of public and private space opportunities.

Spatial Variation - Effective given that the private spaces are faced away from the public spaces directing the sound in the opposite direction overall reducing the noise pollution in the space.

Convenience

Way-finding - Effective due to

undeniable routes between spaces such as color or material changes makes it easily navigable.

Circulation - Effective due to distinguished walkways and a well spaced out layout where personal space can be maintained.

Orientation - Effective due to the openness of the space it makes it easy for the user to always know where they are at in the space.

Accessibility - Effective due to the fact there is no elevation changes, every aspect of the design would be accessible by foot, wheelchair or crutches.

Regeneration

Refresh - Effective due to the natural vegetation, natural light, and floor to ceiling views.

Shifts in Psyche (Mind, Body, Soul) - Effective due to the variety of different spaces that allow for the opportunity for psychological release.



Figure 5.3

VARIATION
Sensorial Variation

VARIATION
Program Variation

VARIATION
Temporal Variation

REGENERATION
Refresh

CONVENIENCE
Accessibility

CONVENIENCE
Wayfinding

VARIATION
Spatial Variation

REGENERATION
Shifts in Psyche

CONVENIENCE
Orientation

ANGRY ANXIOUS
FRUSTRATED
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AGRESSIVE

CHAPTER 6

Chapter 6

Re-Design of S.A.C.D

By conducting the analysis's on the home, work and educational environments with the new stress alleviation model we can fully confirm that the model does work. Meaning , we can now start addressing how it can assist us in re-designing under performing stressful spaces.

As mentioned in chapter three the University of Detroit Mercy's Warren Loranger Architecture building is prone to stress inducing spaces. This is known based on personal experience along with a variety of different on site studies explained in chapter three. To take on a re-design of the entire building would be too much to ask for one thesis, which is why I chose to focus on just two spaces within the building, these spaces are located adjacent to the front entrance of the school, just outside of DCDC and the exterior courtyard just off the back entrance.

I chose these spaces because, they are known to be the "hangout" spots within the school. A place were

someone would go if they needed a quite place to work or if they just needed to clear their head. These spaces are not know as the "hangout" spots because they are thoroughly designed for it, they are known as this because they are the only places in the school that aren't strictly designated with a purpose. My goal is to prove with help from my stress alleviation model I can effectively re-design these spaces to benefit the health and well being of the occupants and overall alleviating their stress levels.



Site A

Figure 6.1



Site B

Figure 6.2

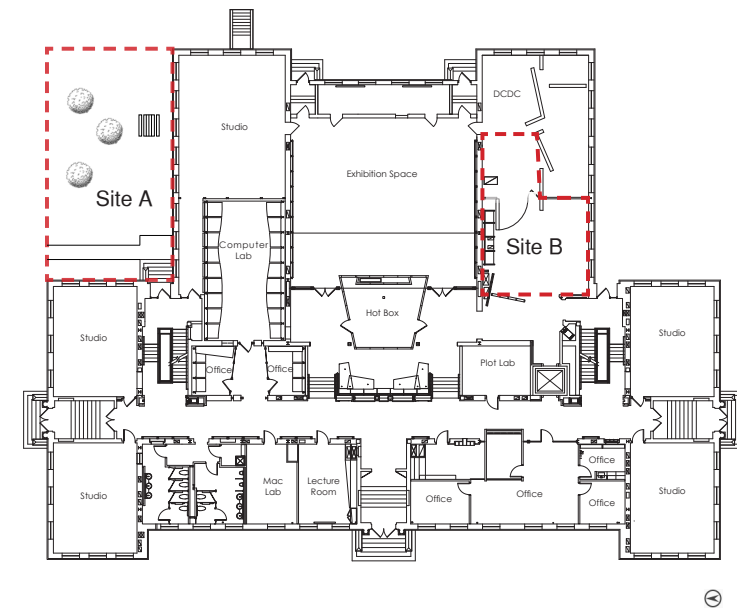


Figure 6.3

UDM Warren Loranger Architecture Building Main Floor

To begin the re-design I first had to assess what the site already had along with what it was missing in terms of the model. In terms of Site A it already had: accessibility, refresh, shift in psyche and sensorial variation and was missing: program variation, temporal variation, spatial variation, circulation, way-finding and orientation.



