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Nature Deficit Disorder and the Need for Environmental Education

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Nature Deficit Disorder and the Need for Environmental Education



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Abstract

With the rise of technology and industrial growth, people have increasingly lost personal contact with nature. This distance has led to mental and physical health problems for many people, notably children in the United States. This thesis explores the current disconnection between humans and the rest of the natural world. In particular, Richard Louv's 2005 book, *Last Child in the Woods*, has drawn attention to what he refers to as "nature-deficit disorder." This encompasses a variety of observed mental and physical problems which he greatly contributes to the increasing gap between people and nature. Instead of climbing a tree or swimming at the beach, children are more likely today to be found indoors playing virtual games or watching television. Arguably consequential of these recently developed preferences are physical problems including obesity, mental ailments including autism and depression, and social and behavioral difficulties. This thesis examines the relationship between nature and human development by exploring the relevant fields of history, psychology, and education. After establishing a direct correlation between human contact with nature and these disorders, steps can be made to alleviate this ongoing problem, especially among America's youth. With the integration of health science and environmental philosophy, public health and education should be reoriented towards nature. The government should mandate recreation time in order for children to form a personal connection with nature early in life (as pictured above from Nurture in Nature's website), and environmental education should be part of a regular curriculum in primary public schools. By fostering a relationship with nature during childhood, many of the psychical and mental symptoms can be alleviated and environmental stewards will be created.

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Introduction: No Child Left Inside

This thesis will thoroughly explore the personal and cultural symptoms of nature dissociation. The main behavioral disorders associated with this problem have been inclusively coined as “nature-deficit disorder” by American author and journalist, Richard Louv. The study of the psychological and physical repercussions of human disconnection from nature is an important discipline. Its development will be examined through a historical lens as well as a scientific one. It is vital for humanity’s sake that we address this subject because it can be fixed with collective concern and government intervention. The proposed solutions of environmentally undistruptive human activity and childhood environmental education can cure nature-deficit disorder in youth, and many of today’s consequent environmental problems.

As a main focus of this thesis, it is imperative to define the term “nature-deficit disorder,” (NDD) as explained by its inventor, Richard Louv. He writes, “I am not suggesting that this term represents an existing medical diagnosis...Nature-deficit disorder describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses” (Louv, *Last Child in the Woods* 34). Each of these is further explored in depth based on the research and studies that have been done by him and others. While NDD afflicts individuals, society at large is also affected. Louv explains, “The disorder can be detected in individuals, families, and communities. Nature deficit can even change human behavior in cities, which could ultimately affect their design, since long-standing studies show a relationship between the absence, or inaccessibility, of parks and open space with high crime rates, depression, and other urban maladies” (Louv, *Last Child in the Woods* 34). Widespread symptoms of nature-deficit disorder are damaging to our collective culture, as each generation becomes more geographically and emotionally disconnected from nature.

Today, many causes of nature-deficit disorder have been identified through observation and research. Some significant contributing factors, such as industrial development and technology-dependent lifestyles, are on the rise. Knowing this and the fact that many children and even adults are already victims of NDD, we need to begin to eliminate the known causes immediately. We can work towards this through examination, analysis, and evaluation of our current situation, and use the knowledge to make improvements for a healthier future. Through strategic planning and social intervention, we can alleviate the current symptoms and prevent future cases of NDD. The expert, Louv, claims that “Nature-deficit disorder can be recognized and reversed, individually and culturally” (Louv, *Last Child in the Woods* 34). If the general public can acknowledge that NDD and its symptoms are a real issue and is willing to make adjustments to our lifestyles and in our societal structure, then children and society at large can be helped. With the proposed necessary changes will come better mental and physical health for all, and a better future for the natural environment.

The purpose of this thesis and the final recommendations that it makes are in line with those of the About the No Child Left Inside® Coalition (NCLI). The NCLI website explains that this national coalition is comprised of over 2000 groups collectively representing more than 50 million people. Since 2007, they have worked together to fight in favor of environmental education (EE). They have called upon the public and Congress alike to recognize the importance of EE and devote adequate resources to its widespread implementation. Specifically, the Coalition is currently working to support the legislation of the No Child Left Inside Act, which would amend the Elementary and Secondary Education Act (No Child Left Behind) to include environmental education for the first time. This act would provide additional financial support for the development of EE, especially to train the teachers and develop literacy plans for

individual states. This thesis agrees with NCLI's mission and every chapter works to support it with information from a variety of applicable disciplines.

Each chapter will identify and analyze a specific aspect of the problems associated with nature-deficit disorder. Chapter one will provide relevant quantitative data regarding NDD symptoms. Through numerical information, it will support the correlation between human behavior and typical NDD symptoms. It will show that there is a direct connection between people's relationship with nature and their mental and physical health. These data trends will lead into the second chapter, which examines humanity's historical shift from a nature-appreciating society to an anthropocentric one. It looks at the historical uses of nature as physical and mental therapy, and their place in society today. Further, it analyzes the collective general changes in the American lifestyle from the active, outdoorsy folk we once were to the sedentary people who prefer to build unnatural environments and reside indoors. The identification of these widespread changes set up the following chapters, which look at the specific effects of these social shifts. Chapter three delves into the various ways that nature affects the human mind. In particular, it evaluates the relationship between nature and a person's mental development, emotional health, and intellectual performance. While the brain is most impressionable as it forms during youth, this section focuses primarily on children. Following this topic is the related analysis of the physical effects that nature has on people. In general, spending time outside in a natural environment causes people to be more active, and less obese. This further reduces common complications of being sedentary and overweight. Additionally, nature has been known to expedite healing and recovery time. Having established the causes of a society plagued by NDD and the variety of benefits that would accompany the alleviation of it, the conclusion proposes realistic solutions for a healthier community and environment.

Chapter 1. Symptoms of Nature-deficit Disorder--Data and Trends

This chapter will explore the quantitative scientific data surrounding the case of nature-deficit disorder (NDD), citing and building on the research done and basis formed by Richard Louv in his book, *Last Child in the Woods: Saving Our Children from Nature-deficit Disorder*. In this work, he explicitly states that NDD is not to be mistaken for an existing medical diagnosis; rather, it identifies and explains the side effects of human alienation from nature. He specifically names “diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses” (Louv, *Last Child in the Woods* 34).” Using this framework, the research in this chapter highlights important statistical data about some of the specific psychological and physical symptoms of NDD. These include the mental ailments of depression, attention deficit/hyperactivity disorder, anxiety and autism, as well as the physical ailment of obesity and its consequent health complications. This data has been collected to show that the symptoms of NDD as outlined by Louv are trending in our society, making it imperative for us to make effective changes towards a healthier society.

