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# An Investigation of Unstructured Play in Nature and its Effect on Children's Self-Efficacy

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# An Investigation of Unstructured Play in Nature and its Effect on Children's Self-Efficacy

## **Abstract**

### **ABSTRACT**

AN INVESTIGATION OF UNSTRUCTURED PLAY IN NATURE AND ITS EFFECT  
ON CHILDREN'S SELF-EFFICACY

**Paul Starling**

**Dr. Lani Nelson-Zlupko**

Much attention is being given to childhood physical and mental well-being as it relates to outdoor play in nature. This is particularly relevant as today's children are spending much less time outdoors, and even less time in unstructured play compared to indoor time or highly regulated supervised activity. Recent research indicates that outdoor unstructured play may be essential to core mastery in children: it has been linked to improvements in cognitive, behavioral, and even physical functioning.

This study investigated whether unstructured play in nature had an effect on children's self-efficacy. An original, mixed methods, empirical study was conducted which enlisted 21 subjects, (n=11 male) and (n=10 female) ages 8-12. These subjects took part in unstructured play in nature within a 3-week period of time while attending a summer camp. Subjects played anywhere from 2-5 days in 45-minute play sessions. Subjects completed the modified widely used Self-Efficacy Scale (SES) and the Emotional Self-Efficacy Scale (ESES) at pre and post conditions in order to explore whether or not exposure to unstructured outdoor play in nature contributes to increases in perceived self-efficacy. Quantitative results indicated no difference at post-test but when frequency of exposure to the experimental condition was factored in a lowering of self-efficacy as measured by the modified SES surfaced. Statistics also revealed that the exposure to the experimental condition alone was not significant enough to account for the decrease in self-efficacy scores. Qualitative field notes taken throughout the study indicated the contrary: there were indeed multiple instances of self-efficacy development.

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## **ABSTRACT**

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# **CHAPTER 1: INTRODUCTION**

## **An Introduction to Childhood Play, Mastery and Self-Efficacy**

Numerous studies indicate that today's children are less active outdoors and spend significantly less time in nature than prior generations. They are also less informed about their natural surroundings, and are engaged increasingly in structured, indoor sedentary activities like video gaming and television watching. Although there is research indicating that structured outdoor activity in nature has a positive effect on self-efficacy, the relationship between unstructured outdoor play in nature and self-efficacy has yet to be sufficiently established.

This dissertation examines existing literature on the benefits of unstructured outdoor play, children's activity levels, and the trends in contemporary children's time allotment for unhindered outdoor play, and the consequences on their physiological health, mental health, cognitive functioning, and sense of mastery over challenges. Theories about child development and the development of self-efficacy are also explored, as well as empirical studies highlighting the impact of children's reduced outdoor time on various areas of their functioning and on their overall well being. Attention is paid to the level of rigor in empirical studies reviewed and the gaps left in the literature. An original empirical study is then described which attempts to further the research on this topic.

### **Children's Activity Levels and Play**

Play is considered such an important aspect of child development that the United Nations High Commissioner for Human Rights recognized it as a basic right for every child (Office of the United Nations Report, 1989). Yet, between 1981 and 1997, children's free playtime decreased by close to 25% and was seemingly influenced by increased time spent in structured activities (Burdette & Whitaker, 2005).

### **Children's Health and Play**

Sedentary lifestyle, coupled with decreased play, appears to put children at risk for numerous threats to health and wellbeing. Children who watch television daily for more than two hours are twice as likely to suffer from asthma by age 11.5 than children who watch daily TV for less than two hours a day. Children who watch two or more hours of television daily are close to two times as likely to suffer from asthma once they reach age 11.5. This is compared to children who view television for 1-2 hours daily (Sherriff et al., 2009). Furthermore, children diagnosed with childhood obesity, a possible consequence of an inactive lifestyle or not enough activity, are at greater risk of being diagnosed with a mental health disorder as well as other physical ailments like, bone or joint disorders, than children who are not obese (Marder & Chang, 2005). Although not causal, this relationship was discovered after Marder and Chang conducted a study which reviewed medical insurance claims of a subset of obese children taken from a national database. More studies need to be conducted to investigate exactly why this relationship exists.

Today's children are affected by a vast number of health problems correlated with lack of active physical activity and practicing sedentary behaviors. Medical conditions

on the rise over the past decade include childhood obesity, asthma, and ADD (Perrin, Bloom, & Gortmaer, 2007). Sixteen percent of American children ages 6-19 are considered obese or overweight (Hedley et al., 2004). According to Koplan, Liverman, and Kraak (2005), the Institute of Medicine found that childhood obesity has doubled over the last three decades for preschoolers and adolescents. Children ages 6-11 have seen a threefold increase in childhood obesity. This current generation of children may be the first to actually have a shorter lifespan than their parents (Ludwig, 2007). If childhood obesity is a byproduct of inactivity and sedentary lifestyle choices, then the importance to get kids active could not be stronger. An exploration of the influence of media on children follows.

### **Children and Media**

Children are spending an increasing amount of time in front of some type of media (Kaiser Family Foundation, 2005, 2006) and less time directly involved with nature and natural settings such as national parks (Pergams & Zaradic, 2006). The term “videophilia” describes the human desire to choose sedentary activities like video-gaming over active lifestyle choices (Zaradic & Pergams 2007). Compared to preschool children who view less than two hours of television daily, those who watch two or more hours each day, spend an average of 30 minutes less time outside playing on a daily basis (Burdette & Whitaker, 2005). Additionally, Clements (2004) surveyed mothers and asked them to compare the degree that they played outdoors as children to the degree that their children played outdoors. Clements found that in the years immediately following the year 2000, children played outdoors less and engaged in more indoor activities than

outdoor activities when compared to the amount of time their mothers spent playing outside as children.

In addition to increased sedentary lifestyle today's children appear to be less engaged in free play of all kinds. This poses a threat beyond those associated with inactivity: lack of free play is also associated with lack of development of mastery over self and environment. What follows is a discussion of the importance of free play in children in the development of mastery and self-efficacy.

### **The Importance of Self-Efficacy**

Self-efficacy has long been understood to play a major role in children's academic and social development (Bandura, 1993). Capara, Pastorelli, and Bandura (1992) found that children who had a high sense of academic self-efficacy made better behavioral choices, were more known by their peers, and experienced less peer rejection than children who did not have high academic self-efficacy beliefs. Additionally, having low academic self-efficacy was associated with physical and verbal aggression, poor behavioral choice making and lack of commitment to moral norms. Capara et al. (1992) also found that the effect of low academic self-efficacy on social behavior grew stronger as children grew older. Academic failure can set the stage for low self-esteem and limited career choices. Developing a strong sense of self-efficacy is paramount to children being able to experience normative academic setbacks and continue to endure in the academic realm. Moving forward, childhood mastery development, and its role in children's interactions with their social, physical, and emotional environments is explored.

## **CHAPTER 2: THE ROLE OF PLAY, SELF-EFFICACY AND NATURE**

### **The Development of Mastery**

The need for mastery is thoroughly discussed in Erik Erikson's theory of child development. Specifically, Erikson viewed mastery as an essential task in the industry versus inferiority stage (age 6-12). Erikson calls this the "I am what I learn" stage (Erikson, 1994). This stage encompasses children's need to master things like reading and tool usage. In modern society, tools include technology-based resources like computers and the internet. During elementary school, children must grasp a basic education which will prepare them for a wide range of opportunities later in life. Erikson claims that elementary school places the child in a dichotomy: on one hand, children grapple with responding to adult directives and expectations, and on the other hand, children struggle with the natural tendency to learn through free play. Children learn by performing tasks which they like to do. A fine balance must be struck between the two poles of educating children: Stray too far one way and children learn to be dependent on structured prescribed tasks; wander too far in the other direction, and it is thought that children may not genuinely master essential skills (Erikson, 1994). Despite an emphasis on free play, Erikson believed that children had much to gain from the insight of others. He believed that many opportunities to learn would be missed if children relied solely on themselves and free play for knowledge. Erikson (1994) purports that a combination of the two modes of learning, play versus the expected, promotes the development of a child who is able to successfully participate in the world of adults.

Erikson (1994) also purports that play is the child's way of cognitively processing difficult experiences and restoring a sense of mastery. Today, restoring a sense of mastery is the rationale for play therapy, play diagnosis, and play observations in clinical settings Erickson (1994). Similar to the way adults ruminate and repeat cognitions and language that have been traumatic, children work out experiences through play until a level of cognitive comfort has been reached. The re-creation of the event must allow for repair and mastery in the child's mind for them to be able to move forward. Erikson theorized that by observing children play, one can determine what is troubling them and what has them stuck in an emotional conundrum. Children's play areas are their toy yards, thus, are seen by Erikson as their therapeutic milieus to be visited during challenging times. If children have successful interactions with their toy environment, they interpret those experiences as having mastered the toys. Progressively, and incrementally, the mastery of the toy environment evolves into mastering conflicts and interactions with others, and the "prestige" that comes with successful mastery (Erikson, 1994).

As children continue to grow, mastery over non-physical items becomes a new task. Children begin to master experiences. This happens as children enter school and encounter others. They are now challenged with sharing, mediation, planning and experimentation (Erikson, 1994). With further growth and development, children eventually become dissatisfied with only make-believe games and solitary play: they crave a sense of usefulness. Without this, Erikson purports children will become agitated and disgruntled. Between the ages of 5-7 years, children begin to seek a sense of industry. They desire to be able to do things and do things well at this stage. Children

who are industrious wish to make things and be recognized for their usefulness. This is where the drive to complete tasks and real work begins. Children at this stage endure and work steadfastly to produce end results. Attention to task and perseverance become important (Erikson, 1994). If children do not have the confidence and competence to master the production of “things” at this stage of development, they may see themselves as failures and develop an inferiority complex in relation to peers and others (Erikson, 1994).

