

**Residential Biophilia: Creating a Nature Based Home
for Better Psychological Health**

by

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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this Thesis is globally accessible and will not permit alterations after a degree is conferred.

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DEDICATION

To all of those who suffer from anxiety and depression; you are not alone. Also, to my ducklings, to whom I am eternally grateful; I would not have made it this far without you.

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ABSTRACT

There is a rise in stress in the modern world and therefore a rise in anxiety and depression. We evolved in nature but as we further evolve so does technology that is taking over our lives. Using nature in interior design can give us a link back to nature and a bridge back to better psychological health. Through combining research and studies that focus on the effects of nature, natural light, vistas, plants, smells, sound as well as color texture and finishes we can have a positive and lasting effect on individuals in the home suffering from anxiety and depression as well as other mental illnesses.

CHAPTER I.

INTRODUCTION

More than eighty percent of the population of the United States is living in cities and the average American spends approximately 90 percent of their time inside, (Kellert, 2018). We are losing touch with nature and with that our overall mental health is being affected in a big way. According to the National Institute of Mental Health, over six percent of adults in the United States are diagnosed with major depression; that totals over sixteen million adults. Recent studies have shown a connection between mental disorders and a lack of time outdoors, leading to mental fatigue (Selhub & Logan, 2012).

Spending seventy percent of our waking hours working, many of us do not have the hours to spend in nature like we should. That is why it is important to integrate nature into our everyday living environment. When we come home that is our sanctuary and place to destress, therefore the residential space seems the perfect place to start; by paying greater attention to the warmth and security of our space, what kind of lighting we use and how it affects our circadian rhythm, to textures and colors of our surroundings, the plants we surround ourselves with and the view we see from our windows we can greatly improve mood, cognition, reduce stress, boost the immune system and reduce anxiety, all improving psychological function.

Warmth is interpreted not as a temperature but rather the stability, safety and security of a place. We need a certain amount of control over the space in which we reside. This concept is built in with the initial structure of the space; is it secure and structurally sound? This can also be affected by the size, shape and placement of doors, windows, and the layout of a home.

Lighting can have a much greater role to play than to help us see. The warmth and temperature of light and what part of the day we are subjected to that light affects our moods, appetites and sleep cycles, which in turn affect our mental health.

Overall plants are a great thing to incorporate into design. They can clean the air, reduce dust, nurture compassion, lower stress levels, and alleviate depression and anxiety. Plants can also help boost your wellbeing, optimism and sense of stability, because you have something to care for. We evolved in nature and now we spend ninety percent of our lives

indoors. The textures and colors you use in your space can echo the natural colors and products of the earth to reinforce that nature feeling. Color, texture and finishes can have a psychological effect on people that is credited to association. This means response will be based on personal experience and upbringing, but some things will remain common; such as red represents lust, love, passion and anger to most people in the United States.

What do you see when you look out your window with a busy street, a brick wall or maybe a mountain view or the ocean? The view from a window at home can have a large impact on the way you feel. Not only does a natural view boost the brain but it also can bolster the reassurance of peace, safety, and control of one's own space.

How we spend our time and what we surround ourselves with ultimately impacts our lives in either a positive or negative fashion. By surrounding ourselves with nature we are giving our brain and therefore our body a chance to rest and rejuvenate. The things we smell taste touch see and hear, can affect the chemical balances in our brain. Which in turn can create or reduce, stress, anxiety, and depression.

PURPOSE

The goal of this paper is to show that by using nature in residential design we can lower the amount of stress, thereby, reducing anxiety and depression. To achieve mental health through interior design a multitude of previous research in the way nature affects us has been studied and cited. The belief is that by utilizing these previous design ideas used in hospitals, and office structures, in residential design we can positively affect mental health where health starts; the home. The very definition of nature according to dictionary.com is "the phenomena of the physical world collectively, including plants, animals, the landscape and products of the earth, as opposed to human creations," (Merriam-Webster's collegiate dictionary, 1999). This would then include, daylight, stone, wood, cotton, wool, brick, clay, leather, seagrass, and much more that comes from the earth that was once living and not man made. Another term that may be used is Organic, which is a product of nature that was once living. Unlike natural, nature-like or naturalistic encompasses the man-made products that imitate nature, such as vinyl flooring made to look like real wood, faux fur, and synthetic stone are just a few examples.

CHAPTER II.

LITERATURE REVIEW

Home, Security/Warmth

Home is more than a place to sleep, or a momentary escape from the pressures of a fast-paced work life. The dictionary describes the noun home as “the place where one lives permanently, especially as a member of a family or household,” (Merriam-Webster's collegiate dictionary, 1999). This definition does not work, however, for the ancient mobile wanderers that followed the herds as they migrated, nor does it truly fit our modern society where we have the opportunity to constantly move.

