

NATURE-DEFICIT DISORDER
AND THE EFFECTS ON ADHD

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Abstract

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The research presented in this paper was done to determine the relationship between Nature-Deficit Disorder and Attention Deficit/Hyperactivity Disorder. Another objective was to discover whether exposure to nature reduces the symptoms of ADHD and other illnesses such as depression. Also researched in this paper were cognitive alertness and attention and the extent direct experiences with nature affect them.

Through a review of the literature it is evident that when children are connected with nature they are healthier physically and emotionally. Studies show that being exposed to views of green grass or trees can improve memory, concentration and grades, and the symptoms of Attention deficit/hyperactivity disorder (ADHD). After spending time in natural settings, Children with ADHD consistently do better at focused activities such as homework than those spending time indoors.

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Chapter One: Introduction

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, 2008) In the United States, children are spending less time playing outside in an unstructured manner. Activities such as hiking, walking, fishing, playing on the beach, or simply climbing a tree are experienced less frequently by children than in the past. Nature-Deficit Disorder does not represent an existing medical diagnosis, but research is showing that children and adults benefit from exposure to nature.

Scientific evidence is showing that physical and emotional health is enhanced by direct exposure to nature. Individuals, families, and even communities can be affected by the disorder. Some cities are designing parks and open spaces in response to the relationship between the absence of these open spaces and high crime rates, depression and other undesirable conditions that occur in urban settings. New studies suggest the symptoms of Attention Deficit Hyperactivity/Disorder (ADHD) may be reduced by direct exposure to nature. Being in nature can also improve cognitive abilities and resistance to stress and depression according to recent studies. (Louv, 2008)

All across the country there has been a greater shift in how children spend their summer vacations. Parents are working more, and children are lured by computers, television, and electronic games. Safety is also a concern in most areas when children are playing outside without supervision. Parents are afraid to allow their children to roam the neighborhood, parks or woods because of

strangers, insects such as ticks, and the effects of the sun so parents feel it is safer inside. Even road trips are manipulated by the pop down video screens that mesmerize children instead of gazing out of the window to watch the sights of the world go by.

Children's experience with nature can be classified in three ways; direct, indirect, and what may be called "vicarious" or "symbolic" experiences. (Kellert, 1996) Direct experience is unstructured and informal physical contact with nature. This experience could occur in a forest, creek, backyard, park or even a vacant lot. These natural habitats of plants and animals exist without continuous human control or manipulation for the most part. Indirect experience involves physical contact with nature, but are more programmed and managed by humans such as zoos, aquariums, and nature centers. Indirect experience could also include gardening, visiting a farm, going to an orchard, or playing organized sports. All of these habitats exist with human intervention. Vicarious or symbolic encounters with nature are experienced through television, videos, computers, or books.

According the director of the University of Illinois landscape and human health laboratory, Frances Kuo (2002), after spending time in natural settings kids with ADHD appear to do better at homework. She surveyed 450 parents who have children with ADHD. The results showed that activities done in green outdoor settings reduced symptoms more than similar activities done indoors or organized outdoor sports.

Statement of the Problem

The problem to be addressed is “What is the relationship between Nature-Deficit Disorder and ADHD? Can exposure to nature reduce the symptoms of ADHD and other illnesses such as depression? To what extent do direct experiences with nature affect cognitive alertness and attention?”

Definition of Terms

Attention Deficit Hyperactivity Disorder (ADHD). A chronic condition that affects millions of children and often persists into adulthood. ADHD includes some combination of problems, such as difficulty sustaining attention, hyperactivity and impulsive behavior. Children with ADHD also may struggle with low self-esteem, troubled relationships and poor performance in school. (Mayo Clinic, 2011).

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. 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, 2008)

Executive function The neurocognitive processes that maintain an appropriate problem-solving set to attain a later goal (Willcutt, 2004)

Circadian rhythms The physical, mental and behavioral changes that follow a roughly 24-hour cycle, responding primarily to light and darkness in an organism's environment. They are found in most living things, including animals, plants and many tiny microbes. The study of circadian rhythms is called chronobiology.