Boeree (2006) points out that industry versus inferiority evolution occurs between the ages of 6 to 12. Social success, feelings of self worth, motivation, attention to task, competence, as well as shifting from simply playing to resolve conflict, to actively problem solving and embracing concerns about pleasing others, both in the home and school, are paramount at this stage of development. During this stage in children’s lives, the development of a strong sense of self-efficacy and competence are critical. If children are not afforded opportunities which allow for the development of self-efficacy and self-competence, Erikson (1994) theorizes that children may internalize a life-long sense of inferiority. Considered by many to be a critical element in the development of a healthy self and a possible protective factor against developing a sense of inferiority, play and play theory are explored and their importance is clarified in the following sections.

### **Play Theory**

Throughout history similarities have been drawn between children’s play and animal play. Darwin’s *Origin of Species*, published in 1859, helped people to make comparisons between evolutionary animal play and human play. Evolutionary adaptive explanations were first attempts at explaining why play occurs. Frederick Von Schiller

and Herbert Spencer theorized that animals, including humans, played to expend surplus energy not needed for survival. They believed this was because children were protected and under the care of their parents. Karl Groos, in the late 1800's, theorized that play in children and animals was a practice activity for skills necessary for survival later in life ("Theories of Play," 2009). Groos also believed that since children are dependent on their parents, they do not need this energy which would ordinarily be used to arm the survival instinct. This surplus energy was used to fuel play or practice behaviors. Mark Baldwin, in the late 1800s, theorized that play was the recapitulation of past evolutionary stages that the human race had experienced. This idea was supported and enriched by John Dewey and others of that time ("Theories of Play," 2009).

Dewey's 1909 writings further developed early play theory by stating that play behavior would later evolve into socially valuable occupational skills. Maria Montessori emerged in the early 1900s and espoused that children's play should afford them the opportunity to encounter reality without having the will and thoughts of others imposed on them ("Theories of Play," 2009). Montessori was opposed to any type of adult contrived childhood fiction. It was thought that these adult imposed stories were the source of the majority of children's fantasy play. Montessori wanted children to interact with reality and create their own fantasies during free play ("Theories of Play," 2009).

Psychoanalytic theories of play emerged in the 1900s and emphasized play as integral for emotional development. Towards the end of the 19<sup>th</sup> century, Sigmund Freud theorized that child play was the reenacting of childhood experiences. He labeled this behavior the "repetition compulsion" ("Theories of Play," 2009). This behavior served to reduce life tension accrued from the pleasure principle and the death instinct. In the early

1930s, Melanie Klein, a psychoanalyst, pioneered what is widely known today as “play therapy.” This therapeutic intervention has roots imbedded in the historical development of play theory and is heavily relied on today as an appropriate child intervention. Klein worked under the premise that children reenact, through play, traumatic or troublesome life events until they have them mastered. This focus on play as essential to emotional development gave rise to play therapy and several academic schools whose missions included statements regarding children’s play and how spontaneous natural play should not be turned into learning experiences. The Summerhill School founded in America around 1914 by A. S. Neil actively encouraged children to play freely and without adult imposed constraints (“Theories of Play,” 2009).

Twentieth century play theory was dominated by three major players: Jean Piaget, Lev Vygotsky, and Jerome Bruner. These theorists shifted etiologies away from evolutionary explanations of play behavior to emphasizing the cognitive functions involved in play; Piaget, a Swiss psychologist, stressed play and its role in socialization. He made great strides in the investigation of children’s moral reasoning (Piaget, 1932). Vygotsky emphasized role playing and language development during play as precursors to later life social and language development. He also believed in what he called the “zone of proximal development” (Wertsch, 1985). This zone described the dynamic interaction whereby a child would exhibit increased performance when exposed to a more experienced playmate during play (Wertsch, 1985). Bruner focused on the role play served in language acquisition and problem solving (“Theories of Play,” 2009). Bruner also interpreted play as a pleasantry and believed that childhood play, if orchestrated correctly, would result in children leading richer and more fulfilling lives (Bruner, 1983).

As can be seen from the historical developments of play theory, humans have grappled with how play serves human functioning throughout time. A critical task during childhood is the struggle for mastery. As can be seen from the literature, language usage, language acquisition, social skills, problem solving, energy expending, and skill building for later occupational endeavors have all been considered critical components of play. The aforementioned components of childhood development are an essential part of children's life experience.

Play behavior in childhood sets the stage for later life skills development, occupational endeavors, emotional expression, and of greatest concern and relevance to this study, the development of mastery. To be able to master tasks at any age requires that one have a belief in oneself that a task can indeed be mastered as a result of direct personal effort. Motivation to persevere under duress and the belief that the environment can be affected by one's actions is imperative in mastering tasks and experiencing positive reinforcement in doing so. The aforementioned personality components are core tenets of self-efficacy. Self-efficacy is necessary for children to prosper. It has been widely theorized that play positively affects many aspects of childhood growth and development including aspects of the self. What follows is a review of the empirical benefits of play.

### **Benefits of Play**

Play is an activity which naturally encourages children to be active, social, and investigative, which often leads to their first experience with winning and losing. The benefits of play to human functioning are many. Ginsburg (2007) purports that play allows children to be creative, use their imaginations, exercise, and develop their mental

and emotional competence. Play offers a critical opportunity for children to interact with their parents (Ginsburg, 2007). Burdette and Whitaker (2005) posit that play is a way to optimize early brain development. The developing brain of a child builds new neural pathways with every encounter, experience, emotion and knowledge acquisition. Brain development is enhanced by play.

Beyond play in general, Francis (1998) reports that children's play in an unstructured natural environment gives children an understanding of the real world. The National Wildlife Foundation (NWF) purports that children who engage in regular outdoor play are more active and fit than their peers who do not play outside (NWF, 2009). White and Stoeklin (1997) report that children regularly and reliably show a strong preference to play outside in nature, and that parents, for the most part, support this kind of activity. Furthermore, research indicates that childhood play in undeveloped, naturally wooded or vegetated wild lands helps children develop navigation and survival skills (Bixler, Floyd, & Hammit, 2002). Running, jumping, lifting, debating, fighting and problem resolution are all part of children's play. They learn how their bodies relate to and move through the world around them. Outdoor play in nature requires kids to climb, reach, grasp, lift, make decisions, and pay attention to surrounding land formations and terrain. Outdoor play engages children in their entirety: physically, cognitively, and emotionally. Kids learn to socialize with peers and adults through play (Ginsburg, 2007).

## **Unstructured Play**

In the 21<sup>st</sup> century, unstructured play time for children is dwindling from year to year (Ginsburg, 2007). Children develop a host of skills during unstructured play that cannot be attained in other settings or scenarios. A working definition of unstructured play is offered by Vecchioni (2008). He states that if a child is playing and establishing his or her own objectives, then he or she is engaged in unstructured play. In a commentary article authored by Howell (2009), an occupational therapist was reported as saying that play is essential to the development of many life skills. Turn taking, social interaction, following directions and fine motors skills are all developed during play. His article goes on to report that highly structured play does not develop critical thinking and problem-solving skills. Howell warns that parents with good intentions enroll their kids in athletic camps and structured summer classes with the hopes that they will learn skills. These types of classes and camps require kids to follow the rules created by adults thus with children missing the opportunity for self guided exploration of the world.

According to Berman (2007), children learn to solve problems, socialize, self regulate, and gain self-confidence through unstructured play. It has been hypothesized that children who are allowed to play on their own terms grow up to be adults who can be leaders in life and the workplace (Berman, 2007). Burdette and Whitaker (2005) believe that free play can help regulate many emotional states such as depression, aggression, anxiety, and sleep problems. With so many benefits of play being noted what might be the connection between play and self-efficacy in children?

## **The Role of Self-Efficacy**

Alfred Bandura, one of the most well know self-efficacy theorists and researchers, in his theory of self-efficacy, indicates that individuals actively contribute to their functioning through what he calls “mechanisms of personal agency.” Bandura purports that central to human functioning is persons’ ability to believe in themselves, the persons’ capacity to exercise control over their lives and variables which may affect their lives, and the degree to which they are able to control and influence their life functioning. Individuals’ self-efficacy can shape how they think, feel, motivate themselves and act. Bandura describes six significant areas of human functioning that are affected by self-efficacy beliefs. These include goal setting, perceived ability, degree of personal influence, emotional stability, academic achievement, and motivation; each is described briefly here.

### **Goals**

Goal setting is a powerful example of a cognitive process. Self appraisal of one’s abilities affects goal setting behavior. Children who have high self-efficacy beliefs envision themselves being successful and are able to use those images and thoughts to guide, drive, and support their efforts while they are pursuing goals. Individuals with a low sense of self-efficacy paint images of failure and are filled with doubt about their abilities. Researchers posit that self-efficacy plays a major role in the daily life of every human being (Bandura, 1997; Pajares & Urdan, (2006).

As young children strive to find themselves and enter the often difficult teenage years, research suggests they need a strong sense of efficacy to function optimally in academia and the social and emotional realm (Bandura, 1993). Accomplishments require

more than just knowledge; they also require self-efficacy beliefs to go with them. Two people with similar skills may perform drastically differently based on their self-efficacy beliefs (Bandura, 1993).

### **Abilities/Competencies**

Humans have no consistent concrete objective standard by which they can assess their abilities: Bandura (1993) reports that people must assess their capabilities in relation to the achievement and attainment of others. Children and preadolescents struggle with this developmental task which is essential to their identity formation. The individuals that people choose to compare themselves to influence how their abilities are judged. In a study by Bandura and Jourdain (1991), individuals who saw themselves surpassed by others on a task demonstrated lower self-efficacy, erratic analytical skills, and progressively impaired performance goals. In contrast to those results, Bandura (1993) found that when people see themselves gaining increasing mastery, they experienced an increase in self-efficacy, thought more efficiently, and experienced more positive performance gains.