Figure 6.4

CONVENIENCE
Accessibility

CONVENIENCE
Accessibility

REGENERATION
Refresh

REGENERATION
Shift in Psyche

VARIATION
Sensorial Variation

Starting my re-design after the initial site assessment I started to incorporate design elements that satisfied the missing aspects of the space:

Variation

Sensorial Variation - Due to lack of vegetation with in the site besides three trees I incorporated a variety of bushes and flowers to go along with the already existing views.

Temporal Variation - Before the re-design there was no way to separate the users duration of time spent in the space so incorporating different features to access was a key point.

Program Variation - Rather than a wide open space with zero program I incorporated three different zones with in the space including a private (lower level), sub-private (under trees) and public space(picnic tables).

Spatial Variation - Before the redesign the whole site was one level to increase the spatial variation with in the site I incorporated a lower level to interrupt the consistency of the site.

Convenience

Way-finding - To increase the way-finding aspect of the space I incorporated a straight line path to the back entrance connecting the two

existing sidewalks.

Circulation - To increase the circulation the straight line path from sidewalk to sidewalk comes into play again this allows for individual personal space when navigating through the site.

Orientation - By separating the public and private spaces along with rotating the seating allows sounds to get lost outside overall reducing the noise pollution from space to space.

Accessibility - With incorporating a lower level accessibility was still an important aspect, which led to the construction of a ramp for easy access for all.

Regeneration

Refresh - Refresh was already present with in the existing site but not prominent, with the inclusion of more vegetation creates a more comfortable and peaceful environment

Shifts in Psyche (Mind, Body, Soul)

- By incorporating different spaces and zones throughout the site allows opportunity for psychological release.