Oppositional defiant disorder (ODD). A condition where a person shows pattern of negative, defiant and hostile behavior toward authority figures. (Mayo Clinic, 2011)

Conduct disorder. A more serious condition than ODD that is marked by antisocial behavior such as stealing, fighting, destroying property and harming people or animals. (Mayo Clinic, 2011)

Depression and bipolar disorder. Depression frequently occurs in children with ADHD. Some children may have bipolar disorder, which includes depression as well as manic behavior. (Mayo Clinic, 2011)

Anxiety disorders. Anxiety disorders tend to occur fairly often in children with ADHD and may cause overwhelming worry, nervousness and worsening of ADHD symptoms. Once anxiety is treated and under control, children are better able to deal with the symptoms of ADHD. (Mayo Clinic, 2011)

Learning disabilities. Learning disabilities are common in children with ADHD. However, gifted learners also may have ADHD. Children with both ADHD and learning disabilities may need extra attention in the classroom or special education services. (Mayo Clinic, 2011)

Tourette syndrome. A neurological disorder characterized by compulsive muscle or vocal tics. (Mayo Clinic, 2011)

Biophilia Hypotheses. The hypothesis that suggests that there is an instinctive bond between human beings and other living systems. The tendency to interact or be closely associated with other forms of life in nature. (Wilson, 1993)

Delimitations of Research

The research will be conducted primarily through the Karrmann Library at the University of Wisconsin-Platteville. Primary searches will be conducted via the Internet through EBSCO host with ERIC and Academic Search Elite as the primary sources. Key search topics included “nature-deficit disorder”, “de-natured child”, “children and nature”, and “nature-deficit disorder and ADHD.

The national bestseller Last Child in the Woods will also be a key component of my research.

Method of Approach

A review of literature on the research and information on and relating to nature-deficit disorder and ADHD will be conducted. This review will include literature relating to research, studies, and anecdotal evidence of the affects of nature on ADHD will be conducted and the findings and conclusions will be summarized.

Chapter Two: Review of Related Literature

Attention Deficit/Hyperactivity Disorder

Millions of children are affected by a chronic condition called Attention-deficit/hyperactivity disorder (ADHD) and it often persists into adulthood.

According to the Centers for Disease control and Prevention, ADD/ADHD is a serious public health problem that impacts approximately 9% of children aged 4-17. The problems that ADHD can cause are difficulty attending, hyperactivity, impulsivity, low self-esteem, difficulty maintaining relationships and poor performance in school. These symptoms can be a challenge for parents and children and the diagnosis of ADHD can be scary.

Signs and symptoms of ADHD:

- Fidgets or squirms frequently
- Often leaves his or her seat in the classroom or in other situations when remaining seated is expected
- Often runs or climbs excessively when it's not appropriate or, if an adolescent, might constantly feel restless
- Frequently has difficulty playing quietly
- Always seems on the go
- Talks excessively
- Blurts out the answers before questions have been completely asked
- Frequently has difficulty waiting for his or her turn
- Often interrupts or intrudes on others' conversations or games

ADHD behaviors can be different in boys and girls:

- Boys are more likely to be primarily hyperactive, whereas girls are more frequently undiagnosed as they tend to be quietly inattentive.

- Girls who have trouble paying attention often daydream, but inattentive boys are more likely to play or fiddle aimlessly.
- Boys tend to be less compliant with teachers and other adults, so their behavior is often more conspicuous

When a child is diagnosed with ADHD the parents often blame themselves. Most likely it is not due to parenting choices, the causes have more to do with inherited traits. According to the Mayo Clinic certain environmental factors may worsen the effects of ADHD. The exact cause of ADHD is a mystery, although brain scans reveal differences in the structure and brain activity of those with ADHD. In the areas of the brain that control activity levels and attention there appears to be less activity. (2011) Heredity also plays a factory in ADHD and it tends to run in families. The child of a woman who is exposed to toxins such as smoking and drug use while pregnant are at increased risk of having ADHD symptoms. Children who are themselves exposed to environmental toxins such as lead are at increased risk of developmental and behavioral problems. Food additives such as artificial coloring and food preservatives may contribute to hyperactivity. (Willcutt, 2004)

Children with ADHD often struggle in the classroom which leads to academic difficulties. They tend to have more accidents in injuries, have trouble interacting with peers and adults, and are at increased risk of alcohol and drug abuse. There are many coexisting conditions that can occur along with ADHD such as Oppositional defiant disorder (ODD), conduct disorder, depression and bipolar disorder, anxiety, learning disabilities, and tourette syndrome.