One of the main symptoms of NDD identified by Louv and supported by others is Attention Deficit/Hyperactivity Disorder (ADHD). This neurobehavioral disorder makes it difficult for children to focus and learn in school, and can even prohibit the formation of healthy social relationships. Very common in America, ADHD affects “more than 2 million school-aged children. Recent statistics indicate that, among children aged 6 to 11 years, the incidence of ADHD is approximately 7%” (Kuo and Taylor). This disorder negatively impairs children’s learning abilities and makes it difficult for them to perform basic everyday tasks that require minimal attention. Another known effect of NDD is autism spectrum disorder (ASD), which is characterized by chronic difficulties with social communication and interactions, and limited,

repetitive behaviors and interests. To be diagnosed with ASD, these symptoms must be exhibited during children's early development, often by the time they are 2 years old. A 2014 government survey on ASD performed by the Centers for Disease Control and Prevention (CDC) found that the rate of ASD was higher than it was in past U.S. studies. When looking specifically at 8-year-olds across the country, the survey estimated that about 1 in 68 children have ASD (NIMH).

In addition to ADHD and ASD, anxiety and depression are NDD-related mental health ailments with a variety of symptoms that have the potential to be debilitating. Anxiety is considered to be a disorder when it is so excessive that the person irrationally dreads basic situations. Some examples of anxiety disorders include obsessive compulsive disorder, post-traumatic stress disorder, social phobia, specific phobia, and generalized anxiety disorder. The symptoms of these anxieties typically start during childhood or adolescence. The NIMH reveals that "A large, national survey of adolescent mental health reported that about 8 percent of teens ages 13-18 have an anxiety disorder, with symptoms commonly emerging around age 6. However, of these teens, only 18 percent received mental health care" (NIMH). On top of this, research by the NIMH claims that about 11 percent of adolescents suffer from a depressive disorder by the time they are 18 years old. As children get older, their risk for depression increases. Depression comes in many forms and hosts a variety of symptoms. For example, "According to the World Health Organization, major depressive disorder is the leading cause of disability among Americans age 15 to 44" (NIMH). With depression being so common and severe, society as a whole suffers. While symptoms may be difficult to identify, not every child is diagnosed properly or at all, meaning it is likely that even more children than those identified are suffering from a mental disorder that will carry over into their adult life.

While the mental disorders are threatening enough, there are also significant physical symptoms related to NDD, the most notable being obesity. Obesity clinically describes an excess of body fat, while “overweight” is characterized by an excess in weight for a specific height from fat, muscles, bone, water, or a combination of these. In 2012, the Centers for Disease Control and Prevention (CDC) found that over one third of children and adolescents classified as either obese or overweight. Further, the CDC has found that in the United States, “Childhood obesity has more than doubled in children and quadrupled in adolescents in the past 30 years” (CDC). Specifically, the percentage of obese children ages 6-11 years rose from 7% in 1980 to about 18% in 2012; and children ages 12-19 years increased from 5% to almost 21% during the same time. As obesity rises, so do its consequent health complications, including cardiovascular diseases, chronic respiratory diseases, and diabetes. These statistical studies show that obesity in American society is on the rise, and has significantly grown during the past 30 years. The current rate of obesity in young children is astounding and reflects a culture dominated by unhealthy behaviors. The CDC notes that obesity is affected by behavioral and environmental factors, some of which will be studied in the following chapter.

Chapter 2. De-Naturing America--A History

This chapter examines the transition of human society from coexisting with and appreciating nature to dominating and undervaluing it. Through a historical lens, it will focus on recent changes in American culture that have contributed to the exponential increase of NDD symptoms discussed in the previous chapter. Historically, humans have a strong, innate connection with nature. It provides all the necessary components to support life, including sustenance, clean air and water, habitation, as well as recreational and aesthetic services. Gradually over time, as industrialization and technology grew, so did the physical and emotional

distance between people and the natural environment. There was a significant spike of people leaving nature, beginning in the 1800s and continuing presently, that accompanied the industrial revolution and urbanization in America. As people left a life of agriculture on farms and migrated to cities, there was a correlated result of decreased personal experience with nature. Wendell Berry's book, *The Unsettling of America*, chronicles the post-World War II shift in the dispersion and lifestyle of Americans. Published in 1977, Berry was writing about the recent modern changes that occurred in the nation as the majority of people abandoned the farm land and culture for a more industrialized life in the city. He writes that, in general, the population's interested changed focus from the household to the automobile. The traditional, puritanical values of workmanship and thrift were abandoned. Replacing them was the "American dream" ideal of a life characterized by leisure, comfort, and entertainment (Berry).

As American infrastructure changed drastically during the 19th and 20th centuries, consequentially so did the lifestyles of the inhabitants. During the middle of the 20th century, millions of city-dwellers relocated to suburbia in order to chase the American dream characterized by a private home situated on a quarter-acre. Theoretically, this would provide people with a comfortable balance between city and rural life. Over time, however, as more people moved to suburbia and the population grew, space became less abundant and more crowded. This alteration was accompanied by a change in development. The newly dominant style could be identified by the "interchangeable shopping malls, faux nature design, rigid control by community covenants and associations" that now plagued towns all across the country (Louv, *Last Child* 25). A visible consequence of these new developments was less green space. Berry argues strongly in his writings that, with the new industrialization and more efficient production methods, good farming was lost and replaced by corporate agribusiness. He

considered wholesome farming to be a cultural necessity accompanied by family practice and spirituality. However, by 1977, and even more so today, impersonal agribusiness production has removed the American people from the land. Estranged from the environments they once worked with and inhabited, the American people suffered consequent loss of community, a lower standard of work ethic, and the degradation of nature. This is all accredited to the pursuit of efficiency in productivity and profits through means of new technologies (Berry).

Following urban crowding was a period of suburban sprawl, in which people sought out more living space. Accompanying the transition from urban dwelling to suburban residency, gradually American lifestyles have become more sedentary. Historically, “suburban living rose in popularity, from about 22% to about 50% of the population from 1950 to 2000” (Clayton 461). This has an effect because, “Suburban neighborhoods often require cars for individuals to get to necessities such as jobs and stores” (Clayton 461). Due to the lower density of buildings in the suburbs than in urban communities, suburban sprawl has been characterized by the widespread distribution of personal vehicles. It is documented that, “As of 2001, US households had more vehicles than drivers, with only 9.4% of households car-free” (Clayton 461). This increase in automobile and gasoline use has been detrimental to the environment as well as people’s physical health.