So how do we define home? “In traditional Western culture, home is often regarded as a specific dwelling or building where we reside and one we travel away from with the intention of returning. To most of us the ideal home symbolizes stability, security and safety,” (Kopec, 2015, p.175). When most people think of home they think of family, comfort, intimacy, a place to relax, to rest, a place that is warm and protected. Home is, privacy, security, complete control of oneself and one's surroundings, allowing a person to be themselves with a lack of fear and danger.

For most people, the meaning of home is analogues with its ability to satisfy their needs at a functional level. Primary spaces are communal or common areas where most of a resident's communication and social interaction take place (e.g., living and dining rooms). Secondary spaces, also communal, are where communication and social interaction migrate to and from (e.g., kitchens, porches). Tertiary space are private or personal areas (e.g., bathrooms, bedrooms) where a resident generally goes to be alone. (Kopec, 2015, p.180).

Many of us see security as the highest priority. If we do not feel safe our brain releases epinephrine, jumping to a state of fight or flight, making a space uncomfortable and ultimately not some place we want to stay. “One's belief that he/she is not safe can lead to stress-related illness, including sleep deprivation, elevated heart rate, and other similar reactions,” (Kopec, 2015, p.7). To feel at home, we have to feel secure and safe, like the initial feeling we have as children in our parents' arms. In practical terms this means doors that lock, security systems, windows that cannot easily be broken, proper outside lighting,

and landscaping that works as a detriment to invasion.

Security goes hand in hand with privacy. “There are many different interpretations of privacy because of people’s needs to regulate their access to others; and their abilities to express those needs are influenced by their culture, personalities, gender, experiences and stage of life,” (Kopec, 2015, p.82). When you are at home you can choose, or control, who enters your space and who does not and how your space is used. You can be free to do as you please, act as you want, say what you think, all because it is your own space; your home.

Control also plays a part in whether or not we feel at home. If we cannot control who enters our home is it really ours? “Personal control within an environment relates to both our freedom of action and the level and type of stimulation to which we are subjected; moreover, our actual or perceived influence or control over our environments directly affects our feelings within and about it,” (Kopec, 2015, p.22). When we are younger in a family unit we are at home but there are rules to follow and we do not have a complete sense of control. Living in an apartment you sign a lease stating what you can and cannot do in that space; no burning candles, no holes in the wall, no painting, etc. You also in that case have no control over those adjoining walls and your neighbor that plays their music loud at one in the morning, breaking the rules and infringing on your comfort and freedom. Some people, to feel completely at home, need to have absolute control of that space or at the very least know they get a say in what and how things are done.

Through self-expression and personalization, the home thus comes to resemble and represent who we are. Provide us with a sense of connection to other people, our past, and our futures; provide both physical and symbolic warmth and safety; and be physically suitable for our physical and psychological health. (Kopec, 2015, p.182)

Home is an extension of who we are. It is the only place that we have the freedom to be unequivocally ourselves and represent who we are. “Even in our modern, highly mobile age, humans covet places where they feel particularly attached, connected, and at home. These settings contribute to feelings of familiarity, comfort, and allegiance.” (Kellert, 2018, p.104). The only way that we can really relax and be comfortable is ‘at home, where we can be ourselves.’ Home is the one place we can release all inhibitions and escape a world where we are expected to act, look, speak, and be a certain way.

Summary of what makes a home:

- Ability to control the space
- Feeling of safety and security
- Ability to personalize space, project self-expression

Effects of Nature

In this modern day of technology, with the majority of Americans living in cities, our connection to nature has decreased while our likelihood of having anxiety, depression and disorders such as ADHD have drastically increased. We are constantly connected to our phones, computers and other electronic devices; we are constantly in demand. In Selhub & Logan's *Your Brain on Nature* (2012), as well as in Florence Williams *The Nature Fix* (2017), they discuss how the demands of the modern world and our current throw away culture is causing constant stress, leading to higher rates of anxiety and depression. Our lack of connection with nature also comes into question and how disconnecting from the tech world and submerging ourselves in nature has positive and restoring affects. Many of us remember the days when our parents told us to go outside and play, but today it seems screen time with technology has taken over at work, at school and at home. We spend more time indoors on electronics than time outside getting in touch with nature and exercising. "Less contact with nature, particularly in one's young years, appears to remove a layer of protection against psychological stress and opportunity for cognitive rejuvenation," (Selhub & Logan, 2012, p.3).