The diagnosis of ADHD is done by a doctor or psychologist. The evaluation may include parent teacher questionnaires, psychological evaluation of the child and family. This includes IQ testing and psychological testing. Also a complete developmental, mental, nutritional, physical and psychosocial examination should be done. A physical exam is done to rule out any other medical condition that may have similar symptoms.

Nature Deficit Disorder

The term Nature Deficit Disorder refers to the alleged trend that children are spending less time outdoors resulting in a wide range of behavioral problems. This disorder is not recognized in medical manuals for mental disorders. It was first coined by Richard Louv in his book called *Last Child in the Woods*. There seem to be many possible causes for children spending less time with nature. One possibility could be parents keeping their children indoors worried about the dangers that unfortunately lurk in our society referred to as “stranger danger”. Another cause of children losing contact with nature is simply the loss of natural surroundings in neighborhoods and cities. The lure of electronic media also keeps kids indoors playing video games and watching TV.

Childhood is a time where we are motivated to seek out and understand the world around us. Both during development and later in life, the question arises as to what drives us to actively seek meaning and value from the natural environment? (Kahn, 2002). Is this human nature based on instincts or fulfilling basic needs such as thirst and hunger? These are part of the equation, but there seems to be a much broader benefit from nature. There also appears to be an

increasing divide between young children and the natural world. Research is revealing the necessity of contact with nature for healthy child, and adult development. (Louv, 2008)

There has been a shift in our relationship to the natural world in the last few decades. Summer camp used to be a place where you actually camped, hiked in the woods, investigated the plants and animals, and told stories of the legendary forest creatures around the campfire. Today, most children attend basketball or football camp, computer camp, or weight-loss camp. Even family trips have become a flip-down video screen with a lineup of the latest movies in the backseat of the SUV. While their focus is on the screen, they are oblivious of the breathtaking mountain scenery outside of the window. Family vacations of the past used to consist of National Parks, the Grand Canyon, or camping up north. Now, most affluent families fly to Disney World or an all inclusive vacation somewhere tropical where all of the entertainment is scheduled and confined to a manmade space. This is eliminating the opportunity for investigation and exposure to unstructured experiences in nature.

Effects of Nature-Deficit

As nature deficit grows, another emerging body of scientific evidence indicates that direct exposure to nature is essential for physical and emotional health. For example, new studies suggest that exposure to nature may reduce the symptoms of Attention Deficit Hyperactivity Disorder (ADHD), and that it can

improve all children's cognitive abilities and resistance to negative stresses and depression. (Louv, 2008)

As we grow more separate from nature, we also physically separate from one another. Most of the communication technologies do not involve any human touch and with texting communication even lacks the human voice. This type of communication puts us one step removed from direct contact or experiences. According to Nancy Dress, senior scientist with the American Psychological Association, infant primates die without touch. Adult primates become more aggressive when they lack physical contact. Dress believes that lack of contact contributes to violence in our society.

Today's children grow up in a world with overwhelming sensory input. Yet, the input is usually coming from a TV or computer screen, where the input cannot be touched, physically manipulated, or even smelled. Not engaging our senses of touch, smell, taste as you could in a physical encounter in nature. Bill McKibben in *The Age of Missing Information* describes his personal experience: "The mountain says you live in a particular place. Though it's a small area, just a square mile or two, it took me many trips to even start to learn its secrets. Here there are blueberries, and here there are bigger blueberries... You pass a hundred different plants along the trail. One could spend a lifetime learning a small range of mountains, and once upon a time people did."