### **Ability to Affect Change**

Similar to goals and abilities, the perceived controllability of one's environment is an area that also affects one's daily functioning. Every day, children experience life situations which require them to act or acquiesce. Bandura (1993) presents two avenues of thought that significantly influence functioning in the areas of control of life events and one's surroundings. The first area involves the strength of the belief that one can produce change with consistent effort and the use of one's personal self and resources. The second involves perceived modifiability of one's environment. Regarding the

strength of self-efficacy, people who are constant self doubters expect negative results from their efforts. These individuals affect very little change in situations and circumstances that provide great opportunity. On the other hand, those with strong efficacy beliefs work hard, persevere, and try to figure out how to exert control even in environments offering little opportunity and many barriers (Bandura, 1993).

Bandura and Wood's (1989) experimental study showed that when an experimental group of business leaders managed an organization operating with the installed belief that group behavior is not easily managed, their management performance plummeted, the group performance decreased, and they lost faith in their abilities. In the same study, when study management groups were told that group behavior is easily manipulated and managed, they displayed highly resilient self-efficacy, persevered in the face of difficult obstacles and set challenging goals for themselves. This management group helped their organization achieve positive group performance (Bandura & Wood, 1989). Empirical research has demonstrated what Bandura theorized that human beings' beliefs regarding in their ability to affect change can be manipulated and those with positive beliefs about their ability to affect change realize positive outcomes from their effort.

### **Motivation**

Bandura's (1993) efficacy theory also outlines motivational aspects of human functioning. Most human motivation, according to Bandura, is generated during cognition. Humans generate beliefs about what they can and cannot do. Possible outcomes of their actions are conceived from these beliefs. This forethought is a guiding force in human motivation. Bandura also states that people anticipate possible outcomes

before undertaking actions; futures and outcomes important to people guide their goal setting and achievement behaviors. The resulting mental outcome expectancies derive their motivational power from efficacy beliefs of capability. Motivation to perform and to assert one's self is a personal attribute that will enable a child to capitalize on opportunities presented. A strong sense of work leadership, the ability to advocate for one self, and the ability to turn goals into action plans all rely heavily on being able to operate with internal motivation (Bandura, 1993; Bandura & Wood 1989). Bandura went on to explain that these experiences of mastery and ability contribute to emotional wellbeing in important ways.

### **Emotional Stability**

In the affective realm, the belief in one's ability to exert control over life stressors plays a central role in anxiety management. When people believe they can control stressful life scenarios they are better able to remain free of disturbing self defeating thought patterns. Individuals who do not feel a sense of control over life stressors experience heightened anxiety arousal. These individuals view their environment and surroundings as dangerous. They magnify perceived threats and potential dangers even when the likelihood of encountering such situations is low (Bandura, 1993).

### **Academics**

Bandura (1993) found that children who do not believe in their social and intellectual efficacy are likely to befriend kids who do not prioritize academics. These attitudes can have lifelong consequences. Compounding self doubt of one's cognitive capacities may lead to missed opportunities both occupationally and socially. As can be seen from the literature, self-efficacy beliefs can have reverberating effects on the

developmental path of young people. As children strive for mastery of the various developmental stages, their sense and strength of self-efficacy beliefs will contribute to their overall success in each stage. As Erikson (1994) indicated, play is an essential part of children's development of mastery. Mastery of one's environment, things, the social process, and work production are critical to the development of a healthy sense of self. In this study, the researcher scientifically investigated the relationship between self-efficacy and outdoor play. Following this discussion of self-efficacy is an overview of what is known about outdoor play.

### **Outdoor Play**

Outdoor play has been widely thought to be influential in the lives of humans. Kellert (2002) talks about three modes of experiencing nature. Those three modes are direct, indirect, and vicarious. Direct experience with nature involves interactions with non-human creatures and physical contact with natural environments. This includes impromptu childhood play in a waterway, wooded area, vacant lot, yard, or nearby park (Kellert, 2002). These types of environments function largely undisturbed by humans. Indirect nature contact involves exposure to nature but in a more controlled removed way. Examples Kellert gives for this type of contact is a zoo, aquarium, or having a domesticated animal like a cat or dog as a pet. The last type of nature contact is vicarious contact. This level of exposure includes viewing or owning art and photographs as well as watching videos of nature or natural areas (Kellert, 2002).

Of the three types of exposure to nature, direct contact has the most salient effect on children's cognitive development. Direct exposure to nature offers limitless sights, sounds, smells, and opportunities for touch which evolve in space and time (Zaradic &

Pergams, 2007). The complex nature of these sensory experiences requires that the body and mind problem solve and adapt to the stimuli being encountered (Sebba, 1991). Wells and Leckies (2006) found that direct exposure to “wild” nature as compared to “domesticated” nature before the age of 11 has a profound effect on shaping adult behaviors and attitudes towards nature. As time spent in national parks and other nature forums decreases, society is witnessing a dramatic increase in the utilization of video games, internet surfing, and home movie viewing (Pergams & Zaradic, 2006). What are the implications of these changes on childhood development?

## **Outdoor Play Research**

When children step outside into a natural setting to play, they receive sensory stimulation from their surroundings. Their taste, visual, auditory, tactile, and olfactory senses are aroused. Once children begin to engage their natural surroundings they have opportunities to make decisions, think creatively and problem solve all the while they are engaged in outdoor play (Burdette & Whitaker, 2005). Outdoor play is generally less structured than indoor play (Wirz et al., 1996).

There is mounting scientific evidence regarding the effect nature has on the human condition. In exploring a link between self-efficacy and outdoor natural play it is important to highlight the powerful effects that nature has on people as a means to justify exploring the relationship between two important constructs: self-efficacy and outdoor play in nature. Since nature has been found to have significant effects on critical aspects of human functioning, a link between self-efficacy and outdoor play in nature is a logical avenue to pursue. Following is a review of what is empirically known about time being spent exposed to nature and its effects on humans.

It has been shown that when children are exposed to natural environments in which they can play, they play more. In fact, there is research investigating the lack of children's exposure to nature and green spaces, as it relates to their activity level and outdoor environment access. Thompson, Aspinall, and Montarizino (2008) found that children's play environments are becoming limited to indoor shelters and backyards, and that only a very small percentage of children are exposed to woods or other wild lands in which they can play. Another possible consequence of infrequent exposure to nature is demonstrated by the fact that many children do not have basic species awareness of the

common wildlife in their own back yard (Balmford, Clegg, Coulson, & Taylor, 2002). Furthermore, Titman (1994) found that children preferred to play in environments comprised of grassy areas and trees. In contrast, children did not like to play in areas with macadam. Taylor, Kou and Sullivan (1998) relied on a sample of African American children, ages 3-12, to explore children's environmental play preferences. The play space studied consisted of open space between housing units. The level of vegetation, considered nature for their study, varied from no vegetation to densely laden with vegetation. Vegetation in this study was operationalized as tree cover. Two hundred and sixty two play behaviors were studied in these children. Researchers recorded the type and frequency of different types of play across the natural environments. Environments varied from built areas (buildings and no flora) to densely vegetated areas. Researchers found that the amount of flora was positively associated with the amount of play within that given area. This suggests that natural areas may be more beneficial than built areas (Fabor et al., 1998). Since creative play has been linked to increased cognitive abilities Fabor et al. examined the different kinds of play behaviors taking place in the study environments. Using surveys and direct observation, they specifically compared imaginative play to structured play. Fabor et al. discovered a positive statistical relationship between naturalness of a play space and creative play behavior. Fabor et al.'s study provides interesting findings but does not look at any developmental or emotionally-based outcomes such as mood, motor development, or measure of self. Data collected on the children's perceptions or reasons for choosing different play environments probably would have been more beneficial.

## **Physiological Benefits of Outdoor Play**

Outdoor exposure has been associated with a number of physiologic and psychological benefits. First, sun exposure has been found to provide positive mood benefits (Wirz et al., 1996). Additionally, rickets-a disease which causes bone deformities and retarded growth in humans and can progress to osteoporosis-can be avoided by getting 10-15 minutes of direct sun exposure weekly. That amount of sun exposure is enough for the body's to produce its required amount of Vitamin D (Brender, Burke, & Glass, 2005). Playing outside is one way that children can absorb adequate amounts of Vitamin D from sunlight for producing adequate amounts of Vitamin D, thus enhancing mood and reducing risk for rickets.

Rose et al. (2008) found that by simply spending time outside, the incidence of myopia was reduced. Myopia is a condition also known as nearsightedness. Objects viewed from a distance are seen out of focus by children who have myopia. Myopia may cause headaches and eye-strain as well (Children's Hospital Boston, 2005-2009). Strengthening the argument for outdoor play, Ellis (1992) believes that children engage in risk taking behaviors while playing outdoors, thus challenging themselves in ways that lead to improved self-esteem and self-confidence, ways that would not be possible while engaged in indoor play.

What's more, increasing amounts of time spent indoors and the lack of physical activity in children likely account for, at least in part, substantial rise in the occurrence of both asthma and obesity. Some researchers believe that with the increase in chronic childhood afflictions, there will be large numbers of young adults with chronic diseases who must rely on public programs and monies. These individuals may also enjoy a lower

quality of life, a smaller degree of community involvement, and suffer from less social success. Obese children experience high rates of increased blood fat levels and high blood pressure as well as bone and joint problems, and social difficulties (Perrin et al., 2007).

Fjortoft (2001) conducted a study to examine the way children use the natural environment as a playground, and its effects of this on their motor development. Fjortoft decided to concentrate on the affordance of the landscape and its correlation for versatile play. The concept of affordance was developed to describe one's awareness of different natural outdoor environments and their uses or functions as they pertain to children's play areas (Gibson, 1979). Fjortoft employed a quasi-experimental design with two groups: an experimental group and a non-experimental group. The non-experimental group received no experimental intervention. The experimental group consisted of 46 children from a kindergarten class in Norway that were exposed to a natural, wooded play area for 1-2 hours each day throughout the school year. The comparison group consisted of 29 children from a neighboring school. This comparison group experienced recess at school as usual, on standard equipment available to all students. In the selection process students were matched for demographics. The control group only used the natural area sporadically and used the traditional playground 1-2 hours daily throughout their school year. Both study groups had the same standard playground equipment on their traditional playgrounds. The experiment ran for nine consecutive months. Participants were given a pretest and a posttest measuring motor skill development test.