As people move farther from their jobs and frequented places, they spend more time sitting in their cars. “From 1950 to 2000, according to state data reported to the Federal Highway Administration, the daily vehicle miles traveled per person increased by 0.4 miles per year from about 8 to 27 miles per day” (Clayton 461). This is a significant increase that affects the way a person spends a decent amount of their time each day. “According to a second source, the National Household Transportation Survey, US adults spent about 55 minutes a day sitting in

a vehicle, which precludes healthier activity during that time and pollutes the air” (Clayton 461). The environments in which we live affect our customary activities, or lack thereof. With less time spent walking or bike riding as a means for transportation, people sit for longer and more frequent amounts of time in their vehicles. This trade-off means less physical activity in general, and contributes to a generally unhealthy lifestyle.

In addition to suburban sprawl’s byproduct of increased car usage during this time, occupations also made a general shift to less active positions. A study found that, “Between 1950 and 2000, sedentary occupations increased from 23.3% to about 42.0%, while physically active occupations decreased from 30% to 22.6%” (Clayton 461). Many more people today go to work and sit in a chair all day. This usually takes place at a desk with a computer screen in front of them. This lack of activity consumes most of their day, as many professionals with offices work full time schedules.

Culturally, personal hobbies also made a shift away from physical activity during recreation time outside of work. Between 1950 and 2000, “television ownership went from 10% to 98% of households, and household viewing times increased from under 5 to over 7.5 hours per day for those with sets, which entails more sedentary behavior and more household energy use” (Clayton 461). Even in their free time, the majority of people are not partaking in physical activity. Based on the statistics just mentioned, it seems that most Americans’ typical day is characterized by sitting in a car, then sitting at work for about 8 hours, back in the car, then sitting in front of a television for a few hours before retiring to bed. The national shifts in residential settings, automobile usage, occupational changes, and technological advances have led to a generally sedentary lifestyle for many Americans. While this directly affects the adults

who follow these cultural norms, this is also the example set for the many children who grow up in these households.

While most Americans have adopted these cultural changes in their personal lives, there are some communities that have not. One research study of “Old Order Amish adults, who are living the equivalent of a rural agricultural lifestyle from the late 1800s, found they walk on average 18,425 steps per day for men and 14,196 for women and have low rates (0% for men, 9% for women) of obesity” (Clayton 461). This modern-day community of people is generally more active than those that adhere to the modern changes made in living environments, occupations, and recreational hobbies related to technological advances. Their average daily steps can be contrasted to other studies, which show that “5,900-6,800 steps per day are about average for adults with more modern lifestyles,” concluding that “trends toward obesity are consistent with lifestyles of greater sedentariness” (Clayton 461). The identified cultural tendencies are directly affecting people’s lifestyles in a negative way. The national community at large is becoming less active and, therefore, less physically healthy.

Perhaps a direct result of the heavily developed regions in which most people reside is a common American conception that polarizes what is urban and what is natural. Many consider nature to be the isolated areas of parks, seashores, and preserved wilderness in remote areas that most people visit infrequently. By contrast, urban settings consist of a high concentration of commercial and residential buildings and extremely limited green space. This idea may be preventing our highly developed areas from incorporating more green spaces in developed, inhabited regions. This separation of industrial development and wildlife is making it more difficult for us to coexist in an environment abundant with nature, rather than live separately

from it. A noted consequence of this segregation is a “de-natured childhood” for America’s youth (Louv, *Last Child* 26).

Richard Louv begins his book, *Last Child in the Woods*, with a brief reminiscence of the past based on his childhood relationship with nature. Specifically, he contrasts the way children experience nature now with the way they did when he was a child just a few decades ago. He explains, “Today, kids are aware of the global threats to the environment – but their physical contact, their intimacy with nature, is fading” (Louv, *Last Child in the Woods* 1). As our intellectual learning of the natural world has increased, our personal connection to, and experiential knowledge of it, has decreased. He accredits this modern phenomenon to our social makeup. The social and cultural framework into which we are born significantly contributes to our personal development, including the way we feel towards specific things. We are often unaware of the effects our surroundings have on us because they are there from the beginning and we do not know differently when we are young. Louv observes, “Our institutions, urban/suburban design, and cultural attitudes unconsciously associate nature with doom – while disassociating the outdoors from joy and solitude” (Louv, *Last Child* 2). Through these unavoidable aspects of society, children are discouraged to have direct experiences with nature, he claims. Rather than lauding nature as a place of wonder and solace, it is portrayed as a place of the dangerous unknown.

As people relocated their minds and bodies from the farms and continued to heavily develop regions, the plentiful wilderness and natural areas gradually shrunk or disappeared. The concept of “wilderness” has widely been studied and philosophized. In *Wilderness and the American Mind* Roderick Nash discusses American connection with the wilderness, or natural land. It is something we are connected to, inherently and historically when we were initially an

agrarian society. It was our source of knowledge, worth, work, and health. Objectively, it is in our best interest to take care of it so that we may receive all of its benefits. The modern anthropocentric lifestyle, however, blinds us from this reality and misleads us to disregard the natural environment. As we have moved from the wilderness, this has become easier to do because it seems distant and irrelevant to our person lives. This is not the case, however, as we rely on ecosystem services to provide us with shelter, sustenance, and pleasure. Without a healthy wilderness, we cannot thrive or even survive. We must revert back to the days during which we appreciated and protected the wilderness (Nash). American society ought to take a step back from the over-industrialized, anthropocentric developments in which we live and recall our inherent relationship with nature.

The recurring concept of nature as scary prevents the youth from having or even wanting a relationship with it. Louv furthers his claim by explaining that “Well-meaning public-school systems, media, and parents are effectively scaring children straight out of the woods and fields” (Louv, *Last Child* 2). Nature as a treacherous place has become so engrained in many children’s young minds by these ubiquitous and influential aspects of society that they often do not even realize it. The notable effect, however, is that children are no longer compelled to enjoy the great outdoors, preventing them from receiving its vast benefits.

With this decreasing relationship between children and the natural environment, a multitude of negative impacts have been observed. Specifically, it has been noted to reduce children’s physiological and psychological senses. Louv writes, “At the very moment that the bond is breaking between the young and the natural world, a growing body of research links our mental, physical, and spiritual health directly to our association with nature – in positive ways” (Louv, *Last Child* 3). Given the increasing knowledge we are gaining about the relationship

between human development and nature, we should be careful not to depict the natural world in such a way that prevents children from experiencing it directly. This is doing harm to their potential, especially at critically young ages, when they are most susceptible to the types of societal influences already mentioned. We should reorient our collective illustration of nature to be a more accurate image of the vital and thoroughly beneficial wonderland that it needs to be recognized as. As we do this, we can learn from the past, as nature's various gifts have historically been utilized by different groups of people.