Children have limited respect for their immediate natural surroundings. Louv says the effects of Nature Deficit Disorder on our children will be an even bigger problem in the future. "A rapid disengagement between children and direct

experiences in nature has profound implications, not only for the health of future generations but for the health of the Earth itself.” (Louv, 2008) Attention disorders and depression may develop. Kids without direct exposure to nature seem more prone to anxiety, depression and attention-deficit problems.

According to the University of Illinois study, interaction with nature has proven to reduce symptoms of ADD. Studies of students in California and nationwide showed that schools that use outdoor classrooms and other forms of experiential education produce significant student gains in all academic areas.

Many schools have had to cut back on budgets for field trips and students experiences beyond the classroom. Ironically, the detachment of education from the physical world not only coincided with the dramatic rise in life-threatening childhood obesity but also with a growing body of evidence that links physical exercise and experience in nature to mental acuity and concentration. (Littlejohn, 2001)

Reducing Symptoms of ADHD

Nature is often overlooked as a healing balm for the emotional hardships in a child’s life. (Louv, 2008) 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 largest increase was those prescribed to preschool children. The amount of money spent on such antidepressant drugs including medications for attention disorders surpasses the

spending on antibiotics and asthma medications for children. Although many children benefit from medications for mental illness and attention disorders, the use of alternative preventive therapy such as nature is overlooked. According to Peter Kahn in the *Human Relationship with Nature*, over one hundred studies confirm that one of the main benefits of spending time in nature is stress reduction. (2001)

Everyone can benefit from eating well, exercising, and getting plenty of sleep. Those with ADD/ADHD can gain even more by following these healthy habits which can help them to stay calm, avoid mood swings, and even curb symptoms of anxiety and depression. Disorganization and impulsivity are common effects of Attention Deficit disorders. Healthy habits can reduce symptoms of hyperactivity, inattention, and distractibility. Having healthy routines can help those with ADHD by regaining control and make life seem more predictable.

One of the most positive ways to reduce hyperactivity and inattention is getting exercise, especially when outdoors. Benefits from sunshine and green surroundings can increase stress relief. (Faber 2009) Exercise can improve mood, calm the mind, and work off the excess energy and aggression one may have. Eating small meals throughout the day, avoiding too much sugar, increasing protein intake, and decreasing carbohydrates can reduce hyperactivity, distractibility, and stress. (Schweitzer, 2001)

There is a growing body of research on the beneficial effects of meditation not only as a stress-coping mechanism, but also in improving brain function.

Researchers are beginning to explore the use of meditation for attention and ADHD symptoms. (Grosswald, 2008) Intensive family treatment program of Sahaja Yoga meditation found improvement in children's ADHD behavior, family relationships, and self-esteem.

The most common way to reduce symptoms of ADHD is prescribing stimulants such as Ritalin or Concerta, Adderall, and Focalin. A nonstimulant drug often prescribed is Strattera which may work as well as stimulants. Most often those with ADHD not only have attention issues, but also behavioral and executive function disorder. Doctors and psychologists often prescribe other medications such as Zoloft, Risperdal, or Welbutrin to help stabilize mood. Although medications can benefit some children with ADHD, there may be negative health effects. Evidence suggests risks of cardiac disorders and sudden death, liver damage, and psychiatric events. (2008)

The Landscape and Human Health Lab's research done through the University of Illinois at Urbana-Champaign has shown that performing activities in green settings can reduce children's Attention Deficit-Hyperactivity Disorder symptoms. In a study that tested children with ADHD after they had walked in one of three environments that differed from one another in the level of greenery. The three environments were a park, a neighborhood, and a quiet downtown area. The findings confirmed that the attention of children with ADHD functions better after spending time in more natural settings. (Kuo, 2009)