Recent studies by Qing Li, in the effects of Forest Bathing (2010), have shown that being in nature, seeing, hearing and smelling nature, has a profound effect on our neurological system. It can relieve stress, reduce anxiety, and alleviate depression by helping our bodies natural chemical process. The further we advance and remove ourselves from our natural surrounding the higher our stress levels, anxiety and depression become. As we immerse ourselves in nature our brains have a chance to reset, which also balances the chemicals in our bodies, giving us a better chance to alleviate stressors.

The practice of biophilia, although only recently named, has been in practice the world over for as long as written history exists. Using images and shapes of plants and animals, having open window concepts in buildings, reusing furniture and growing things in

doors are all a part of Biophilia. “Biophilic design is based on the Biophilia hypothesis, which proposes that humans have an innate connection with the natural world and that exposure to the natural world is therefore important for human wellbeing,” (Gillis, Gatersleben, 2015, p.1). A recent publication by Stephen R Kellert, *Nature by Design*, outlines biophilia in a down to earth and easily readable way. He lists the eight biophilic values: affection, attraction, aversion, control, exploration, intellect, symbolism and spirituality. All impacting human health and wellbeing. We all have ingrained biological responses to the world around us. Evolution and adaptation have put us at the top of the food chain and yet we have somehow disconnected ourselves from what made us who we are. Our growth in nature is what has programmed our brain and the reactions it has to certain stimuli. In using nature in design, we have the opportunity to reconnect and reactivate dormant parts of us. We weren’t meant to live in cages, but that is what society has become.

Kaplan’s *Nature at the Doorstep* (1985) is a study based on residential satisfaction and the natural environment that is nearby. The study focused on cluster housing, containing multiple families, that has similar features including parking lots and open spaces. The first question was to define natural space and how people related to it. Once that was defined it was asked how that affected people’s lives. Then finally what effect would this have on residential satisfaction. Residents were given a self-administered questionnaire packet. Of the 810 packets distributed 268 were used in the data analysis. Most of the residents that responded were in their 20’s and 60% were women. Children were present in 30% of the households. The average resident had an income below \$16,000 per year and only 12% made over \$24,000. The questionnaire had a mix of images and questions rated on scales 1-3 or 1-5. It focused on natural areas and proximity, neighborhood satisfaction, family size, community and nature. Residents with views of trees were the most satisfied, while those with views of parking lots and powerlines were the most dissatisfied. Those with access to growing spaces were more satisfied with their sense of community. The conclusion of the study however was that the arrangement of the space is likely more important than the size of that space when it comes to satisfaction. Results also show a desire for growing spaces in link with community satisfaction.

Summary of the Importance of Nature:

- Immersion in nature lowers blood pressure, cortisol levels, stress, and subsequently anxiety and depression
- Promotes cognitive restoration
- Seeing, hearing and smelling nature has a positive lasting effect on the neurological system
- Green spaces with trees lead to improved satisfaction

Incorporating green space into residential interior design combines the home, the safe-haven away from the tech ridden world, and natural aspects to guide us to better psychological health. When we have the opportunity to start the day, from home, with a better mental state, it can have a huge impact on how we live out the rest of our day, and ultimately our lives. “Access to green space has proven to alleviate anxiety and stress, while improving psychological function,” (Kopec, 2015, p.261). Immersion in nature gives the brain an opportunity to rest, lowering cortisol levels, decreasing blood pressure, and ultimately releasing stress that will build up to symptoms of anxiety and depression.

Natural Light

Without light there is no life. In almost every culture around the world spirituality and religion has reflected the sun as an integral part of life. In 2003 the COPE, the National Research Council of Canada, did a study on the *Satisfaction with Lighting in Open-plan Offices*. It discusses the effects of light on our general wellbeing, from the way we communicate, to our daily comfort including vision, safety and health and how the lighting we use in built spaces must meet all of these needs to create a unified environment. Humans are diurnal animals; we thrive in the day. “When people lack the actual sight of nature – for example, when confined to a windowless space, a barren landscape or a featureless setting – they often experience confusion and anxiety,” (Kellert, 2018, p26). We need light to maintain healthy rhythms and mental states. “The interaction between environmental light and the light-sensitive cells in the retina is far-reaching and can ultimately influence sleep, alertness, mood, and cognitive performance,” (Selhub & Logan, 2012, p.89).

Circadian rhythms can influence sleep-wake cycles, hormone release, eating habits and digestion, body temperature, and other important bodily functions. Biological

clocks that run fast or slow can result in disrupted or abnormal circadian rhythms. Irregular rhythms have been linked to various chronic health conditions, such as sleep disorders, obesity, diabetes, depression, bipolar disorder, and seasonal affective disorder (National Institute of General Medical Sciences, 2017, para 6).