Chapter 3. Peace of Mind and Body--Nature's Gifts

This chapter explores the effects of natural environments versus those of manmade, or built, environments on human psychological development and physical wellbeing. It will contrast the positive impacts of the former with the negative associations of the latter through the lens of environmental psychology. This section of the thesis will specifically dive into the negative psychological developments of living in urban environments. This will be achieved with the support of the vast research that has been done on the positive mental benefits of living in a natural environment, or community with a greater supply of natural amenities. This will further be supported by the study of the decline of mental and behavioral health in America that accompanied the decline of exposure to nature. In supporting the phenomenon relating poor mental health with a lack of natural environment, we will take a close look at numerous studies of the positive impact of nature. Louv explains that "deficit is only one side of the coin. The other is natural abundance. By weighing the consequences of the disorder, we also can become more aware of how blessed our children can be – biologically, cognitively, and spiritually – through positive physical connection to nature" (Louv, *Last Child in the Woods* 34). Much research in this field is done by studying the positive effects of a child's experience with nature.

These findings are compared to the documented negative effects when a child's nature exposure is limited to draw valid conclusions about the connection to mental health.

The practice of using of nature for mental wellbeing is a historical practice. Natural landscapes and especially gardens have been used for therapy for ages. For example, "Over two thousand years ago, Chinese Taoists created gardens and greenhouses they believed to be beneficial for health" (Louv, *Last Child* 45). This idea became increasingly widespread over time: "By 1699, the book *English Gardener* advised the reader to spend 'spare time in the garden, either digging, setting out, or weeding; there is no better way to preserve your health'" (Louv, *Last Child* 45). Even during the 17th century, there was written word documenting the healthful benefits of interacting with nature. People knew simply from personal experience of working in a garden that it had immense benefits. Despite the lack of exhaustive research and scientific data backing up this theory, the mental and physical gifts people were experiencing were proof. While other cultures may have been more accepting of the idea connecting a person's health to nature than that in America, the nation did have its early leaders and believers in the field. "In America, mental health pioneer Dr. Benjamin Rush (a signer of the American Declaration of Independence), declared, "digging in the soil has a curative effect on the mentally ill'" (Louv, *Last Child* 45). Shortly after his lifetime, this practice was adopted institutionally when, "Beginning in the 1870s, the Quakers' Friends Hospital in Pennsylvania used acres of natural landscape and a greenhouse as part of its treatment of mental illness" (Louv, *Last Child* 45). Utilizing these practices on such a large scale is beneficial to the person, the system, and society at large.

The institutional implementation of nature work to cure mental illness grew in America during the mid-20th century. During World War II, for example, psychiatry pioneer Carl

Menninger began a horticulture therapy practice in the Veterans Administration Hospital System. Then, “In the 1950s, a wider movement emerged, one that recognized the therapeutic benefits of gardening for people with chronic illnesses” (Louv, *Last Child* 45). These practices became increasingly mainstream in modern American culture. Over time, as its effects became better known and more scientifically studied, nature therapy was welcomed as a legitimate branch of health care. With an increasing number of people growing interested in the medical benefits of nature, it became a popular subject of study for academics. Accredited public universities began recognizing nature therapy as an academic field when, “In 1955, Michigan State University awarded the first graduate degree in horticultural/occupational therapy. And in 1971, Kansas State University established the first horticulture therapy degree curriculum” (Louv, *Last Child* 45). Since then, the field has spread to many more schools and become widely favored and well-respected. With a growing number of people, from psychologists and scientists to environmentalists and educators, studying the links between human health and the natural world, there are increasing insights from which we can learn.

Today, the main field surrounding the link between mental health and the environment is called ecopsychology. This is an interdisciplinary study that gained traction in 1992 with Theodore Roszak’s book, *Voice of the Earth*. His writings argue that human inherent connection with the rest of the natural world, or biophilia, have been repressed by modern psychology, which separates a person’s internal world from their external environment. More recently, the idea of ecopsychology has extended to encompass “nature therapy, which asks not only what we do to the earth, but what the earth does for us – for our health” (Louv, *Last Child* 44). There is a special focus of environmental benefits on children. It has been observed that, “children’s emotional, intellectual, and values-related development, especially during middle childhood and

early adolescence, is greatly enhanced by varied, recurrent, and ongoing contact with relatively familiar natural settings and processes” (Kahn and Kellert 146). These specific mental effects on children have been studied and will be evaluated individually.

Emotional Benefits. The Diagnostic and Statistical Manual from the American Psychiatric Association contains over three hundred mental diseases. Some of these are related to separation anxiety, which occurs when a person experiences an abnormally high amount of anxiety when absent from home or close people. It is now argued, however, that separation from the natural world can be significantly damaging as well. Due to the relationship perceived between man and nature, many are calling for more in-depth studies and attention paid to the area of ecopsychology (Louv, *Last Child* 44). Separation from a natural environment can cause anxiety in humans because we inherently and naturally belong to it.

One of the key mental effects of the natural world is its impact on people’s emotional health. Living environments with a more natural landscape provide their inhabitants with multiple benefits. For example, “Green views from homes are associated with better attentional capacity and increased concentration, self-discipline, and impulse control (Clayton 124).” Another study found that “children with more nature near their home received lower ratings than peers with less nature near their home on measures of behavioral conduct disorders, anxiety, and depression” (Louv, *Last Child* 49). These mental health factors are valuable for people of all ages. Children especially, however, can benefit from these benefits as they are in their young impressionable stage of development. In a case examining the relationship between mental health and nature, “research revealed Michigan prison inmates whose cells faced a prison courtyard had 24 percent more illnesses than those whose cells had a view of farmland” (Louv, *Last Child* 46). Simply looking at nature has been proven in many studies to be therapeutic. In

this case, the natural view had significant effects on the minds of prisoners. However, this phenomenon is relevant for all people, and can be especially effective for children, who are also impacted by a wide variety of serious mental illnesses.

Another essential benefit of living by nature that a Cornell University study concluded is stress reduction, as they advise that “that nature in or around the home appears to be a significant factor in protecting the psychological well-being of children in rural areas” (Louv, *Last Child* 49). They conclude that living in or near a natural environment has the most effect on children with great amounts of stress by diminishing the stress levels. Another study found that “Natural areas help adolescents calm down and gain perspective after stressful events...Nature, as distinct from other restorative environments, affords reflection (Clayton 124).” In general, contact with the natural world, including landscapes as well as animals, reduces stress in people. Further, it has been observed to aid the repercussions of stressful or traumatic events. In this respect, nature provides a sort of therapy that can help people with day-to-day living, or even trying circumstances. This can be vital to the mental development of children because it teaches them how to cope with difficult events. Nature has this unique ability because it allows a person to reflect with its quietness and pureness. It is reassuring and mentally restorative in this way. As a stress alleviant, nature is immensely valuable because it can help in all aspects of life, including school, social behaviors, and general health.