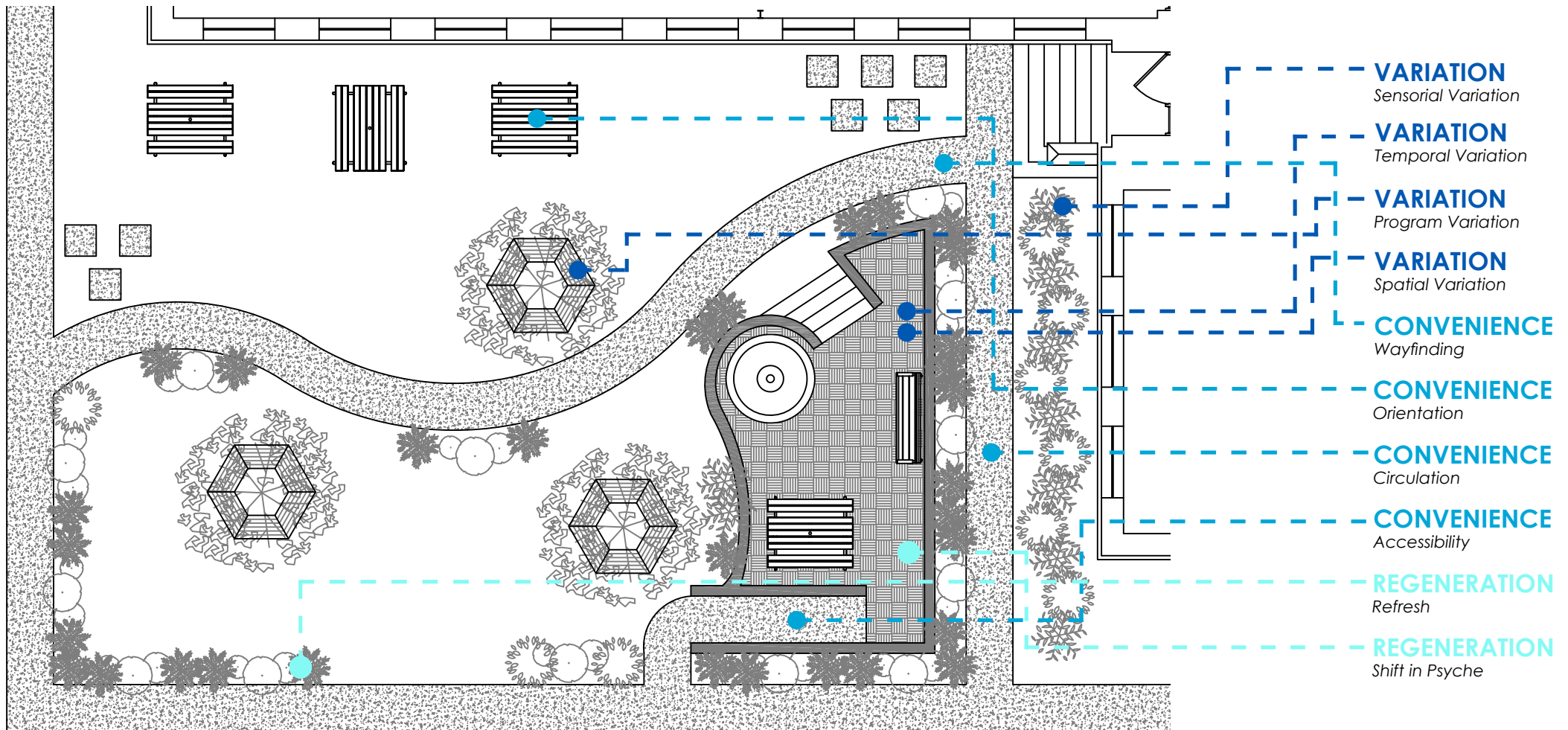


Figure 6.5

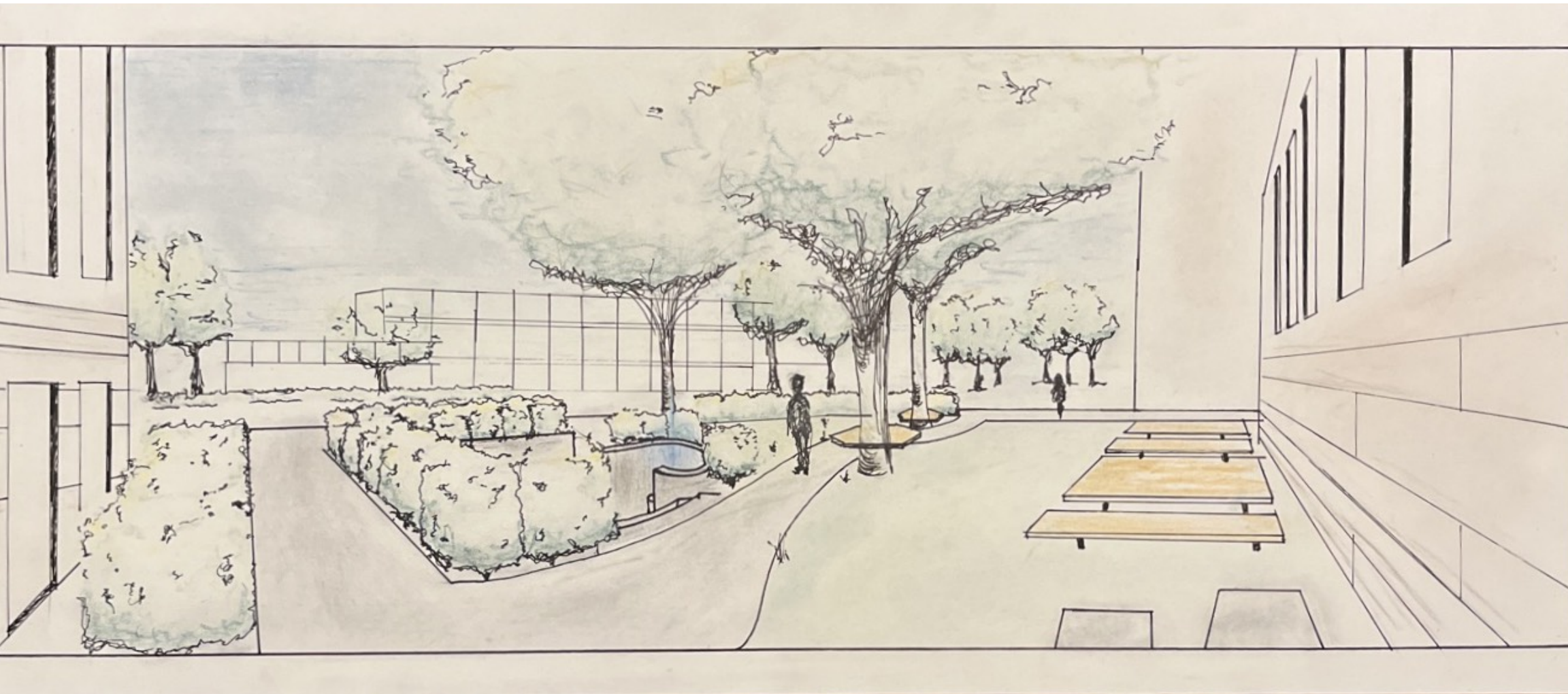


Figure 6.6

To begin the re-design I first had to assess what the site already had along with what it was missing in terms of the model. In terms of Site B it already had: program variation, refresh, circulation, and accessibility and was missing: spatial variation, temporal variation, sensorial variation, way-finding, orientation and shift in psyche .

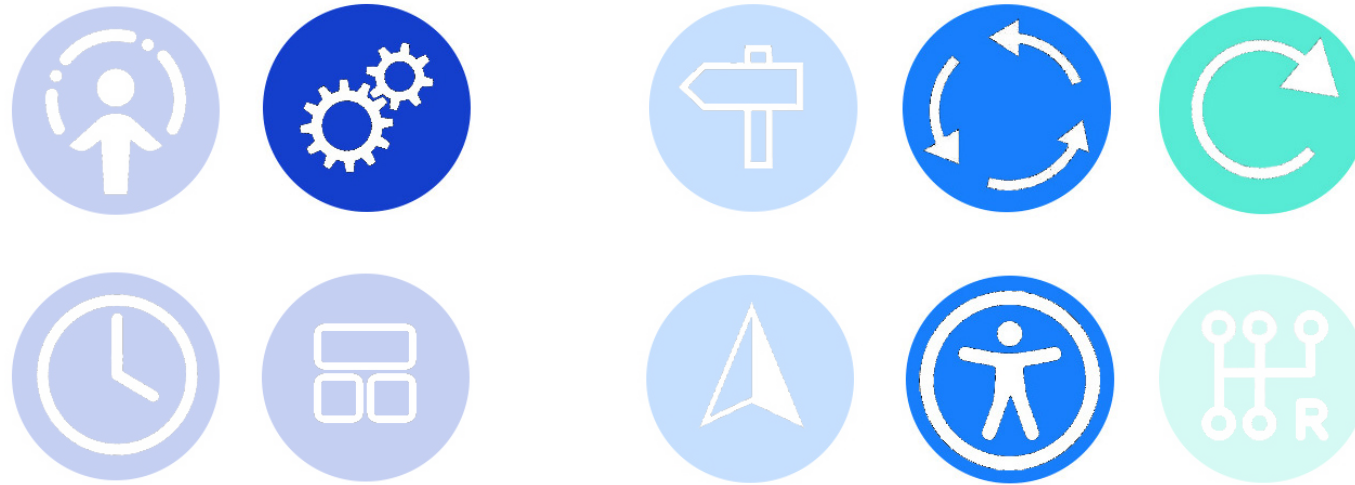


Figure 6.7

VARIATION
• Program Variation

CONVENIENCE
• Circulation

VARIATION
• Program Variation

REGENERATION
• Refresh

CONVENIENCE
• Accessibility

Starting my re-design after the initial site assessment I started to incorporate design elements that satisfied the missing aspects of the space:

Variation

Sensorial Variation - With the lack of sensorial stimulation in the space I incorporated earthy materials, green walls and maximized the natural light with in the space.