When we deal with symptoms of Seasonal Affective Disorder (SAD), doctors often prescribe light therapy. Also, “light therapy (1,000 lux) in the morning can improve cognitive functioning, alertness, subjective happiness, low-grade anxiety, and subsequent sleep in otherwise healthy adults,” (Selhub & Logan, 2012, p.93). “There is evidence that morning sunlight is twice as effective as evening light when treating some forms of depression such as SAD, (Lewy et al., 1998, p. 894).”

Light plays such a large role in our lives. Not just the natural light through windows, but all of the synthetic light around us. Our phones, TVs, lamps, basically every electronic device that emits light, is affecting our daily cycle and how we produce chemicals in our body. “Exposure to light from mobile devices during the night may alter circadian rhythms and sleep-wake cycles,” (National Institute of General Medical Sciences, 2017, para 7). “A prevailing amount of sunlight affects brain serotonergic activity, and thus underlies mood seasonality and seasonal affective disorder,” (Lambert, Reid, Kay, Jennings & Esler, 2003, p. 1842).

In interior design we can control daylight and synthetic lighting through window sizing, placement, shape, quantity, lamp type and placement of synthetic lights. “In contrast to our floodlit nights, we spend our daytime hours in environments that are often devoid of adequate natural light,” (Selhub & Logan, 2012, p.90). With advances in full-spectrum and enhancements in ultraviolet lighting we have the opportunity to mimic the health benefits of natural light during the day and using proper window shading to eliminate light overflow at night.

Daylight alone seems to be a powerful and underutilized natural resource to heal symptoms of depression and anxiety. “Recent investigations have reported that light therapy is valuable in relieving other forms of depression, eating disorders, and anxiety,” (Selhub & Logan, 2012, p.92-93). “Both sunlight and artificial indoor lighting are bright enough to prevent the release of melatonin and promote insomnia. When daylight or artificial light is inadequate, the natural suppression of melatonin production fails to occur,” (Kopec, 2015,

p.43).

Although there have been major advances in artificial lighting, “we cannot overlook the simple adjustment that requires no electricity; leveraging the value of simple windows,” (Selhub & Logan, 2012, p.95). In design we need to pay attention to direction of light, where the sun rises, sets, where it is the brightest or lightest. Then in adding windows in appropriate sizing with adequate shading we can have a massive effect on people's' daily cycles.

When the exposure to natural light is impeded by, for example, a windowless space, artificial lighting, or the condition of constant light, people often suffer problems related to health, performance and wellbeing. –Design strategies capable of bringing natural light into interior spaces often involve glass walls, clerestories, skylights, atria, reflective colors, and materials, and mirrors that track the path of the sunlight and reflect it into interior areas, (Kellert, 2018, p.28).

Summary of Biophilic Design Strategies for Natural Light:

- Light effects visibility, activity, communication, mood and comfort
- Lighting effects health and safety
- We need light to maintain healthy rhythms in the body
 - Irregular rhythms have been linked to various chronic illness
- Sunlight directly affects the production of mood regulating brain chemicals
 - Lack of proper lighting decreases levels of serotonin and norepinephrine
- Light therapy is beneficial in treating depression.
 - Morning sunlight is twice as effective as evening sunlight in effectiveness towards depression or Seasonal Affective Disorder.

Vistas

Windows provide us access not only to natural light that benefits our mental health but also allows us a view into the natural or cultivated natural world that also improves our mental state. “As exciting, cutting-edge studies confirm that viewing nature scenes can put a damper on the raging fires of stress physiology, research has also shown that access to greenspace provides a much-needed buffer against stress,” (Selhub & Logan, 2012, p.24).

Vistas are the views we see through our windows. Ulrich, R. S. (1984), View

Through a Window, studies have shown that nature settings promote recovery at a higher rate. Between 1972 & 1981 a study was conducted with surgical patients who recently had undergone similar gall bladder surgeries. The study was restricted to the second and third floors of a hospital building. One side had a view out to nature, and the other side had a view of a brick wall. The rooms all held two patients and were nearly identical in terms of dimensions and a single window and furniture arrangement. Beds were placed with an unobstructed view of the window. “In comparison with the wall-view group, the patients with the tree view had shorter postoperative hospital stays, had fewer negative evaluative comments from nurses, took fewer moderate and strong analgesic doses, and had slightly lower scores for minor postsurgical complications,” (Ulrich, 1984, para 12).