Furthering the unique theme of reflection in nature is the idea that it helps a person to keep perspective. A twenty-year-old student discusses the impact of nature on her emotional health as she writes, “I really believe that there is something about nature – that when you are in it, it makes you realize that there are far larger things at work than yourself. This helps to put problems in perspective” (Louv, *Last Child* 50). While this is a personal and subjective

experience, many people agree with this sentiment. It is so easy to get lost in our day-to-day routines and personal lives. Actively acknowledging the larger, dynamic and infinitely complex existence of the natural world can help us to understand our own lives more accurately. We can reflect on the massiveness of the world, and know our relative place. This recognition of all else allows us to scale our problems more appropriately than we do when we forget to think about the miraculous world around us.

Intellectual Benefits. In addition to emotional health, exposure to nature has been observed to improve children's cognitive and learning abilities. One study analyzed the different landscapes of 101 high schools and, with other school characteristics controlled, found that "larger classroom windows, more views of nature and views of close vegetation were associated with higher test scores, graduation rates, and college attendance. Numerous other academic gains occur when natural settings are incorporated in schooling, using environment as an integrating context for learning" (Clayton 124). Scientific studies have shown, as described here, that proximity to a natural landscape affects academic performance. Children who attend school in more natural environments, with more exposure to the elements from the classroom via windows and outdoor learning time, excel in the classroom. Academically, they did significantly better when compared to children in schools in urban environments with little to no exposure to nature.

A common disorder affecting children's ability to perform well in school, and also some normal daily activities, is Attention Deficit Hyperactivity Disorder (ADHD). This distracts children from the task which they are to be focusing on, making it difficult to complete basic assignments. Natural environments may be able to alleviate symptoms of this disorder, as a study showed, "Among children diagnosed with attention deficit hyperactivity disorder

symptoms, Kuo and Faber Taylor (2004) found that parents reported that their children showed reduced symptoms after activities in natural settings as compared with indoor and built outdoor settings (Clayton 124).” Similar to its effects on stress, nature exposure has been observed to help reduce ADHD symptoms, making it easier for children to perform better in the classroom as well as routine activities outside of school. Many children are prescribed medicinal remedies for ADHD, which gradually have to be increased in dosage and often make it impossible for children to live without once they become dependent. If increased exposure to nature can alleviate symptoms organically, this should be done before medicine is prescribed, as it is better for the child mentally and physically.

During early childhood learning, a specific skill gained from nature is creativity. Studies show that “Creative play is greater among preschoolers with green play spaces. The opportunity to explore a relatively unstructured physical environment is important in developing a sense of direction as well as problem-solving abilities (Clayton 124).” By exploring natural outdoor surroundings, children see and learn new things, expanding their creativity. This adventure also helps children to navigate a non-uniform setting, as opposed to a structured manmade environment, or indoor setting. This is a valuable skill because life is full of unexpected circumstances and factors, and the sooner children learn how to react and creatively solve problems, the better off they will be.

Consistent with this idea, Louv describes nature as a place where children can find healing through their imagination. They use their imagination because nature allows room for utilizing all the senses in a way that urban or built settings do not leave room for. This space for creative thought is psychologically healthy because it lets children imagine the world as they perceive it, or think that it should be. This contemplation is beneficial to mental wellbeing in a

way comparable to dreaming. Louv writes, “In nature, a child finds freedom, fantasy, and privacy: a place distant from the adult world, a separate peace” (Louv, *Last Child* 7). Having this therapeutic time and space has been observed as a fundamental means for children to develop mentally.

The problem, however, is that in today’s modern world characterized by increasing technological advances, younger children spend more time with electronic devices than interacting in the real, natural world. Outdoor play time has largely been replaced with watching television, playing video games, or using a cell phone. The recently discovered negative effects, however, are profound. Experiments show us that, “Australian children in a town without TV spent more time playing and doing outdoor activities than in similar towns with TV. Experiments in reduced TV time also show that children increase their creative play activities and reading” (Kahn and Kellert 54-55). Even if children only play outside due to a lack of indoor options, they are still being more constructive. The outdoor alternative engages them in more creative and imaginative activity than does mindless television watching. In contemporary American technology-obsessed culture, it is particularly important to be aware of the changes in youthful preferences, and the long-term negative effects of these tendencies.

Despite the abundant studies showing that nature can alleviate mental health problems, children are being initially treated with prescription drugs at a young age and a high rate. For example, “A 2003 survey, published in the journal *Psychiatric Services*, found the rate at which American children are prescribed antidepressants almost doubled in five years; the steepest increase – 66 percent – was among preschool children” (Louv, *Last Child* 48). These children become dependent on these drugs and often will never be able to live without them. Instead of

trying more holistic methods of treating depression with nature therapy, which is often extremely effective, adults are immediately treating the symptoms with medicine.

Further research has been done on this topic. A data analysis from 2004 shows that “between 2000 and 2003 there was a 49 percent increase in the use of psychotropic drugs – antipsychotics, benzodiazepines, and antidepressants. For the first time, spending on such drugs, if medications for attention disorders are included, surpassed spending on antibiotics and asthma medication for children” (Louv, *Last Child* 48). This statistic reflects a social problem in which very young children are being treated with serious drugs. Instead of trying to cure the problem naturally by making healthier lifestyle changes, we are treating symptoms with chemicals. This is just adding more problems for society and its children.

Social Benefits. There are further details of the specific privileges of outdoor exploration over sedentary indoor habits because it combines cognitive and emotional behaviors with social development. “For example, construction and imaginative play require planning skills, coordination, negotiation, creativity, and trust, which form the basis of teamwork” (Kahn and Kellert 55). Additionally, these types of activities generally involve children of various age groups, allowing for more opportunities to learn and socialize at a rate that is more beneficial to the child’s development than is, for instance, watching television. These studies led to the conclusion that, “The psychological value of aimless exploration, especially in natural settings, may be more important than many realize. It is associated with creativity, stress reduction, and self-esteem” (Kahn and Kellert 55). These psychological values are extremely important in a child’s development not only personally, but socially.