Scientists working in its Lighting Innovations Institute at John Carroll University have developed blue-blocking glasses that appear to reduce the

symptoms of ADHD. The glasses also improve sleep patterns among people who have a difficult time falling asleep. One of the common symptoms of ADHD is the inability to sleep adequately. The glasses are designed to block blue light to alter a person's circadian rhythm. Circadian rhythms can alter hormone release, sleep-wake cycles, and body temperature. Melatonin is the hormone that makes you sleepy which is released at night and tells the brain to make more so you become drowsy. When a person puts on the glasses a few hours before bedtime, blocking the blue rays and starts the circadian rhythm to release melatonin. Studies indicate that this earlier release of melatonin decreases the symptoms of ADHD. Other uses of blue-blocking glasses:

1. Providing better sleep
2. Avoiding postpartum depression
3. Preventing Seasonal Affective Disorder
4. Reducing the risk of Cancer

Night lights and light bulbs with coatings that block the blue light have also been developed instead of wearing the glasses. (2007)

There are many other possible strategies to improve ADHD. One strategy is the intake of Omega 3 fish oil which has also been linked to reduce depression and for brain development in the fetus and infants. Another possibility is placing a child with ADHD on a restricted diet which eliminates eating any processed foods. This can be a difficult regimen to follow. Neurotherapy is another alternative to reducing the symptoms of ADHD. It is a computer-based technique for retraining the brain to produce electrical activity that has more normal

patterns. Neurotherapy was originally developed at the UCLA Medical School as a treatment for epilepsy in children.

A summary of many treatment modalities for ADHD:

1. Medications such as stimulants and antidepressants may be recommended in the short term.
2. Medication such as antibiotics may be used in cases of confirmed bacterial infections,

together with and followed by probiotics to replace beneficial bacteria in the gut)
3. Neurotherapy, to redress abnormal brainwave patterns
4. Dietary interventions.
5. Nutritional supplementation including the use of probiotics (beneficial bacteria supplements).
6. Family counseling. Cognitive Behavior Therapy and behavioral intervention Programs.
7. Behavior modification, including ABA
8. Blue-blocking glasses
9. Exposure to Nature and the natural environment (green space)
10. Meditation
11. Exercise

There are many theories on ways to reduce symptoms of ADHD and no one way is the answer to all who are affected by the disorder. Those afflicted have chronic difficulty paying attention and focusing on tasks. They can be impulsive, have outbursts, and sometimes be aggressive. Attention Deficit/Hyperactivity disorder affects up to 9% of children. Current treatments

such as drugs and behavioral therapy do not work in all cases. More and more the concept of healthy lifestyle including exercise and adding green spaces into the routine prevails. The research findings suggest adding trees where children spend a lot of time and giving opportunities to be and learn in nature may help supplement treatments to improve the symptoms of ADHD. (Taylor, 2001)

There are many movements to validate the importance of nature in everyone's lives including the No Child Left Inside Act of 2008. This was an extraordinary moment symbolizing just how far the children and nature movement has come. The act would require K-12 school systems to pay for outdoor education instruction. The No Child Left Inside Coalition works to get children outside and learning actively in the natural environment. The Sierra Club, one of the 745 supporting organizations, helped to provide hands-on outdoor environmental education through opportunities to improve academic performance in our schools and to provide a solution for trends of childhood obesity and nature deficit disorder.

The movement is beginning to appear in schools around the world. One example is the Cedarsong Nature School on Vashon Island, Washington which is a year-round entirely outdoor school for three to six year olds. There, children are allowed to immerse in nature, learn creativity, cooperation and problem-solving. Other schools such as this are being modeled after schools in Germany and Scandinavia where studies have shown academic and health benefits for children exposed to nature.

Many organizations support a reframing of our traditional views of parks as places for leisure and sport towards a view that emphasizes physical, mental, and social health benefits. (Louv, 2011) The American Academy of Pediatrics (AAP) recommends that pediatricians promote unstructured play and physical activity in parks, playground, or open spaces for at a minimum of 30 minutes per day. They also discourage excessive passive entertainment such as TV, internet, and video games. (Kahn, 2002)