Results from this study support those of prior studies demonstrating that children engage in vigorous play when set loose in unstructured natural surroundings (Frost,

Wortham, & Reifel, 2001). Fjortoft (2001) discovered that while in the natural play area, children engaged in free and creative play. This was evidenced by the building of shelters, naming of structures, game playing, and the creation of hiding places. Study data also showed that children played outside creatively and actively throughout the winter. The affordance of natural structures changed with winter snow cover and leaf loss from trees. With proper clothing, children created slides, slopes, and jumps on which to play. Fjortoft describes climbing, crawling, and other active behaviors as functional play. A significant relationship was found to exist between the landscape diversity (terrain and natural structure variance) and the affordance of play. Additionally, significant increases were found in motor ability in the experimental group which used the forest scape as a playground. Furthermore, during the pretest the control group scored higher than the experimental group. Conversely, at the conclusion of the intervention the experimental group scored higher than the control group in all motor skill areas examined (Fjortoft, 2001). The results of this study, as Fjortoft's study did, found that children playing outdoors reap both physical and psychological benefits.

Fjortoft's (2001) study was able to utilize two groups of children from similar settings and of comparable demographic backgrounds in his experimental and reference groups. Fjortoft increased internal validity by controlling for parent's socioeconomic level through regression analysis using parents' educational and professional backgrounds as variables. Fjortoft also recorded data on the children throughout seasonal changes. The data support the claim that children should be encouraged to play outside despite weather conditions.

As with all studies, Fjortoft's (2001) study has some limitations. The physical motor ability growth noted in the results section may be impacted by normal growth and development over the 9-month study span. Fjortoft noted that private leisure activity undertaken by the participants in both the experimental group and the control group also may have contributed to their motor development. No qualitative data was formally collected in this study. Results describing and detailing the play activities could have been collected and shared in a way which would allow for replication in the future. Also, Fjortoft's study was done in Norway, which may have variations in culture, economics, and other variables as compared to the United States. This may limit the generalizability, or external validity of the study.

## **Nature and its Effect on Attention in Humans**

Kuo and Taylor (2004) investigated whether exposure to green or natural settings had an effect on Attention Deficit Hyperactivity Disorder (ADHD). These researchers used an internet survey to elicit responses from parents whose children were from 5-18 years of age. They compared parent ratings of children's behavioral symptoms related to ADHD after common after school and weekend activities conducted either in indoor spaces, outdoor natural areas, or outdoor built areas. They found that time spent in outdoor natural areas had the greatest effect on ADHD symptom reduction. Taylor, Kuo, and Sullivan (2001) investigated whether contact with everyday nature is related to attentional functioning in children. Parents of children 7-12 years of age who were clinically diagnosed with ADHD were recruited to participate in the sample. Internet and hard copy questionnaires were used to gather data from parents. Taylor et al. (2001) found that children demonstrated increased functioning regarding ADHD symptoms after participating in activities in green settings. The data also showed that the greener the environment, the better functioning displayed by the children with regards to their ADHD symptoms according to parent input. Taylor et al. produced data strong enough to suggest that contact with nature is directly related to lessened ADHD symptoms. As can be seen from the empirical literature, natural environments have a profound effect on human cognitive functioning. Research has demonstrated that ADHD can be more effectively mitigated in a natural setting than in a non natural environment. The researcher further examines the literature for studies of nature and its effect on human functioning.

## **Nature Exposure and its Effect on Cognitive States**

The benefits of exposure to natural environments has been documented in both urban and rural environments. For example, Wells' (2000) study focused on the effects of a natural window view on children's cognitive functioning. She studied low income urban children after a move from their urban home to a variety of levels of green home environments. This was a two stage study. The initial data were collected in the urban home environment where "greenness" or visible vegetation was low. The second phase was in a relocated home environment where there was an increase in "greenness." Subjects included 7-12 year old black and white kids. Naturalness was measured via a scale developed around the amount of nature that was visible from a window view in several areas throughout the homes. The Attention Deficit Disorders Evaluation Scale, developed by McCarney (1995), was used to assess cognitive functioning. Mothers provided the responses to questionnaires regarding their children's cognitive functioning. They found that children whose home living environment improved the most in terms of greenness had the highest post move levels of cognitive functioning as measured by the Attention Deficit Disorders Evaluation Scale (McCarney, 1995). McCarney's study took into account the seasonal changes in vegetation and conducted the interviews during consecutive summer months. McCarney did not take into account the historical changes that may have taken place in the children and the parents over time. Factors like, change in parents' employment, family structure, children's health and general activity levels may have influenced parent perceptions of their children. The parents' moods and coping skills may have improved independent of the move thus affecting the ability to cope with their children's behavior. This may have resulted in under reporting of symptoms in the

children. The children themselves may have developed increased abilities to focus and concentrate over time as well. McCarney provides correlational data indicating that it is likely that “greenness” affects children’s cognitive functioning. Continued research in this area is necessary to further strengthen the relationship between nature and increased human functioning.

In a study of the levels of nearby nature and its relation to stress in children, Wells and Evans (2003) found that parents who lived in rural settings with the most vegetation reported that their children exhibited lower levels of stress in response to life stressors than did those who lived in areas with lesser degrees of naturalness or visible vegetation. Students in Grades 3, 4, and 5 were included in this study. A naturalness scale developed by Evans, Wells, Chan & Saltman (2000) was used to measure the amount of greenery visible out of particular windows in the home, as well as amounts of indoor plant life and live materials in the home yard. Researchers found that nearby nature mitigated the effects of stressful life events on children’s psychological distress. Specifically, those children who lived near higher levels of vegetated environments had lowered responses to stressful life events than did children who lived near less densely vegetated environments.

Evans et al.’s (2000) study, like many studies without the random assignment of subjects, was vulnerable to self selection bias. Self selection bias dictates that some of the parents may have chosen to live in a rural setting and that those parents may already have possessed characteristics that account for the study’s results. The researchers did control for income but there were a multitude of other factors that may have influenced the parent’s reporting and their capacity to influence their children’s lives.

Evans et al.'s (2000) data should be used as a launching point for future studies investigating nature's effect on humans in an experimental study. With proper controls and randomization of subjects to experimental conditions, this study may yield stronger evidence of nature's effect on cognitive and emotional states in children.

Tarrant's (1996) study on nature and its effects on humans explored changes in subjects' affect and physical symptoms after exposure to one of four treatment conditions. Treatment conditions included recalling past instances of passive or active outdoor experiences, exposure to a classroom test taking scenario or participation in an autogenic relaxation intervention. The autogenic treatment required participants to imagine sensations throughout their body while focusing inwardly on themselves and their inner mental and physical states. This 44 subject laboratory experiment found that recall of outdoor recreation experiences promoted positive affect, reduced negative feelings, and decreased reported physical symptoms such as headaches and general aches and pains. Outdoor recreation recall produced more improved subjective health states, higher positive affect and lower negative affect than did the autogenic treatment condition. Conversely, the classroom exam scenario produced higher physical symptom reporting and negative affect than the recollection of passive and active outdoor recreation. Evidence from this study suggests that internally generated representations of time spent in nature are effective at altering mood states. This study used recall of past experiences as a treatment condition. One criticism of this study is that memory recall may be subject to intrusive thoughts associated with that same time period or event. Past experience associations and/or other extraneous memories may have affected the induced mood in this study. Furthermore, the subjects' qualifications of what constitutes a

“natural setting” may have been drastically different as well. “Natural setting” was not operationalized in the study. Lastly, Tarrant’s study did not have a control group for comparison of the treatment conditions.

Korpela and Ylen (2007) discovered that people who visit favorite natural places experience a reduction of physical symptoms and negative affect. More specifically, they studied people ( $n = 211$ , average age 40) with varying degrees of physical ailments. Those with more complaints visited natural areas more frequently than those with fewer complaints. Subjects also experienced a shift from negative to positive affect after the natural favorite place visit. Korpela and Ylen produced results that open the door for investigation of the effects of natural environments on one’s mood. The study relied on subjects’ recollections for data reporting. Memory reporting is subject to be whatever the respondent is able to piece together at the time and may not be accurate thus lowering the questionnaires fidelity. Despite the fact that this study was conducted in Finland it is plausible that the findings hold true in other countries as well.

Another study which examined nature and its effect on mood was conducted by Ulrich et al. (1991). Ulrich et al. examined the effects of nature exposure on restorative emotional states of 120 undergraduate students from the University of Delaware, half of whom were male and half female. Participants viewed two 10-minute tapes on a 19-inch black and white television screen. The initial video tape viewed was considered the stressor (a film about injuries in the workplace). Several severe injuries were viewed all displaying blood and body disfiguration as a result of machinery accidents. Students then viewed a second tape which was the recovery scenario. This color video showed the subjects in six everyday environments. Two of the environments were nature scenes and

four were urban scenes. Subjects were randomly assigned to the conditions so that 20 subjects were exposed to each recovery environment. The conditions were: nature vegetation, water scene (river), heavy urban traffic, light traffic in an urban area, and an urban area with many people traveling via foot. Physiological measurements were taken during each test scenario for additional data including EKG (electro cardiogram), pulse, transmitting time, spontaneous skin conductance recording, and EMG (Frontalis muscle tension). The results showed that the subjects who experienced the natural setting videos during the recovery period reported improved emotional states as well as lower stress levels as evidenced by the physiological measures recorded. Subjects who experienced the urban scenarios during recovery experienced less improvement in both physiological states and emotional states. Although there was no actual nature experience, data suggest that even simulated images of nature produced mood improvement. The randomization of subjects to the treatment conditions (recovery videos) effectively addressed threats to internal validity. Ulrich et al.'s (1991) study demonstrates how even false nature can have a positive effect on aspects of the human self, thus setting the stage for future research on nature and its effect on people.