In 2007 Shin did a similar study showing that people in offices with windows had a more positive outlook. People who had more active jobs were less likely to notice the lack of a window. Also, if the view from the window included trees or forest it was even more beneficial. Both studies show the importance of a view to the outside world. We were not made to be kept in boxes or cages; sitting in a windowless room deafens our senses of the passage of time, blocks our access to natural light and creates an underlying sense of panic as we cannot see the joys or stressors of the world. We are more able to handle a threat if we can see it.

In cities especially, natural views are blocked by high rise buildings, motor ways and industrial areas. In cases where the view from a window cannot be changed it becomes even more important for the interior to represent the natural view that is missing. “Those with only 10 percent greenspace within one kilometer (0.6miles) has a 25 percent greater risk of depression and 30 percent greater risk of anxiety disorders verses those at the upper end of greenspace near home,” (Selhub, Logan, 2012, p.26). We need to experience nature to survive and be healthy; fresh air and light are especially essential to our wellbeing.

Biophilic Design Strategies for Vistas:

- Scenes with significant amounts of vegetation (regardless of rural or urban setting) is associated with lower reported anger levels,
- Higher amounts of nature from apartment-building windows is linked to greater scores of self-control (lower impulsivity) and

- Grater vegetation through windows had a big impact on girls (average age of 9): they were more willing to put off short-term rewards for longer-term benefit, performed better on tasks of concentration, and had higher scores of impulse inhibition. (Selhub, Logan, 2012, p.74)

Plants

As much as we have cultivated ourselves to live in a box we evolved in nature, therefore, it is perfectly natural to assume that nature would be calming to our minds. In the beginning of Kellert's book he talks about the close ties of human evolution and nature. Evolving in nature our brains respond to natural stimuli differently than mechanical stimuli. In several studies it has been shown that even through the introduction of nature images or additional trees in an urban setting that it can have a calming effect. "Plants are probably the most frequently employed strategy for creating direct contact between people and nature in the built environment," (Kellert, 2018, p.33). Bringing more greenery indoors can boost attention and productivity just by giving the brain a break and a different place to focus for a moment. It reduces sick leave by cleaning out the chemicals, and people just work better when they are in a better mood.

Studies by Shin (2007) and Ulrich (1984), suggest that greenery distracts patients from their pain; moreover, a bland and careless design can draw their attention to it. The interesting thing is that color in this regard may play into it as flowers in bloom have a greater effect than just a green plant. Last but not least, plants work as a noise buffer. In a noisy office or a noisy neighborhood, plants can help reduce ambient noise by reflecting, absorbing and or refracting it. Healthline suggests one potted plant for every one hundred square feet, while an article in Health and Home suggests a minimum of three plants to a space. It does make a difference what plant is used in a space and the purpose of the plant. Potted plants in offices have been found to increase productivity, and reduce stress

Overall, plants are a great thing to incorporate into design. "Plants may come to the rescue, acting as a sort of vacuum cleaner for the air," (Selhub, Logan, 2012, p.87). They can clean the air, reduce dust, nurture compassion, lower stress levels and alleviate depression and anxiety. Plants can also help boost your wellbeing, optimism and sense of stability, because you have something to care for. "Effective biophilic design of interior plants should

avoid creating contrived and artificial occurrences such as isolated planters consisting of mainly exotic vegetation, (Kellert, 2018, p.35-36). We evolved in nature and now we spend eighty percent of our lives in doors. “The need to reaffirm our link with nature and to be surrounded with living plants is fundamental,” (Yakeley, 2010, p.4).

Biophilic Design Strategies for Plants:

- Plants and nature views have a calming effect
- Indoor greenery can boost productivity and attention
- Plants clean the air of chemicals and reduce dust
- One potted plant for every 100 sq ft is needed to be beneficial
- Greenery (plants) can distract from pain
- Plants create a natural noise barrier
- Caring for plants boosts compassion, lowers stress, and alleviates depression and anxiety

Smell

Recently there has been an upsurge of interest in aromatherapy. Many people use natural oils in their homes and on their bodies to produce specific responses. “Large reviews of existing aromatherapy data show that in randomized controlled studies on anxiety and depression, subjects reported a meaningful reduction in symptoms, and the aromatherapy was safe and well tolerated,” (Selhub & Logan, 2012, p.84). The most well-known smells are scents like jasmine, chamomile, and lavender for sleep; citrus smells for invigoration; and patchouli and cypress for anxiety and depression. It only takes a small amount of scent to make a large impact.

Experimental studies in Japan on forest bathing have shown that phytoncide a chemical produced by trees can lower the production of stress, reduce anxiety and depression, (Li, 2010). Home designers can use an oil diffuser to replicate the experience of a walk in the woods. Diffusers come in all sizes and styles to meet various needs. You can plug them into your computer, car jack, the wall or light a candle for scent and ambiance. However, I would caution against the use of candles and incense as those also add toxins to the air while burning.