One specific example of the social benefits of outdoor play took place in Sweden. It found “that children and parents who live in places that allow for outdoor access have twice as

many friends as those who have restricted outdoor access due to traffic” (Louv, *Last Child* 49). It is generally true that green spaces encourage social interaction by gathering people together. This social aspect that occurs among natural environments may directly contribute to nature’s observed social benefits for children and even adults.

In addition to landscapes, animals are also included in what is considered the natural world. Like climbing trees and hiking on mountains, animals are known to have immense therapeutic effects. Animal therapy is generally accepted in the health care field, especially for children and the elderly. Pet therapy has particularly been known to help children with autism. One case involves an autistic child’s interaction with therapy dogs, including a hyperactive pup named Buster. After spending time with Buster, the child “said his first new words in six months: ‘Buster sit!’ The child learned to play ball with Buster and give him food rewards – and also learned to seek out Buster for comfort” (Louv, *Last Child* 46). Animals are able to provide children with an alternative type of companion. Often, pet therapy sparks social and learning development in children with autism and other diseases.

When entire communities are living in nature-deprived environments, Louv identifies the result as “cultural autism.” The symptoms of this include lessened senses, and severe feelings of isolation or containment. This happens, he explains, because people are exposing themselves to fewer experiences, including physical risk. There are many contributing factors to this, including the cultural shift towards sedentary lifestyles. While this atrophy of the senses has gotten worse over time, “children, and many suburban children, have long been isolated from the natural world because of a lack of neighborhood parks, or lack of opportunity – lack of time and money for parents who might otherwise take them out of the city. But the new technology accelerated the phenomenon” (Louv, *Last Child* 64). A main factor that has developed more recently is the

higher usage of technologies such as television, computers, and cellular phones. These have dulled our senses to be more inclined to virtual experiences than they are to real, firsthand interactions.

Another expert's view on postmodern childhood play comes from Robin Moore, the director of the National Learning Initiative: "Primary experience of nature is being replaced, he writes, 'by the secondary, vicarious, often distorted, dual sensory (vision and sound only), one-way experience of television and other electronic media'" (Louv, *Last Child* 65). The effect of this is that children do not learn as much. Instead of enriching their time by exploring and learning in an interactive natural environment, they are sitting mindlessly in front of these new technologies. While it is possible to learn from television programs and other media, these secondary experiences, Moore argues, are not nearly as enriching as alternative primary experiences. The modern way of learning has become more convenient, but less real as much of it exists virtually. An example of a primary experience would be children interacting with one another while climbing a tree. During this time, they gain a personal encounter with one another and also the natural environment. They know firsthand what the tree feels and smells like, and how to work with it to accomplish the goal of scaling it. This is arguably more valuable than the secondhand experience of watching a television program or playing a video game in which children climb a tree. While the viewer may gain some knowledge from this as well, it will be much less personal and less enlightening about the nature of the tree. These virtual experiences prohibit us from having real life engagement and experiential knowledge through firsthand interaction.

A main approach to understanding the lack of indirect experience in our modern world is through ecological psychology, often called ecopsychology. This idea is "steeped in the ideas of

John Dewey, America's most influential educator. Dewey warned a century ago that worship of secondary experience in childhood came with the risk of depersonalizing human life" (Louv, *Last Child* 64-65). Rather than firsthand experiences in nature, many childhoods today are consumed by the secondary, unresponsive experiences of television, computers, cell phones, and other ever-evolving electronic media. This creates a culture where the norm is impersonal and anti-social. The effect of our indoor, technology-centered lifestyles has been further studied. A main problem that has been identified is that, "Even as we grow more separate from nature, we continue to separate from one another physically. The effects are more than skin deep, says Nancy Dess, senior scientist with the American Psychological Association. "None of the new communication technologies involve human touch; they all tend to place us one step removed from direct experience"" (Louv, *Last Child* 66). While much emphasis has been put on nature, it is important to remember that humans are a significant component of the natural world. It is also important for us to recognize the effects of our changing culture, especially that it is paving an easy path for a mostly solitary lifestyle. This is particularly damaging to the newest generations of children who are directly entering a community with an emphasis on indoor, secondarily- or anti-social technologies and a disregard for firsthand, personalized and social experiences among nature.

Childhoods dominated by impersonal, technology-based experiences have been connected to violence. This particular threat of technology has often been linked to video game violence. However, some studies have also linked it to our increasingly impersonal social culture. One observation is that "Diminishing touch is only one by-product of the culture of technical control, but Dess believes it contributes to violence in an ever more tightly wired society" (Louv, *Last Child* 66). If this connection is real, it is yet another vital reason to make

cultural shifts with a greater emphasis on personal experience in the real world with other people. This can be most effectively fostered during childhood, when young people first learn social behaviors.

While modern technologies have their benefits, the destructiveness occurs when their presence replaces children's real-life experiences with other humans and the natural environment. The increased amount of virtual experiences is largely substituting for outdoor play as children are more inclined to use their gadgets than explore the wilderness. Frank Wilson, professor of neurology at the Stanford University School of Medicine, has observed, "For a whole generation of kids, direct experiences in the backyard, in the tool shed, in the fields and woods, has been replaced by indirect learning, through machines. These young people are smart, they grew up with computers, they were supposed to be superior – but now we know that something's missing" (Louv, *Last Child* 66). Technology's immense benefits for our society and the future are being overshadowed by the detriment it is causing by replacing natural, direct methods of learning. Although many do not realize the benefits of the great outdoors, it is true that "Any natural place contains an infinite reservoir of information, and therefore the potential for inexhaustible new discoveries" (Louv, *Last Child* 67). Children are greatly being deprived this source of knowledge as it is replaced with more convenient devices. It is time now for us to acknowledge the effects of this cultural change.

Physical Benefits. In addition to the psychological benefits, there have been studies proving the variety of physical health benefits of interacting with nature.

These lifestyle preferences are not only affecting adult lives, but the lives of the nation's youth. Children these days are growing up indoors, watching television, playing video games,

and using cell phones constantly. Recent studies are showing the negative effects of these cultural changes on the health of the newer generations. Within this field of study:

“The Centers for Disease Control (CDC) reports that the number of overweight adult Americans increased over 60 percent between 1991 and 2000. According to CDC data, the U.S. population of overweight children between ages two and five increased by almost 36 percent from 1989 to 1999. And two out of ten of America’s children are clinically obese – four times the percentage of childhood obesity reported in the late 1960s” (Louv, *Last Child* 47).

These concurrent increases in obesity and our cultural changes in activity are not coincidental, but directly related. The majority of our society has moved inside for both work and play, and remains largely sedentary. Time spent this way, instead of actively outside, is directly and negatively affecting our health.