## **Frequency of Children's Exposure to Nature**

Moving from different types of natural environment exposure to frequency of exposure to outdoor play and nature, studies continue to provide support for the notion that outdoor exposure has positive effects on humans. A 2004 study by Clements of Hofstra University examined the extent to which children in America are actually playing outside and the degree to which they are benefiting from outdoor play. A survey designed to assess the opinions of mothers of children 3 to 12 years of age was utilized. Responses were recorded via online survey. The survey was a multi-tiered survey which accommodated multiple response variables. The mothers were asked questions regarding their childhood activities. Those questions were immediately followed with the same question, but with application to their eldest child. The subjects were invited to participate in the study via email invitations. Study members' responses regarding their child's status were taken on the honor system. Information was collected and organized based on the type, frequency, and duration of outdoor play of their eldest child.

Results indicated that this generation of children in the U.S. spends less time playing outside than the children in prior generations. In fact, 70% of mothers indicated that they played outside daily while young compared to only 31% of their own children. Additionally, findings indicated that mothers spent at least three hours outside during each outdoor play bout compared to 22% of their children. Other results from Clement's study indicated that children participate in fewer creative or imaginative games than did their mothers. The only area that was reported to occur at a higher rate in the children than in their mothers was structured, organized, outdoor play. These included activities like sports, scouts, etc. It was also discovered in Clement's study that children engaged

in more indoor activities than outdoor play activities. Clements' data also showed that 75% of mothers surveyed believed that outdoor play had a positive influence on their children's social skills, 82% believed that outdoor play increased their child's self worth, 67% indicated outdoor play was conducive to getting along with other cultures, and 97% identified outdoor play as an effective mediator of everyday stress.

Clements' 2001 study, while revealing some interesting data, also had some limitations. Study participants were solicited via the Internet. This selection method may have excluded people based on the ability to pay for Internet service. On the same note, only using those who had Internet access may have biased the sample towards younger more highly educated families. Demographic data like marital status, number of children and employment status were collected but no socio-economic status data were reported. Clements and the researchers also trusted the responses and identities of the people responding to the surveys online. Also trusted was the fact that the participants stated the number and age of their kids without verification. The two prior points are threats to external validity because the identities of those filling out the surveys were not positively known nor were the validity of the mothers' statements regarding the numbers and ages of their children. The strengths of this study lie in the range of questions posed to the participants and the structure of the survey. Clements employed a pilot study to ensure the user friendliness of the actual survey. There were no qualitative data collected directly from the kids or mothers regarding how outdoor play in nature affected mood and other areas of individual functioning. Qualitative information would enable researchers to gain a better understanding of children's affective and subjective experiences first-hand. Clements states that the most successful outdoor play involves

children choosing their own activities. This knowledge supports the need for further investigation of unstructured outdoor play in nature and its effect on measures of the self.

### **Benefits of Structured Outdoor Activity**

As a parallel to unstructured play in nature, researchers have examined structured outdoor activity and its effect on self-efficacy. Kimbrough (2007) found that a group of 72 coeds who took part in a college outdoor recreation course experienced significant increases in self-efficacy on the General Self-Efficacy scale (GSE). The GSE measures a general sense of perceived self-efficacy (Kimbrough, 2007). Subjects were given a pretest and posttest and showed significant increases on 7 out of the 10 items on the GSE. No subjects had lower posttest scores than pretest scores on any of the questions. In Kimbrough's article, she states that evidence gathered from research examining structured outdoor adventure education's effect on self-efficacy offers support for the hypothesis that outdoor play has genuine positive effects on self-efficacy that can be measured.

In sum, the literature is beginning to produce research on nature and its effect on humans. In recent years, studies have documented benefits including ADHD symptom reduction after time spent in nature affect as it relates to views of greenery from windows, change in mood during a rafting trip with college students, physical symptom reduction after exposure to nature, motor skill development after play in the woods, as well as validation of self-efficacy increases resulting from structured outdoor activities (Caulkins, Russel, & White, 2006; Jones & Hinton, 2007; Richardson, 2003) have all surfaced in recent years. Continued child focused research is necessary to expand the investigations of exposure to nature and its effect on the human condition.

As evidenced by the studies presented exposure to nature and representations of nature have profound effects on humans. This empirical evidence is further bolstered by a theory which purports that humans have a genetic predisposition to commune with nature. This theory is explored next.

### **The Biophilia Hypothesis**

Internationally renown sociobiologist, E. O. Wilson and counterpart Steven Kellert have coined the term “biophilia” to describe what they believe to be human kinds’ necessary, innate emotional connection to other living creatures and the natural world (Kellert & Wilson, 1993). Wilson and Kellert purport that biophilia is a part of our heritable makeup passed on from generation to generation. Biophilia is thought to be a behavior-based phenomenon. According to this theory, people learn and choose not to learn various responses. Kellert and Wilson believe that biophilia is not only innate but also an intricate pattern of unique learning rules. It is their belief that these rules can be analyzed down to an individual level. There are feelings attached to these rules and they can be categorized into opposing phenomenon. Examples would be attraction versus aversion, excited versus apathetic, and emotionally content versus emotional unrest or strife. Biophilia offers the idea that several emotional response branches are integrated into meaningful representations which make up a large part of human culture.

Kellert and Wilson (1993) suggest that when a person is removed from nature and the living environment, the rules governing biophilic learning responses are not replaced by modern-day rules of having the same meaning as representation or affiliation to the natural world. As such, the rules of learning are guided by responses evolving from engineered artifacts and technological creations which demand so much of a human

being's time, energy, and living space. Kellert and Wilson purport that it is because of biophilia that more children and adults in the United States and Canada frequent zoos than all professional sports games combined. They also posit that the reason humans have frequent unexplained mental phobias, whether about snakes, spiders, or butterflies, is because of the innate biophilia connection. The human brain developed in a biocentric world comprised of flora, fauna, chemistry, and geology. It was a biological birthplace. It would be largely impossible for all learning rules attached to that early learning environment to be erased in a few thousand years. This holds true even in people who have existed and evolved solely in urban environments for several generations.

For greater than 90% of human history, mankind has lived and survived as hunters and gatherers. During these times, humans remained intimately associated and housed with other living organisms. Deep into this history, before and during paleohominid times, humans relied on learned knowledge of critical aspects of human natural history (Wilson & Kellert, 1993). Essential knowledge like tool creation, fire starting, and knowing what foods are deadly are all examples of how knowledge has been handed down over time enabling the survival of human kind. Modern day evidence of this fact can be seen in the behavior of chimpanzees. Chimpanzees have basic comprehension of tool usage and possess a working knowledge of plants and animals necessary for survival (Kellert & Wilson 1993).

Human beings' need for nature goes well beyond the material usage of its resources. The influence is widespread encompassing the influence of nature on our emotions, cognition, spirit, and aesthetics. Biophilia suggests that placing the highest value and respect on nature and the natural world has given humankind significant

advantages in the evolutionary process. Adapting to life and the environment, successful species propagation, and the ability of man to thrive have all depended on a close affiliation with living organisms and life-like processes. This affiliation has allowed humankind to continue to survive and prosper. Alternatively, the destruction and slow degradation of the affiliation with nature and life giving and supporting process may increase the likelihood of existing in a diminishing capacity in all of our emotional and physical realms. Human affect, cognition, and access to earthly materials and resources may be adversely affected by a disconnect between man and nature (Kellert & Wilson, 1993).

Kellert and Wilson (1993) discuss, categorize, and hypothesize nine dimensions of the biophilia hypothesis. These nine categories describe humankind's evolutionary dependence on nature and the natural world as it is related to survival and personal fulfillment. Utilitarian, naturalistic, ecologicistic-scientific, aesthetic, symbolic, humanistic, moralistic, dominionistic and negativistic make up the nine areas of the biophilia hypothesis. These are discussed individually here.

### **The Utilitarian Dimension**

The utilitarian dimension describes the tendency of humans to reap physical benefits from nature and the natural world. These benefits are said to be necessary for survival and human prosperity. Natural organisms are used for their medicinal properties, as food, clothing, and tool sources (Kellert & Wilson, 1993). The media is frequently filled with news on new movements towards energy conservation, land preservation, and animal species protection. Support for this dimension of the biophilia hypothesis can be seen in the numerous "going green" promotions widely seen in the

media. In this study, it is presumed that the children involved are already taking advantage of the utilitarianism component of the biophilia hypothesis. All are presumably fed, housed, medicated as needed, and living in structures drawn from the natural world.

### **The Naturalistic Dimension**

The next area is the naturalistic domain. The naturalistic tendency describes human beings' propensity to derive pleasure from exposure to and contact with the natural world. Joy, satisfaction, and amazement are all descriptors used to capture the array of feelings experienced and the emotional impact that spending intimate time in nature has on humans. Witnessing the wide variety of natural species and the vast environmental diversity makes an indelible mark on human beings exposed to nature (Kellert & Wilson, 1993).

Kellert and Wilson (1993) believe that these emotional experiences, the cognitive and physiological changes enjoyed may be among the oldest rooted connections fueling the maintenance of the relationship between humans and the natural world. Recreational access and utilization have groomed this relationship in modern times. Naturalism involves seeking out, exploring nature, and encompasses an unyielding curiosity to learn about nature. This natural curiosity and desire to know and explore the environment has strengthened the evolutionary path of human beings over time. The acquisition of knowledge gained from exploration and inquisitiveness contributed to an evolutionary advantage thus increasing rates of human survival.

The naturalistic dimension of biophilia provides the foundation for physical fitness and the pursuit of outdoor recreational sports such as hiking, backpacking and

camping, and the acquired outdoor skills that come along with these activities. The naturalistic tendency may be responsible for children's play in the woods. Kids often go into the woods to catch insects, amphibians, reptiles, and small mammals and to investigate various plant species. The woods can be a place where kids use their imagination and explore their surroundings (Kellert & Wilson, 1993).