Temporal Variation - Before the re-design there was no way to separate the users duration of time spent in the space so incorporating different features to access was a key point..

Program Variation - Before the space was open flexible seating and couldn't be distinguished from public or private. Inclusion of lounge seating and a half wall distinguishes that space as public. Whereas the boxed in space with desks is distinguished as private.

Spatial Variation - Keeping all the wall heights human scale counter acts the existing high ceilings with in the existing room.

Convenience

Way-finding - To increase the way-finding aspect of the space I made sure that the public space was viewable from the building entry.

Circulation - To define the circulation I defined a wide path down the middle of the site making navigating through the site effortless.

Orientation - By separating the public and private spaces along with rotating the seating allows sounds to travel in opposite directions overall reducing the noise pollution from space to space.

Accessibility - Accessibility was already predominate in the site leaving it one level maintained it's prominence.

Regeneration

Refresh - With no greenery with in the space initially I added a green wall to the work space and along the

separation wall.

Shifts in Psyche (Mind, Body, Soul)

- By incorporating different spaces and zones throughout the site allows opportunity for psychological release.

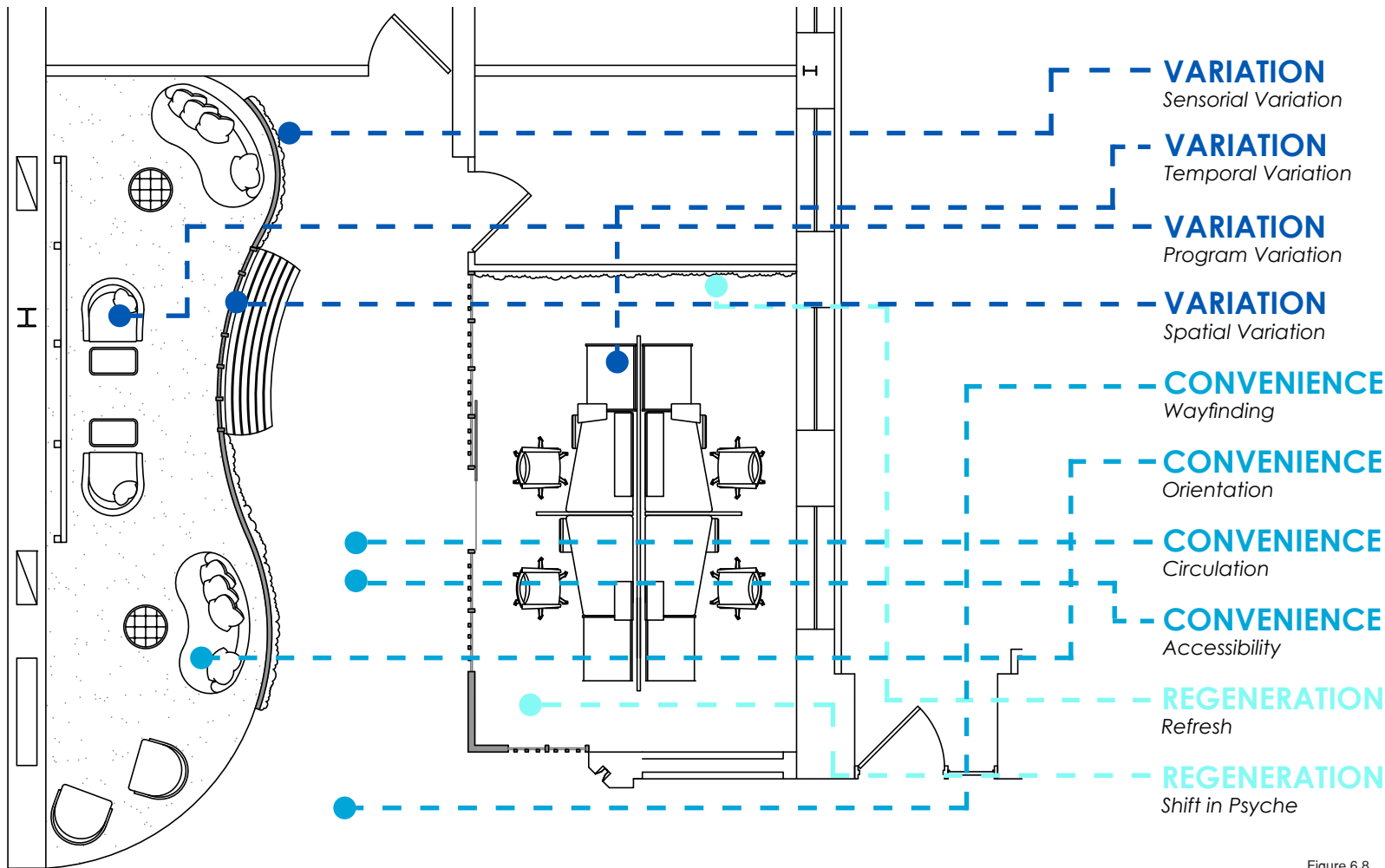


Figure 6.8

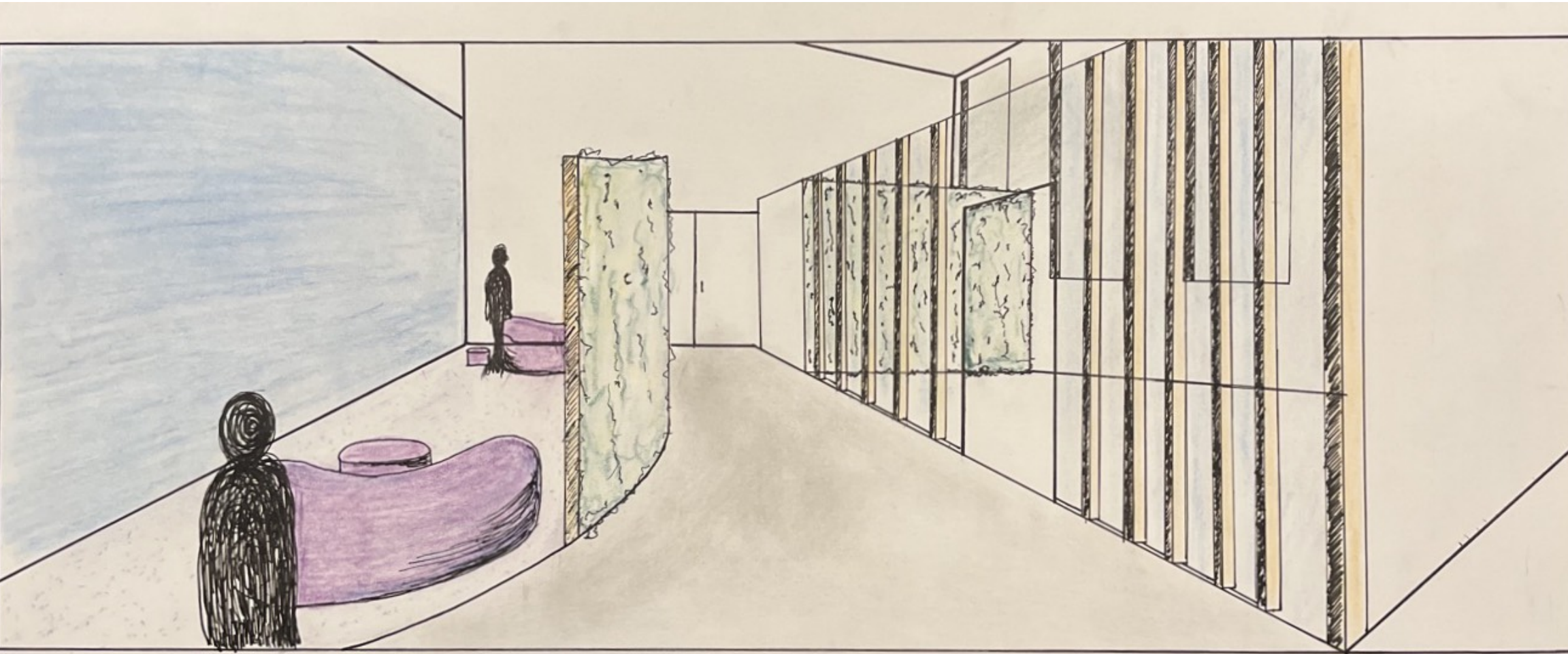


Figure 6.9

Thesis Statement

Stress is not a new issue in the world. It affects more than half the population on a day-to-day basis. Whether stress is experienced in the workplace, at school, or at home, it can be a continuing burden on the health and well-being of an individual. There have been ways in which society has tried to lessen the effects of stress with different design techniques. But, many of these techniques are based on the program of the space and not space itself.