Further studies found the relationship between children’s television habits and their physical health. Specifically, “In the United States, children ages six to eleven spend about thirty hours a week looking at a TV or computer monitor. This study also found that the amount of TV that children watched directly correlated with measures of their body fat” (Louv, *Last Child* 47). With our social culture becoming more and more geared towards the indoors and technological gadgets, children are growing up without much physical activity or time spent outdoors, and it they are becoming more overweight because of it.

Oddly enough, “the obesity epidemic has coincided with the greatest increase in organized sports for children in history” (Louv, *Last Child* 47). This seemingly strange combination of phenomena has people begging the question, “What are kids missing that soccer and Little League cannot provide?” (Louv, *Last Child* 47). Through research and case studies,

many are finding that the answer to this question is that “Generalized, hour-to-hour physical activity is the likely absent ingredient. The physical and emotional exercise that children enjoy when they play in nature is more varied and less time-bound than organized sports” (Louv, *Last Child* 47). The negative health effects of a lack of free outdoor exploration is why many people today, across a wide variety of fields and disciplines, are urging for change in our culture as a whole. They are stressing the importance, for physical and mental health, of increased exposure to nature. While this is important for people of all ages, there is a special emphasis on children because they are impressionable and will determine the future social culture.

Today, increasing amounts of research is being done on the topic of nature and physical health. It has been found that “Numerous studies have shown that across age groups, time outside has numerous physical health benefits, such as lower rates of obesity, deriving from greater levels of physical activity (Clayton 124).” When outside, most people engage in some recreational activity, from competitive sports to leisurely hikes and bike rides. These physical activities help children, and all people, to be more physically fit, reducing obesity and other health problems that arise from being overweight and generally inactive. More specifically, “Studies suggest that green environments lead to lower rates of asthma and myopia, better recovery from hospital stays, and enhanced immunological responses (Clayton 124).” These conditions can be serious, so all precautions should be taken, especially free and effective exposure to nature.

A person’s living environment has recently been identified as a contributing factor to their physical health. Specifically, “Researchers from multiple disciplines now scrutinize how seemingly simple behaviors, such as eating and walking, are in fact complex events involving psychological, social, policy, and physical environmental aspects” (Clayton 460).

Environmental factors of a community greatly determine how much time a person is going to spend outside. Studies have found that “environmental measures of features such as street forms or land uses are often related to walking or weight” (Clayton 463). If an area is more pedestrian-friendly, aesthetically pleasing, or contains facilities for outdoor recreation or leisure, people are likely to spend more time partaking in physical activity outdoors.

When measuring an area’s attractiveness to support physical activity, factors of pleasurability are closely examined, including greenery, views, storefronts, and similar traits that affect a person’s experience of a place. “Currently a lot of attention is paid to the health and psychological benefits of exposure to nature, so views of trees, green spaces, and natural vistas have been proposed to support walking” (Clayton 468). The effectiveness of nature to stimulate more walking in an area is supported by research. For example, “One European study has shown that those with more greenery in their neighborhoods are three times as likely to be physically active and 40% less likely to be overweight or obese; an Australian study shows that visually interesting features including beaches relate to more physical activity” (Clayton 468). In similar studies in the United States, an increase in a neighborhood’s amount of greenery and accessible destinations were found to lower the inhabitants’ BMI (Clayton 468). Natural spaces of a wide variety, it can be concluded, can increase the physical activity and consequently the health of the people who live there.

Studies about our increasingly sedentary and consumption-focused lifestyles have led to some serious observations about our current health risks as an entire community. As our physical environment has enabled us to eat more and walk less over the past 50 years, obesity rates have risen. These changes “have led to the controversial calculation that obesity-related health problems will end the 200 years of life span increases seen in the United States” (Clayton

474). In other words, these environment-related health problems of physical inactivity and obesity are so serious that they will cause American life spans to cease increasing. This is a major threat to our society that can be corrected if, together, we actively make the necessary changes.

Aside from solving obesity-related problems, children manifest even further benefits when they spend more time playing outdoors. One study found, “For ages five to seven years, the physical affordances of a complex natural play setting (including trees, rocks, uneven ground, shrubbery, etc.) result in greater physical motor development, including agility and balance, in comparison to a less-varied, manicured play setting (Clayton 124).” Experience with a natural environment teaches children how to navigate complicated, unexpected terrain. This is a useful skill because it can occur anywhere. As we rely on our bodies to move about, agility and balance are also essential talents for children to have. This study additionally found that “children in environments heavy with auto traffic and lacking in green spaces that adults can oversee showed less physical development gains (and their parents were more strained), in comparison to children in environments that offered outside play (Clayton 124).” Again, children have more to gain from exposure to natural environments than built ones. The physical benefits are immensely useful and necessary for strong overall health as a child grows.

As previously discussed, pet therapy has been proven to positively affect mental health, especially for children with autism. This modern health care approach has also proven beneficial to physical health. Something as simple as watching fish in an aquarium has been shown to significantly lower blood pressure. Even more beneficial is to actually own a pet, which has been known to reduce high blood pressure and increase survival after a heart attack. This is proven as “The mortality rate of heart-disease patients with pets was found to be one-third that of

patients without pets” (Louv, *Last Child* 45). While heart-disease is often linked to stress, having a pet or contact with animals can reduce stress, lower blood pressure, and potentially save lives.

Other physical symptoms of stress have also been observed to soothe more rapidly with the help of nature. One research study “has shown that people who watch images of natural landscape after a stressful experience calm markedly in only five minutes: their muscle tension, pulse, and skin-conductance readings plummet” (Louv, *Last Child* 46). This provides physical evidence of the effects of nature to supplement the sometimes invisible mental benefits. In addition to its effects on stress alleviation, nature’s ability to expedite recovery after a physical injury has also been proven. A specific case studied the recovery time of gallbladder surgery patients. It was found that those whose recovery occurred in rooms facing a grove of trees healed faster than those whose rooms had the view of a brick wall (Louv, *Last Child* 46). In addition to gardening and playing with animals, simply looking at nature can have a healing effect on the body. As this field grows and becomes more widely tested and accepted scientifically, more people can see the undeniable evidence. Understandably, it is easier for some people to believe vital readings than to trust the way a person feels emotionally after looking at a picture of nature. Consistently, these varieties of studies and tests show that the positive effects of nature on the human mind and body are not only subjectively perceived, but have been continuously proven scientifically.