### **The Ecologistic-Scientific Tendency**

The belief that nature can be explained and understood through research and scientific study underlie the ecologistic-scientific tendency. Ecology describes the relationships that exist in nature amongst individual organisms and systems whereas a strict scientific study of nature emphasizes the physiological processes, taxonomy, and classification of organism. As evidenced by the multitude of natural sciences, biological sciences, and physical sciences in modern society, the ecological-scientific domain is ever present in the lives of human beings. To have even a basic understanding of the world, children and adults are instructed in school, and to a lesser degree in the home, about the natural and physical sciences. Everyday information that children possess about their bodies and the way the world around them works is obtained via a basic education in the ecological scientific dimension. The question must be asked, "How might an increased understanding of one's emotional and physical self affect self-efficacy and a sense of agency?" Furthermore, an affinity for nature and its organisms can be developed as a result of scientific and ecological investigations (Kellert & Wilson, 1993).

## **Aesthetic Dimension**

The raw beauty of nature and natural landscapes often invokes extreme emotional reactions in humans. Kellert and Wilson (1993) discuss the variety of aesthetic responses elicited by nature. They range from awe inspiring mountain ranges to whales breaking the water's surface and magnificent sunsets. The innate adaptive function of nature's aestheticism may lie in its ability to engender feelings of serenity, relaxation, and overall psychological well being and confidence. Kellert and Wilson suggest that natural landscapes and animals' aesthetic appeal and effect on humans may be part of humans' ability to recognize environments and scenarios where there is a greater likelihood of encountering food, shelter, and security. The effect nature has on individuals is well documented in the empirical literature (Fjortoft, 2001; Ulrich et al.,1991). Although no study to date has explained why nature has the effect on individuals that it does, the aesthetic response makes an attempt at connecting biophilia with real world behaviors.

## **The Symbolic Dimension**

The use of natural symbols has been said to have influenced the development of human language. The variety of categorizations, classifications, species, and life forms makes for a metaphorical springboard from which language foundations were created (Kellert & Wilson, 1993). If this tenet of biophilia is taken to be true, then language development has its roots in nature. The influence of the natural world on human beings may have given rise to an essential element of human society, language. Communication between and across species may have its foundations in nature and its strata of systems and organisms; when humans interact with each other, they are using a system heavily influenced, albeit unconsciously or consciously, by nature. Since self-efficacy is

essential to development of effective communication skills (Bandura, 1993), one might argue that this dimension can be fostered and honed with a strong sense of self-efficacy.

### **Humanistic Domain**

This aspect of biophilia describes the emotional attachment that humans develop to natural objects, usually the large living creature. In this domain, strong bonds are formed with animals and, at times, inanimate natural objects incapable of reciprocating emotions. With regards to adaptation, human survival has always benefited from relationships and attachments to other organisms in the natural world. This humanistic tendency to develop emotional bonds with individual elements of nature serves to increase the survival potential of humans. Households across the world have pets of all different kinds. Evidence of this kind of phenomenon is pervasive. Homes, rehabilitation centers, schools, law enforcement agencies and a plethora of other human headed households live with and are emotionally bonded with animals; many helping professionals target the social and psychological benefits of bonding with animals (Banks & Banks, 2002; Levinson, 1984).

### **The Moralistic Dimension**

This biophilia tendency encompasses the sense of moral obligation people feel to protect, preserve, and nurture the natural world. This realm even accounts for the spiritual connection often found in human culture. Evidence of this can be seen in creative writing, religion, and philosophy throughout the world. As a biological adaptation contributing to the passing of human genes from generation to generation, it is thought that this spiritual, artistic, and written dimension contributes to close family and communal bonds, altruistic behavior, and a sense of something more grand and beyond

oneself. It is theorized that the result is enhanced relationship and chances of survival (Kellert & Wilson, 1993).

Throughout time, humans have been known to hold animals in high regard and even worship them as gods. The media today is filled with movements to protect and preserve the land. If the moralistic tendency is legitimate, the push to get children and adults back into nature may be driven at least in part by a basic human need to appreciate and care for the natural world. This behavior can be observed when people venture into the woods to enjoy photography, paint pictures, find inspiration to write, seek peace and tranquility and commune through group activities and social events.

### **The Dominionistic Dimension**

The dominionistic tendency describes humans' desire to dominate the natural world. This can be associated with destruction, pollution, and exploitation of the natural environment. In attempts to master and dominate the natural world, humans gain significant and substantial knowledge about nature and its organisms. This expression of biophilia may be less apparent today than in early evolutionary times (Kellert & Wilson, 1993). Evidence of the human need to master their physical world can be seen in Erickson's theory of development. The early stages of Erickson's industry versus inferiority stage emphasize children's need to master their toys and other "things" during play (Erikson, 1994).

### **Negativistic Dimension**

The propensity to fear and have irreverence for specific aspects of the natural world is the negativistic tendency. The biological adaptation here is represented in the avoidance of potentially harmful or fatal encounters with natural threats (Kellert &

Wilson, 1993). Evidence of the biophilia tendency is all around us. Humans freely express their fear of spiders, snakes, and the like (Teachman, Greg, & Woody, 2001). Avoiding these creatures may ensure survival at its most basic level.

Reviewed in this chapter were physiological, psychological and emotional benefits of nature exposure on human beings. So significant is the thought that nature is an integral part of the human creature, a theory, biophilia, describing how humans are innately tied to nature, has been developed. Significant attention is currently being paid to how the natural world not only affects but benefits human beings, especially children. The empirical studies to date have failed to investigate the relationship of unstructured outdoor play in nature and its effect on child development. With the rise in inactivity, chronic health conditions, and sedentary behavior it is imperative to determine how such a readily available resource, in various forms, may be a factor in ameliorating many of the aforementioned conditions.

## **CHAPTER 3: METHODS**

In an effort to fill the gap in the empirical literature on unstructured outdoor play and its effect on child development, a mixed methods study was conducted in which children were exposed to unstructured play while in a natural environment. This study was a two-tiered study. The first tier included the quantitative data collection via scales. The children's self-efficacy was measure before and after their exposure period. The second tier consisted of researcher field notes documenting observations of self-efficacious behavior in nature. This chapter summarizes the methods, procedures and findings.

### **Design/Study Site/ Participants**

For this study, a pre-post intervention design was utilized to explore the effect of unstructured outdoor play in nature, in other words, free play in nature on children's self-efficacy. The experiment took place on a 500+acre parcel of land in rural Downingtown, Pennsylvania. Subjects were participants in a day camp run on the property. Twenty-one children, 11 boys and 10 girls, ages 8- 12 years, signed up for the study. Free play in nature was incorporated into the camp experience as an open elective. There were ten other electives from which the children could have chosen. Subjects and their parents chose this elective as either their first, second, or third choice, in choices unknown to the investigator.

## **Recruitment of Participants**

Subjects were recruited into this study via flyers (see Appendix A) mailed to camp registrants who were between the ages of 8-12. Subjects were also recruited in person by the investigator at a camp open house. Children who registered to attend camp for any amount of time within the three week study period were accepted into the study.

## **Variables**

The independent variable, 45 minutes spent in a natural area playing, was implemented 2 x the first week and 3 x weekly the following two weeks at the camp. The frequency of subjects' exposure to the natural environments was anywhere from 2 to 5 days.

The dependent variable, self-efficacy, was measured via the modified Self-Efficacy Scale (SES) which was modeled after Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs & Rogers' (1982) scale (see Appendix C). Subjects entered the study at different points in time depending on which week they signed up for camp and when they opted into the "free play in nature elective." On their first day in the free play elective, participants completed the modified SES. This was done either sitting on bleachers or at the site where the play was to take place.

## **Instrumentation**

The subjects completed two scales for this study. The Self-Efficacy Scale (Sherer et al. (1982) is a widely used 30-item instrument which is designed to measure self competence. It was normed on 376 undergraduate students in a psychology class at a university. There are two subscales imbedded in the SES. The general subscale has an internal consistency alpha of .86. The social subscale has an alpha of .71. There are no

test retest data available. For this study the SES has been modified by the researchers and members of the dissertation committee to accommodate children 8-12 years of age.

In addition to completing the modified SES, subjects completed seven questions developed by the researcher. This scale, named the Emotional Self-Efficacy Scale (ESES; see Appendix C), measures children's feelings regarding self-efficacious behaviors. The seven items on the ESES together yielded a coefficient alpha of .34. Statistical parameters for the modified SES follow. The general subscale in this study had internal consistency alpha of .74. The social subscale has an alpha of .70. The scales were not significantly correlated ( $r_s = 0.26, p = 0.10, n = .42$ ).

Subjects completed the SES and the ESES with pencil and paper, either in small groups or individually, depending on how many children were entering the study at any given time. Subjects read the questions on their own, but any questions the children had were answered by the investigator who was on hand during survey administration.

### **Additional Variables**

A relationship between self-efficacy and age, gender, and amount of time spent in the "free play" group was statistically examined for the study. Qualitative data was obtained via researcher observations in the field.

### **Treatment Group Conditions**

The treatment condition consisted of spending 45 minutes daily playing in one of three natural environments, as described hereunder. In each of these settings, participants chose to do whatever they wanted within a prescribed area set by the camp staff. The children were told to stay within direct line of sight in all environments and to do whatever they would like for that time period. Participants were not guided during their

45 minute block of time in the natural areas. All adult supervisors were told that they must not direct the children's activities. However, if a child was engaged in an activity and invited one of the adults to join them in their play the adults were permitted to do so.

### **Natural Environments**

There will be three different natural environments in which participants in the experimental group may play, each with its own topography and terrain. The affordance (Gibson, 1979) of each natural area is different across each experimental condition. The experimental areas are as follows.