In the book *Your Brain on Nature*, it is discussed in great detail the toxins that are released from everyday objects. Indoor pollutants caused by off gassing can have distinct negative effects on the immune system, causing long term and lasting health issues. Most chemically altered materials emit chemical in gas form into the atmosphere. It is in this case even more important to use natural resources when possible and make sure that your home has proper ventilation.

Adding air pollutants to cover up smell is not the answer. Every chemical we put into the air we are also putting into our lungs, so it is imperative to be cautious and use products as directed. Using plants in a home is a natural filter to the toxins produced in household products. There are also air purifiers that you can plug in that produce negative ions balancing the air in the environment. According to allergists smells are not allergens, but irritants; trial and error is the only way to find what works for you.

Summary of Biophilic Design Strategies for Smell:

- Aromatherapy can positively impact anxiety and depression
- Only small amounts of scent are needed for positive results
- Natural and synthetic chemicals can impact the brain
- Airborne pollutants have been linked to anxiety, depression, autism, aggression, irritability, pain, fatigue and cognitive decline

Sound

Smells are not the only thing that can pollute the atmosphere. Sound can be considered a particularly annoying pollutant that can affect our stress levels and sleep patterns. Noise has been considered one of the most stressful of stimuli. While the presence of noise-producing machines in a home environment can contribute to stress, anxiety, and insomnia, integrating natural sounds into one's home design can counteract those negative effects (Selhub & Logan, 2012). The natural sound of waves, rain, light wind, bird song, and distant thunder have all been shown to have a positive impact on stress. The sounds of traffic, construction, other people, etc.... have been shown to rapidly increase stress. "A more rapid normalization of physiological markers occurred when the background noise involved nature sounds. In addition, researchers have determined that listening to recorded bird sounds early

in the morning can lift mood and decrease fatigue,” (Selhub & Logan, 2012, p.103). Natural noise pollution dampeners are water fountains, wind, nature recordings or landscaping can be used to filter out unwanted sound. Insulation is a great noise blocker when used properly. Designers who prefer natural insulation can use hemp products or recycled cotton. Most designers agree that using trees in landscaping to reduce city noise is very beneficial.

Summary of Biophilic Design Strategies for Noise/Sound:

- Noise is one of the most stressful stimuli and can produce stress hormones
- Noise can affect stress levels and sleep patterns, which in turn affect anxiety and depression
- Nature sounds can positively impact the mind
 - Such as: waves, rain, bird song, light wind, distant thunder
- Bird song early in the morning can lift mood and decrease fatigue

Colors, Textures and Finishes

Because our surroundings have such a huge impact on how we feel it is important to pay attention to detail as well as making sure the finish product represents the person occupying the space. Depending on the space we are in also makes a difference on how we treat and design a space. We need human contact to feel good about ourselves and this needs to also be considered in design. According to Williams (2017), science has shown that music, friends, and cultural events are good for our mental health. We need to feel secure, have our own space and a sense of personal identity. This is represented by the exterior and especially the interior of our homes. Each individual part has a role to play; we cannot focus on only one aspect of design.

Most importantly for interior design we focus on the colors, visual and literal textures, and the finishes of a home. Through art, materials, color palettes, choices of wood, stone or natural fibers we impact how people feel. Here are some of the best ways to infuse a home with nature, without going overboard.

To start, as primarily visual creatures, “Images of nature are an ancient means for bringing the likeness of the natural world into the built environment. – Images of plants, animals, water, landscapes, and geological features continue to be common forms of contact

between people and nature in the built environment,” (Kellert, 2018, p.52). Images with some form of water in it seem to have the best psychological effect. Research has also shown that abstract art can have negative effects on health and healing.

Roger Ulrich's (1984) findings indicate that psychologically appropriate artwork, such as nature scenes (especially those of water and trees), can also positively affect patient outcomes in an acute care setting by reducing blood pressure, anxiety, intake of pain medication, length of patients' hospital stays (Friedrich, 1999), and sadness and depression. (as cited in Kopec, 2015, p.262).

Natural materials have a heavy impact on how we feel and interpret our space. “Natural materials possess visual and tactile qualities that few if any artificial materials can replicate,” (Kellert, 2018, p.60). Use materials such as cotton, wool, linen, wood, and stone. “Natural materials reveal the properties of maturation, aging and change in adaptive response to the challenges of survival over time. By contrast, artificial materials often lack dynamic features; instead they seem fixed in lifeless space and time,” (Kellert, 2018, p.62) These materials also are what creates visual and physical texture through the items themselves or strategic placement. Texture can also refer to light, sound and color. Most people prefer natural finishes and textures to synthetic because it triggers instinctual parts of our brain.