Chapter 4. Conclusion: The Future of Environmental Education

It has been established that nature has immense mental and physical benefits to offer all people, and especially children. If the majority of today’s children are growing up without adequate access to the natural environment, they have an increased risk of developing the

identified emotional, cognitive, social, and physical problems. If we can treat and further prevent the ailments associated with nature-deficit disorder now, the future will be a healthier place for people and the natural world. This final chapter explores what actions can and should be taken to cure nature-deficit disorder by methods of conservation, restoration, government mandate and, perhaps most importantly, environmental education (EE). It proposes suggestions on how to improve environmental literacy in both built and natural communities. Environmental education is necessary, but its success greatly depends on the supplementation of a person's access to the natural world.

A key approach to combat the current nature-deficit plaguing the nation's youth is through environmental education. Environmental education emphasizes experiential learning to supplement traditional classroom teaching. Refocusing the educational system towards this might be the most effective way to inform mass amounts of people, and alleviate nature-deficit symptoms. There are many optional programs dedicated to wilderness exploration and education available, but not every child has access to them, which is why targeting the public school system may be necessary in order to have a grand effect. This is precisely what the No Child Left Inside Coalition (NCLI) is working towards changing this, as discussed in the introduction. It has conducted studies proving the benefits of environmental education. They have identified changes including "reduced discipline and classroom management problems; increased engagement and enthusiasm for learning; and, greater student pride and ownership in accomplishments" (NCLI). By regulating formal environmental education throughout the years while all children are in school, and mandating nature-based research, experiments and field immersions, it will be difficult for the majority to avoid forming a connection with nature. An example of NCLI in successful action has occurred in Connecticut, where the state has taken

action to provide its community members with ways to get outside. It provides them with free information about organized activities that teach children about the environment while also providing them with firsthand experiences. Additionally, the Connecticut Department of Energy and Environmental Protection works to maintain a healthy natural environment to ensure that all children have access to these opportunities. Through learning about and forming a relationship with the natural environment, the children will care more deeply about its health, and grow up to be a generation of environmental stewards.

One proposal of a specific type of EE is structural development, or constructivist, education, which “allows children to explore, interact, recognize problems, attempt solutions, make mistakes, and generate more adequate solutions” (Kahn and Kellert 111). With its main emphasis being on development, nature would play a central role. Its profound physical, psychological, and behavioral effects make nature a vital role in the development of youth. Educators should emphasize, in and outside of the classroom, the importance of the children’s connection with the natural world. They should understand its importance on an intellectual level, but also gain meaningful personal experiences in such a setting. Research on the actual benefits of school-based environmental education consistently shows that programs are most effective when “they connect learning to the real worlds of students’ homes, communities, or regions” (Clayton 545). What is learned in a class about the environment can be practically applied to a student’s real life. Many subjects are often too abstract for children to learn in an applicable way. The specific environment in which they live, however, is a meaningful subject that will be easier for them to comprehend, and contain valuable knowledge that they can carry with them beyond the classroom.

Beyond schooling, our society at large ought to refocus itself on the environment. It is not enough to recycle and use reusable bags (although these help). In our communities we need to foster the existing environment and restore abused land and other natural resources. They are vital parts of our life support, as well as the healthy development of our children and those of future generations. Urban areas specifically need more parks and greenspace for the health of the overwhelmingly manmade environment as well as its inhabitants. It is essential for humanity as a whole to “recognize our need for a more pristine and at times wild nature so that adults and children alike can experience it, construct concepts of ecological health, and be nourished by it in body and mind” (Kahn and Kellert 114). Ecosystem services should be acknowledged and treated as the life and health providers that they truly are.

In terms of the physical environment, currently, most playgrounds, especially at schools, continue to use still, manmade objects. “Even though there is good evidence of the value of natural landscapes and moveable objects for constructing, schools still have playgrounds with hard surfaces and no vegetation” (Kahn and Kellert 52). This is largely due to fears regarding accidents, legal trouble, and maintenance. Regardless, the adults in charge, especially educators and caretakers, should do what is best for the healthy development of the children. It is suggested that “The design of daycare centers, playgrounds, schools, homes, and hospitals could benefit enormously from a better understanding of children’s natural play behaviors” (Kahn and Kellert 52). Fixed play equipment, such as swings, does not allow for the same imagination and creativity development that an organic environment does. Built, or manmade, environments do not have the same level of positive effects that natural playgrounds do. As observed, “natural refuges and natural materials (flowers, sticks, stones) facilitated long bouts of imaginary play, a behavior with high social and cognitive payoffs” (Kahn and Kellert 52). Therefore, natural play

areas should be more widely implemented wherever possible instead of the existing built play environments that do not allow children as much development in certain physical and psychological areas.

In our society, “Nature is often overlooked as a healing balm for the emotional hardships in a child’s life. You’ll likely never see a slick commercial for nature therapy, as you do for the latest antidepressant pharmaceuticals. But parents, educators, and health workers need to know what a useful antidote to emotional and physical stress nature can be” (Louv, *Last Child* 47). Knowing the observed benefits that nature can offer children in place of strong pharmaceuticals, adults need to put more concern into fixing the cause of the problem naturally before prescribing the symptom an antidote. As a society, we need to implement nature more as a cure for many of our problems. We can begin to do this by emphasizing nature’s benefits in our physical environment, as well as our widespread institutions.

Consequent of children’s relationship with nature, or lack thereof, is detrimental treatment of the environment. Many environmentalists have argued that, without a personal connection to nature, which is most often rooted in childhood, a person will not care for it. Specifically, “A study by Hoyt and Acredolo (1992) shows that environment attitudes, preferences for nature, and the development of pastoral values are strongly influenced by children’s actual experience in natural settings” (Kahn and Kellert 54). Essentially, if children do not grow up with experiences among nature, they will not feel compelled to preserve and protect it in the future. This will contribute to a cycle of environmental abuse, depriving future generations of vital resources and propagating the consequent psychological and physical problems that have already been observed.

In terms of the future, people will only take care of the environment and the world's shared, finite resources, if they care about such matter. Many studies show that people who grow up to be environmental stewards credit their activism to a personal childhood connection with nature. They grow up to be concerned citizens "because they come to care for intrinsic qualities of nature, particular places, or the well-being of people who are affected by the environment, because they internalize social norms of environmental responsibility, and because they develop an identity of connection to nature" (Clayton 528-529). One reason why childhood play in nature is thought to contribute to this deep affection later in life is that "natural areas are places where children can set challenges at levels they choose for themselves and enjoy the effects of their actions: new vistas, for example, as they climb higher and higher in a tree" (Clayton 529). These memories are remain prominent throughout a person's life because they are so valuable in ways they might not consciously realize. Among nature, we learn new things about the world and about ourselves. To fully benefit from the gifts nature has to offer, we should reorient our social priorities to put greater emphasis on learning from the natural world to benefit ourselves, future generations, and our life-giving ecosystem services.

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