#### **Wooded Area**

The wooded area contained tall trees, low brush and ground cover like soil, leaves, and small rocks. There were downed trees, leaves and tall grass all within this area. The affordance of this area provided opportunities for climbing trees, collecting downed wood, building forts, collecting deadfall, and catching and observing wild creature.

#### **Wetlands Area I**

This area was approximately 100 yards from the road and included a 15-foot wide stream. Woods with dense vegetation grew along the stream banks on both sides. There were deep pools and logs across parts of the stream. The water ranged from 3 inches to approximately 3 feet deep in the pools. This environment provided opportunities for water submersion, wading, catching and observing wild creatures, and stream bank walking.

## **Wetlands Area II**

This area was located next to a small bridge on one side and a road on another. The water here was approximately 4 feet deep in some spots and contained small rapids in other parts. There were rocks along the banks and many fish visible in the water. This location provided opportunities for swimming, submersion, fishing, catching and observing of wild creatures, and stream bank exploration.

## **Research Question**

The research question for the study is as follows: What effect, if any, did outdoor unstructured play in nature have on the self-efficacy of school-aged children.

## **Hypothesis**

Based on the literature that suggests that play in nature improves feelings of self worth, mood, and one's sense of mastery, it was hypothesized that there would be improvements in self-efficacy scores when children 8-12 years old are exposed to unstructured play in nature as measured by the modified Self-Efficacy Scale.

Specifically, it was hypothesized that children assigned to the experimental condition receiving 1-8 hours of unstructured play time in nature would report overall greater gains after spending various amounts of time in nature playing freely.

## **Null Hypothesis**

The null hypothesis in this study states that there is no relationship between self-efficacy in children and free play in nature.

## **Data Collection and Analysis**

Data were collected on all 21 participants. Demographic information like name and age were captured. Subjects completed both the modified SES and the ESES. Field notes were collected by the researchers each day: language used, activities undertaken, cooperative behaviors, child-to-child interactions and adult-child interactions were all observed and recorded. Daily temperature and weather conditions were also noted. Qualitative data were collected in the form of observations during each session of unstructured play in nature. The researcher shadowed the subjects and documented in writing how the children spent their time doing. The data were organized into sections according to the environment in which the behavior was observed and how their behaviors related to self-efficacy.

## **Human Subject Protection**

Assent was obtained from study participants and consent from their parents. The concern for human subjects, in this case children, was low to moderate. Study conditions were typical of camp and outdoor experiences for children. A nurse was on site to attend to any participant who may have needed medical attention. The instrument and data collection process posed minimal risk to the children as the SES only contains items that are of an everyday nature. Institutional Review Board approval was given through the University of Pennsylvania.

## CHAPTER 4: RESULTS

### Demographics

Twenty-one subjects, 11 boys and 10 girls, qualified and participated in this study. Approximately 50 persons signed up for the study, but due to elective options and choosing to take part in different electives during the study period, 21 qualified as participants.

### Frequency and Duration

The independent variable, unstructured outdoor play (45 minutes spent in a natural area playing), was implemented 2 x the first week and 3 x weekly the following two weeks at the camp. The frequency of subjects' exposure to the natural environments was anywhere from 2 to 5 days ( $M = 3.5$ ,  $SD = 1.4$ ).

### Scales

The general subscale in this study had an internal consistency alpha of .74. The social subscale had an alpha of .70. The scales are not significantly correlated ( $r = 0.26$ ,  $p = 0.10$ ,  $n = .42$ ).

In addition to completing the modified SES, subjects completed seven questions developed by the researcher. This scale, named the Emotional Self-Efficacy Scale (ESES; see Appendix A) was used to measure children's feelings regarding self-efficacious behaviors. Item analyses were conducted on the seven items. The seven items together yielded an unacceptable coefficient alpha of .34. Removing item 3 "I feel\_\_\_\_when I work hard to solve a problem" improved the alpha to .40. No other item

removal improved the alpha beyond this point, suggesting that the scale lacked internal consistency.

### **Analysis**

Findings in the study did not reveal a significant increase in self-efficacy scores pre and post measurement. On the contrary, data revealed a slight decrease. The pre-post test and exposure interaction was significant  $\eta^2 = .74$ ,  $F(1, 17) = 6.03$ ,  $p = .025$ . The correlation between exposure and the change in the general subscale from pre-post was  $r_s = -0.54$ ,  $p = 0.11$ ,  $n = 21$  which acts counter to the hypothesis. More exposure yielded lower improvements from pretest to posttest (Figure 1). Although a significant relationship was found, the variability in scores was not significant enough to attribute the decrease in self-efficacy to frequency of exposure alone.

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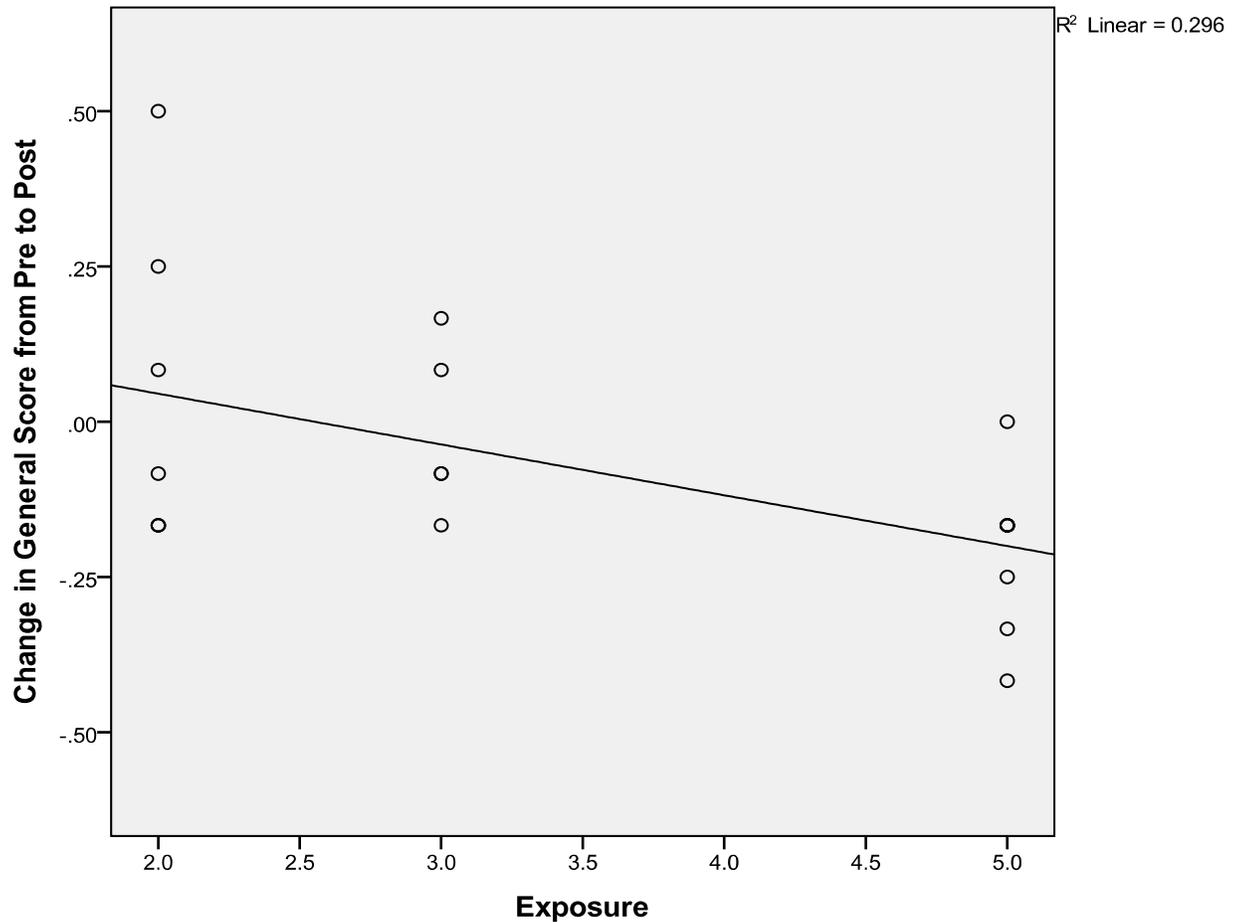


Figure 1. Relationship between the change from pre-post for the General Scale and Exposure.

### The Modified Self-Efficacy Scale Social Subscale

A within-subjects analysis of variance was conducted to evaluate the effect of exposure to unstructured outdoor play in nature on the change from pretest to posttest on the Modified Self-Efficacy Scale Social Subscale. The dependent variable was measured via the Modified Self-Efficacy Scale Social Subscale. The within-subject factor was pre-post test. Exposure and age were added to the model as covariates and gender was added as a between subjects factor. All effects were tested using the multivariate criterion of Wilks' lambda ( $\lambda$ ). Pre-post test was not significant  $\lambda = .93$ ,  $F(1,17) = 1.25$ ,  $p = .278$

which indicates that subjects' overall scores on the social subscale did not change pre-post. The interactions between pre-post and age, and pre-post and gender were likewise not significant  $\eta^2 = .94$ ,  $F(1,17) = .94$ ,  $p = .331$  and  $\eta^2 = .92$ ,  $F(1,17) = 1.52$ ,  $p = .235$ , respectively. In addition, the pre-post and frequency of exposure interaction was not significant  $\eta^2 = .94$ ,  $F(1,17) = 1.15$ ,  $p = .299$ , which failed to reject the null hypothesis that there is no relationship between self-efficacy in children and outdoor unstructured free play in nature.