Nature has some very distinct and prominent colors. Earth tones, such as green, blue, light browns and off whites, help us feel safe, comfortable and calm when used in our homes. “The theory of ecological color valence suggests that people generally prefer natural colors that have proven advantageously appealing to humans over time,” (Kellert, 2018, p.72). This does not mean to limit yourself to only this palate; as stated before it is about self-representation and expression. Another aspect of color often overlooked is hue and saturation. Basically, if a color is too dark or in some cases too light it will impact how light is reflected around a space, ultimately affecting how you feel and even how you view other colors in that space.

For us to feel comfortable and safe in our home environment we must also feel that the space represents us. “Personalization often reflects self-identity; the manner in which people decorate their homes reflects their realistic or idealized self-images,” (Kopec, 2015, p.178). It is a space that we invite people into and a representation to the world of who we are. “We form attachments to places that not only define or express who we are (i.e., support

our self-images) or who we want to be seen as, but also give us a sense of belonging, freedom or both (i.e. provide psychological security) ,” (Kopec, 2015, p.178). We use textures, colors and finishes to personalize a home, giving it flair and using symbols that represent us.

Summary of Biophilic Design Strategies for Color, Textures & Finishes:

- Use natural colors such as light blues, greens and brown
- Use natural materials such as wood, linen, wool, cotton, stone, metal
- Make sure items used represent the main occupant of the space

CHAPTER III.

DISCUSSION

When I first started writing I was thinking of how-to bring nature indoors. “Outside in” is the concept I came up with and quickly found that I was not the first to use the phrase to describe using nature for health benefits. It seems to often be made fun of when the full concept is misunderstood.

At the time I had never heard of the practice of biophilia, or of biophilic design. Even through most of my research, dating back to the 80’s and 90’s, this term did not come up. It seems the reason why is that Biophilia is a somewhat modern term for designing with nature for better human health, and even though humans have unwittingly practiced this for some time, we have fallen away from our connection to nature. The idea behind biophilia is that humans as animals adapted and evolved in nature and therefore it only makes sense that a maintained connection is necessary for our continued wellbeing.

Many studies have been done on the subject of biophilic design or ‘using nature in design’ to create a more healthful environment and beneficial outcomes. However, most of these studies have focused on hospitals, office setting and school environments. While it is important to have a connection to nature wherever we are and anything to improve health is beneficial, the home has mostly been ignored. The home is a refuge, a safe place to get away from the stress of the world, the place that represents us as a personal reflection to the world, and it only makes sense that mental health starts there.

One of the most important aspects as we move forward is remembering that the home is usually a representation of self. Therefore, it is important to do what is comfortable and feels right. “Those seeking to apply strategies for practicing biophilic design should avoid the temptation of a “one size fits all” mentality involving a crude and relatively mindless checklist approach,” (Kellert, 2018, p.23). In the design world we can only give suggestions based on our knowledge but what it inevitably comes down to is the primary person occupying the space. When you include nature in the design of your home through color, texture, finishes or natural aesthetics keep in mind; does this feel good or right to me? If the answer is no, then it is likely going to get in the way of the ultimate goal of better psychological health.

Although biophilia is only recently recognized as a practice it has been used throughout time. The ancient Egyptians decorated with palm fronds and the Greeks decorated with acanthus leaves on the Corinthian columns on important buildings and temples. Mesopotamian interiors often included animals and geometric shapes inviting nature into a space. As technology has gained prevalence, we have begun to lose our connection to nature, causing increases in stress, and therefore anxiety and depression. An easily understandable description of biophilia is using nature in design for human health. Our focus here is how using biophilia in the home can improve stress levels thereby lessening anxiety and depression. The reason it is important to focus on the home is the home is where our day starts and ends, it is also where we feel safe and in control. Home is our safe haven, a place to be unquestionably truest selves.

Creating a biophilic interior is simpler and more cost effective than it might seem. Four creative purposes imagine an empty space. Choose a space that you feel comfortable in that you can dedicate to your personal wellbeing. The best space would be well lit with natural light with east and or south facing windows. The most effective time to absorb sunlight is in the morning. If you can spend fifteen minutes in a room with east facing windows this is ideal. If you cannot create a space with east facing windows, south is second best. If neither is available, daylight LED lights and specifically a sun lamp is necessary.