Relationships between Nature-Deficit Disorder and ADHD in Summary

The number of children diagnosed with Attention Deficit/Hyperactivity Disorder is astounding. It impairs school performance and socialization and may persist into adulthood. The most predominant symptoms are hyperactivity, difficulty attending to tasks, low self-esteem and difficulty maintaining relationships. The exact cause of ADHD is unknown and there are many factors that may contribute to the disorder. Many experts believe that heredity, toxins and food additives are to blame. It is certain that the structure of the brain and brain activity is different in those with ADHD. Many conditions can coexist with ADHD such as oppositional defiant disorder depression, anxiety, and learning disabilities. (Schweitzer, 2002) Attention Deficit/Hyperactivity Disorder's symptoms are most commonly reduced by the use of stimulants other behavioral and emotional issues are often prescribed antidepressants. Those who suffer from symptoms of ADHD can benefit from eating healthy, exercise and getting plenty of sleep. There are many other alternatives therapies are being

considered such as meditation, neurotherapy, behavioral interventions blocking blue light, and exposure to the natural environment.

Children and adults are spending less time interacting with nature due to busy schedules, risk of danger from predators, loss of natural settings or green spaces, and increased electronic media. Contact with nature is a necessity for healthy child and adult development. (Louv, 2008) Many studies conclude that exposure to nature may reduce the symptoms of ADHD and depression, and can improve cognitive abilities. Nature Deficit Disorder is not a recognized mental disorder, but a philosophy that children are spending less time outdoors and this contributes to a wide range of behavioral problems. The result of Nature Deficit Disorder has a profound effect on the health of future generations and also the earth itself due to lack of respect for natural surroundings. (Louv, 2008) If there is less respect for nature, it will not be taken care of and there will be fewer truly natural areas to cherish.

The No Child Left Inside Act of 2008 has validated the importance of children in nature by requiring K-12 schools to support outdoor education instruction. Many other organizations are supporting the cause to insure that there are green spaces for children to have exposure to. Schools are beginning to emerge that understand and the importance of outdoor activities and emersion with nature. Humans have an instinctive liking for nature referred to as the biophilia hypothesis and are taking steps to spend more time outdoors and to promote outdoor education.

Chapter Three: Conclusions and Recommendations

In summary, this paper presents research on Attention Deficit/Hyperactivity Disorder and the symptoms and reducing the effects associated with the disorder. There are millions of children affected by a chronic condition called Attention Deficit/Hyperactivity Disorder. It becomes evident that there is no cure for the disorder, although substantial evidence suggests that children and adults benefit from being close to nature. Also, the research presented in this paper shows that Nature Deficit Disorder does have a direct correlation to negatively impacting the symptoms of ADHD. According to many studies, interaction with nature has proven to reduce symptoms of ADHD in children. (Kuo, 2004) Exposure to ordinary, unstructured natural settings on a daily basis may be effective to help children reduce attention deficit symptoms. Mental acuity and long term ability to cope with stress is also attributed to being close with nature.

The existing literature on the topics leads to the conclusions that Nature deficit can negatively affect children's cognitive abilities and resistance to negative stress and depression. Exercising outdoors whether one is hiking, playing or just investigating the natural world around them can improve mood, rid excess energy or aggression, and calm the mind. Our senses are engaged when immersed in nature. Not just those senses we use when watching TV or a computer screen such as sight and hearing, but also our sense of smell, touch, and even taste.

American children are prescribed medications to help elevate the symptoms of ADHD and for some these medications can be beneficial, but evidence shows that adding trees and greenery where children spend a lot of time will help supplement treatments to improve children's functioning. Findings confirm that children with ADHD can attend better after spending time in more natural settings. It is a well known fact that everyone benefit from eating well, exercising, and getting plenty of sleep. These healthy habits can help those with ADHD stay calm, and avoid anxiety and mood swings. There are many treatments for ADHD such as stimulants and antidepressants, cognitive behavior therapy, meditation, and neurotherapy, but one concept was reoccurring in the research conducted, exposure to nature and the natural environment. Exposure to nature is not the cure for symptoms of ADHD, but rather an additive to help elevate the symptoms.