To define stress, it is our body's response to internal and external pressure. Many situations in which someone's life can cause stress, but what is the true foundation of it? Well, defined by Elizabeth Scott PhD in stress management, psychology, and family counseling, it is any type of change that causes emotional, physical, or psychological strain on an individual. Stress is the body's response to anything that requires attention or action. When the body is experiencing stress the first thing it does is release the hormones cortisol and adrenaline steaming from the adrenal glands. This puts the body into the mode of fight or flight. In response, your heart begins to beat faster, muscles tighten, breathing seems to be harder and more rapid, palms begin to sweat and all the senses become sharper. I am sure we've all experienced some of these sensations at some point in our lives, but there are also multiple types of stress as well, they can be categorized as acute, episodic, and chronic.

With stress being so prominent when it comes to maintaining good mental health begs the question, what has already been studied about stress and what are the current best practices to alleviate stress?

This thesis focuses on analyzing how the built environment can increase, sustain, and alleviate stress through multiple aspects of the design. Including factors such as variation, regeneration, and convenience. Contribute to increasing, sustaining, or alleviating stress. Architectural practice can help with ongoing research of stress making the work place, home, and educational environments more sensitive to its occupants, in hopes of achieving optimal efficiency within a space.

According to the American Institute of Stress, stress affects over 50% of the United States population daily. With the average person spending 75% of their life indoors the built environment plays a crucial role in affecting the stress levels of individuals. University campuses contribute too 44.9% of college students say they experience "more than average" levels of stress.

One of the biggest concerns of this thesis would be individuals understanding the importance of design to manage stress. Without it being part of the code and potentially more money than an average space, the overall investment may not seem feasible to some employers or schools. Another concern for this thesis would be the percentage of the population that believe stress is evident and will always be an issue no matter what we try to do to stop it.

The biggest restriction with this study would be finding a design strategy that will help everyone with their stress levels. Knowing stress is an overly complex issue it will be hard to find a strategy or even multiple strategies that will help everyone.

This study focuses on one of the most important things today: mental health. With Covid-19 persisting, the importance of maintaining good mental health has been a point of emphasis. With stress being the most common form of mental illness along with anxiety and depression, it is important to know what the architectural community can do to help destress and overall improve the overall well-being of individuals.

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ANGRY ANXIOUS
FRUSTRATED
IRRITABLE ANGRY ANXIOUS
AFRAID DEPRESSED FRUSTRATED
JITTERY IRRITABLE SAD
NAUSEA AFRAID DEPRESSED
HYPERVENTILATING JITTERY
HEADACHES BLOATING
DIGESTION CONSTIPATION
HEADACHES BLOATING
PAINS DIARRHEA CONSTI
AL PROBLEMS SWEATING
WITHDRAW FROM PEOPLE
SEXUAL PROBLEMS
SMOKING
DRUGS WITHDRAW FROM P
SLEEP PROBLEMS SMOKING
DECISIVE DRINKING DRUGS
INFLEXIBLE SNAPPING PROBLEM
AGGRESSIVE DRINKING
SNAPPING
INFLEXIBLE AGGRESSIVE