It would be optimal if the view from the window could be forest, however most of us do not have that much control on the view from our window. Other beneficial views could be the ocean, a garden, or bird sanctuary. If none of this is possible you can add artificial views in your space by adding photography and art work. Stay away from abstract art and somber people. Instead find natural images that make you happy or happy smiling people. Images with water in them seem to have the most beneficial responses.

Next is the color of the room. Earth tones are best. You can either paint with earth tones, use them as accents with neutral walls or do a combination. Earth tones are considered naturally occurring tones such as light blues, greens, purples, browns and off white. Be careful with the saturation of the color, too dark and it defeats the positive effects of natural light. Above all, choose a color palette that makes you feel good. You can also add more color as you add items in the room. Stay away from black, gray, red, and unnatural colors.

Materials in the room should be organic whenever possible. Not only does this

remind of us our connection to nature but also cuts down on the amount of off gassing from unnatural products. Organic materials are things that were once living such as: cotton, wool, leather, wood, linen, hemp, stone, and metal. These materials can be used on window treatments, flooring, furniture or as random bits of décor. Use furniture that is comfortable and comforting. Adding floral prints and fractal shapes also bring in a bit of nature. Accent with darker greens and floral tones.

After you bring in the furniture and finishes, it is time to think about plants. Plants help create oxygen, clean the toxins from the air. Caring for plants gives people a sense of purpose releasing anxiety and depression while having other living things in a space eases stress. One plant is not enough and ten could be too many. Start with three to create rhythm and harmony. Once again this comes down to what you think is comfortable and maintainable for the person occupying the space. Some plants to consider are aloe vera, it produces the most amount of oxygen, spider plants, snake plant, lavender, or orchids. You can find lists all over the internet for best purifiers, anxiety reducing and sleep improving plants.

A well-insulated space is great for warmth as well as blocking out unwanted sounds. If insulation is not an immediate solution, add a white noise machine, listen to bird song or nature sounds. Sound canceling headphones are also an easy way to cut out the noise. Window treatments can also cut down on outside noise caused by human mechanics, or unnatural noises. Also, the softer surfaces the more it will cut down on reverberation.

Smells are not just an irritant but can make a profound difference in a space even if we do not strongly perceive the scent and what we are breathing in. Off gassing is when chemicals leach into the air from natural or synthetic products. Things like carpet treatment, varnishes, or natural gasses from digging into the earth. Plants go a long way to resolving this issue as well as not using synthetic materials. You can also add certain smells to promote relaxation, cognitive function, sleep etc. Burning candles puts more toxins into the air as they burn as does incense; if you can, use an oil diffuser. Some scents that help relieve stress, anxiety and depression are cypress, Jasmin, lavender, geranium, patchouli and many more. Find a scent that works for you. Much like perfume if you can smell it constantly, it is too much.

Above all, do what works for you, makes you feel comfortable and calm. Create at least one space that is just about letting the rest of the world go. You can use these tricks

throughout your home and for a complete biophilic experience for your wellbeing.

CHAPTER IV.

CREATIVE COMPONENT

On this journey of biophilia, I explored varying research on how to include nature in design and the effects it has on the human body and brain. I decided to venture out into nature to explore shapes, light, balance, harmony, and repetition how it occurred in nature. I rented a macro lens for my digital camera and really focused on detail. The two locations of the shoots were the rose garden at the Des Moines Art Museum and the Botanical Center in Des Moines, to pretend it was a sunny day.

I then shared the resulting images with friends and photographers without premise to gauge their initial response. Based on their comments I selected a photo that people kept thinking was corrugated metal but was actually a large palm leaf. I then traced the pattern of the leaf simplifying it to its basic geometry. I drew several sketches of furniture based on the simple yet complex design. In the end I decided to transfer this design to a door. Originally, I was making a 1” to 1’ model, but the wood veneer samples kept cracking at such small points.

I remembered that I had three doors hanging out in my garage. I chose three different paint colors in shades of green and had samples made. I measured the door and translated the original design to the full side door. I measured and marked everything out and then used painters’ tape to mark off areas and add layers of paint to create a beautiful geometric fan.

The point of my research however emphasizes that biophilia works best when multiple elements come together. In showcasing my door, I wanted to create a small space that used multiple aspects of biophilic design to create a stress free, relaxing environment that people could experience.

The door will be the focal point emphasized by framed photography from my exploration. It will be joined by the smell of cypress using an oil diffuser. The sounds of nature will be provided from a CD player (yes, they still make them). If a space with a window is not available, then a therapy lamp will be added. Comfortable and natural furniture will be added to suggest an interior space and represent natural materials. Frames

have been purchased second hand to represent the patina of time. Plants will be introduced for air quality as well as aesthetics. Small natural objects will also adorn the space as a reminder of being in nature.



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