Our world is saturated with sensory input from TV, computers, multi-media, and video games. Children between the ages of eight and eighteen years old spend an average of 6.5 hours a day plugged in electronically. (Bronson, 2009) That is forty-five hours a week. More time than what is considered an adult work week. Watching television and playing video games may be associated with increased attention problems in children according to researchers Andrea Faber and Francis Kuo. (2008) Their research has also shown that symptoms of attention-deficit disorder can be more manageable when a child's everyday environment is greener. Many other studies suggest that children who spend more time in nature are healthier, happier, and smarter.

Based on these conclusions, it is recommended that children spend more time in nature, combined with less television, more stimulating play, and meaningful educational settings. This may go a long way to reduce attention deficits symptoms in children and just as important, improve their joy in life. Prescribing more green time as a treatment for ADHD has many advantages. It is inexpensive, has no side effects, and is widely available for those who chose to engage in its glory.

REFERENCES

- Beatley, T. (2000). *Green urbanism: Learning from European cities*. Washington, DC: Island Press.
- Bronson, P., Merryman, A. (2009) *Nature Shock, New thinking about children*. New York, NY: Twelve Hachette Book Group, Grand Central Publishing.
- Faber Taylor, A. & Kuo, F.E. (2009). "Children with attention deficits concentrate better after walk in the park." *Journal of Attention Disorders*, 12, 402-409.
- Gardner, M. (2006). For more children, less time for outdoor play. *The Christian Science Monitor* 6(29). 31-34.
- Grosswald, S. J., Stixrud, W. R., Travis, F., & Bateh, M. A. (2008, December). *Use of the Transcendental Meditation technique to reduce symptoms of Attention Deficit Hyperactivity Disorder (ADHD) by reducing stress and anxiety: An exploratory study*. Current Issues in Education
- John Carroll University (2007, November 12). Blue-blocking glasses to improve sleep and ADHD symptoms developed. *Science Daily*. Retrieved December 29, 2011, from <http://www.sciencedaily.com/releases/2007/11/071112143308.htm>
- Kahn, P.H., (2001) *The human relationship with nature, development and culture*. Cambridge, MA: MIT Press.
- Kahn, P.H., Jr., & Kellert, S. R. eds. (2002). *Children and nature psychological, sociocultural, and evolutionary investigations*. Cambridge, MA: MIT Press.
- Kuo, F.E., Faber T.A, (2004). *A potential natural treatment for Attention Deficit/Hyperactivity Disorder: Evidence from a national study*. American Journal of Public Health, 94(9), 1580-1586.
- Littlejohn, G. T. (2001). *Greening school grounds Creating habitats for learning*. Gabriola Island, BC: New Society Publishers.
- Louv, R. (2008). *Last child in the woods saving our children from nature-deficit disorder updated and expanded*. Chapel Hill, NC: Algonquin Books of Chapel Hill.
- Louv, R. (2011). *The nature principle Human restoration and the end of nature-deficit disorder*. Chapel Hill, NC: Algonquin Books of Chapel Hill.

Mayo Clinic Staff., (2011). *Attention deficit/hyperactivity disorder (ADHD) in children*. Mayo Foundation for Medical Education and Research,

Overcoming ADHD without medication a parent and educator's Guide.

Association for Youth Children and Natural Psychology (2011) Newark, NJ: Newark Psychological and Educational Publishing

Schweitzer, J.B., Cummins T.K., Kant C.A., (2001). *Attention deficit/hyperactivity disorder*. *Medical Clinics of North America*, 85 (3), pp. 757-777.

Sobel, D. (1996). *Beyond Ecophobia: Reclaiming the heart in nature education*. Great Barrington, MA: The Orion Society and the Myrin Institute.

Taylor, A.F., Kuo, F.E., Sullivan, W.C. (2001). Views of nature and self-discipline: Evidence from inner city children. *Journal of Environmental Psychology*, 21, 9-30. Doi:10.1006/jevp2001.0241

Willcutt, E. G., Doyle, A. E., Nigg, J. T., Faraone, S. V., Pennington, B.F. (2004). Validity of executive function theory of attention-deficit/hyperactivity disorder. Boston, MA. *Geological Psychiatry*, Vol. 57. Issue 11, 1385-1390