### **Within-Subjects Analysis (Age and Gender)**

A within-subjects analysis of variance was conducted to evaluate the effect of frequency of exposure to unstructured outdoor free play in nature on the change from pre to posttest of the Modified Self-Efficacy Scale General Subscale. The dependent variable was measured via the Modified Self-Efficacy Scale General Subscale. The within-subject factor was pre-post test. Exposure and age were added to the model as covariates and gender was added as a between subjects factor. All effects were tested using the multivariate criterion of Wilks' lambda ( $\eta^2$ ). Pre-post test was not significant;  $\eta^2 = .97$ ,  $F(1,17) = .60$ ,  $p = .451$ , which indicates that subjects' overall scores on the general subscale did not change pre-post. The interactions between pre-post and age, and pre-post and Gender were likewise not significant  $\eta^2 = .90$ ,  $F(1,17) = 1.93$ ,  $p = .183$  and  $\eta^2 = .95$ ,  $F(1,17) = .85$ ,  $p = .368$ , respectively.

### **Emotional Self-Efficacy Scale (ESES)**

A within-subjects analysis of variance was conducted to evaluate the effect of exposure to outdoor unstructured play in nature on the change from pre to post test on the Emotional Self-Efficacy Scale. The dependent variable was the self-efficacy. The within-subject factor was pre-post test. Exposure and age were added to the model as covariates and gender was added as a between subjects factor. All effects were tested using the multivariate criterion of Wilks' lambda ( $\lambda$ ). Pre-post test was not significant  $\lambda = 1.00$ ,  $F(1,17) = .07$ ,  $p = .802$ , which indicates that subjects' overall scores did not change pre-post. The interactions between pre-post x Age and pre-post x Gender were likewise not significant  $\lambda = 1.00$ ,  $F(1,17) = .001$ ,  $p = .98$  and  $\lambda = .99$ ,  $F(1,17) = .14$ ,  $p = .714$ , respectively. In addition, the pre-post x exposure interaction was not significant  $\lambda = .94$ ,  $F(1,17) = 1.04$ ,  $p = .321$ , failing to reject the null hypothesis that there is no relationship between self-efficacy in children and outdoor unstructured free play in nature.

While it is reasonable to credit the ESES scale's low internal consistency with its inability to reject the null hypothesis, in combination with the results of the Modified Self-Efficacy Scale's results, the hypothesis, "Children assigned to the experimental condition receiving 1-8 hours of unstructured play time in nature would report overall greater gains after spending various amounts of time in nature laying freely," is not supported in this study.

## **Qualitative Field Data**

While the first portion of this study had a significant focus on hypothesis testing there was a great deal of observational data that were obtained by the researcher. Extensive field notes revealed a number of findings relevant to the topic of study. Findings are presented here.

### **Cooperative Play**

In all of the natural play settings, children were observed enjoying each other's company while engaging in unstructured activity. In the wooded area children dispersed into several groups. They began constructing various stick forts and other structures. One group of girls branched off and worked together to create a stick fort. They designated areas within the fort as living spaces. They collected items from the woods like, rocks, sticks, and leaves that they used to represent kitchen items, flooring, and other household structures. Another group of children decided that they would swim in a stream. The water level was deep enough for them to submerge themselves. Several boys and girls took turns going neck deep into the water. A female child even recruited other children to join her in the deep water pool. Children in all group activities asked each other for help while building, carrying and traversing obstacles. Heavy logs used for fort construction were moved by groups of children. All it took was for one child to say, "Hey, I need help with this big stick" and several children responded by getting up and assisting. There were times in the stream when kids just sat on rocks and just talked with each other. Some children in the stream collected items and shared their finds with others who had also collected items.

On another occasion two girls in one of the streams teamed up to catch a crayfish. They shared efforts to catch the creature with a single net. They followed it under rocks, and around logs. The girls took turns trying to capture the creature. After they finally caught the crayfish, the girls showed it to all of the others in the area.

According to self-efficacy theory Bandura (1997), successful socialization and peer interaction requires that children have a belief in their social capacity. They believe that they are valuable and that they have worth in others' eyes.

The children in this vignette (crayfish) demonstrated a goal oriented drive. They talked about wanting to catch a crayfish and they did everything necessary to accomplish their goal. Bandura (1997) would categorize their behavior as self-efficacious. They believed that their actions would have a positive outcome. That belief led them to persevere in their efforts to catch the creature. According to Bandura (1997), these children likely had the belief that they were valuable, their skills were valuable and that they had similar abilities to those around them.

### **Sharing of Ideas and Discoveries**

Children were often heard saying, "Look at me," "Look what I found," and "I need help." The natural items that were available to the kids ignited a sense of wonder and the desire to share what they had found with their peers. The children often called on the supervising adults to join them in exploring or collecting natural items like bugs, crayfish, turtles, leaves, and sticks. A girl decided that she was going to venture neck deep into a pool of water. She called to other kids to join her. This activity was appropriate given the high summer temperatures.

The children in these circumstances displayed social confidence. Their self-efficacious beliefs that what they had to say and what they were doing had value, enabled them to engage other children and adults with their ideas and discoveries. If they believed that they had no valuable contributions, or that they had little value to their peer groups, they may not have reached out to other children.

### **Perseverance**

While adding sticks on to a stick fort, a thunderstorm storm, with frequent flashes of lightening, moved over the play area. As the storm approached, thunder could be heard in the distance and the sky quickly darkened. The play group worked feverishly to complete construction on a fort started by another group. When the children were told that they would have to evacuate the woods because of the approaching storm, they all began working faster. They repeatedly asked if they could stay and continue to build the fort in spite of the impending risks of the thunderstorm; in fact, some of the kids wanted to see if the shelter could weather the storm with them inside it.

Another case of perseverance was demonstrated by a small group of boys. Four boys worked tirelessly to eventually catch a fish. One boy took the lead and guided the other boys' actions. They all waded in the water waist deep for at least 30 minutes trying to lure a fish into a net. One boy held the net while others corralled the fish closer to the catch net. The group made use of a hand-made fishing lure to lure the fish towards the net for an eventual capture. The group celebrated with a cheer after they caught the fish. They joyously showed the fish to the camp counselors and the other children. The group released the fish after it was examined and identified.

There were two girls who worked for an entire unstructured play in nature period of 40 minutes to catch a crayfish. One of the girls said that she had never before seen a crayfish up close. The two teamed up to eventually catch a crayfish.

A favorite activity made available by the waterways was collecting creatures from the water. On several occasions, children needed a way to capture waterborne creatures. Cups were made available to the children as were a few nets. The children used these tools to assist them in exploring their environment. Several children actually found discarded fishing lines, sticks, and live bait (worms and insects) and crafted fishing poles. A child duo worked together in a shallow stream to build a small dam. These children did not know each other but walked together along the stream bank eventually ending up cooperating on the dam build project.

Children worked hard to accomplish tasks in the aforementioned examples. Perseverance is displayed when a person, in this case children, believe that their abilities can affect change. The children in the prior examples did not give up on their efforts after repeated attempts in many cases. The children persevered. As Bandura (1993) expressed, humans anticipate possible outcomes of their actions before undertaking tasks. Their belief regarding possible outcomes can positively or negatively influence their actions. If children believe they can accomplish specific tasks they will work harder to achieve their desired end. In this case their end was a water dam, stick fort or the capture of a creature.

## **Leadership Behaviors**

As mentioned previously, a male child organized and guided several male peers through a successful fishing expedition. He gave instructions to the group, fashioned the tools necessary to catch the fish and worked with the boys until they caught a fish without a real fishing rod. To give another example, a male child determined that a field of long grass could be harvested and the grass could be used to add cover to a wood fort. This child remembered that the group had passed a grass field on the walk to the wooded play site. He talked to the group and told them about his idea to use the grass as a fort cover. He recruited children to accompany him and a camp counselor to return to the grassy field and collect grass to place on the stick fort as cover.

Another example of leadership was displayed when a girl strayed away from the group at one of the streams. She explored the area and discovered a deep pool within the stream. She came back to the group, recruited other children to join her, and led them to the deep pool where they all plunged in up to their necks.

A strong sense of leadership relies on being internally motivated. Motivation to assert oneself and one's ideas is a tenet of self-efficacy (Bandura, 1993; Bandura & Wood 1989). Leaders must have the internal motivation to assert their ideas, social skills, and practical knowledge if they are to be received by their peers. The children in the aforementioned vignette used their ideas to turn goals into action plans. They were leaders.

## **Problem Solving**

Children displayed problem-solving skills during their unstructured time in nature. While attempting to catch different kinds of wildlife, children were required to decide where they would look for animals, what tools were necessary to accomplish this, and how to organize as a group or work individually to accomplish the task. Children also demonstrated problem-solving abilities when they were constructing the woods forts. On several occasions children stepped back and surveyed their work on a woods fort and talked as a group about where to strategically place sticks and other materials they were using to complete their fort.

While attempting to catch fish, groups of kids had to first locate fish, find a way into the water without falling in or getting hurt, lure the fish to them (with artificial means), and finally organize as a group to catch the fish. The kids tried for close to an hour, revising their methods as they made continued attempts. Another example of problem-solving was when two girls were attempting to catch crayfish in a shallow stream. They kept revising their methods with every unsuccessful attempt. They initially tried to place the capture net in front of the crayfish. After realizing that crayfish swim backwards, they tried another tactic. The two girls talked to each other about placing the net behind the crayfish, thus, they figured how to coax the crayfish into the net.

Problem solving requires a belief that one's actions can influence the environment as well as a belief that the same actions can bring about change (Bandura, 1993).

Secondly, problem solving involves perseverance and goal setting behavior. As Bandura (1993) indicates in his theory of self-efficacy, motivation is required to turn goals into action. Motivation is a component of self-efficacy. The children's problem solving

behavior was fueled by internal motivation. There was no one telling them what to do. Bandura (1993) also states that self efficacious behavior with regards to problem solving requires the belief that one can produce change with consistent effort. Children in the problem solving scenarios were consistent in their effort and saw tangible results from their efforts.

### **Social Initiative**

Children used their social skills throughout their unstructured play in nature experience. For example, children invited others to join them in building stick forts on several occasions. Children offered assistance to others with various tasks throughout their experience. They assisted each other in identifying insects and carrying large natural items like logs and rocks after being asked to do so by a peer. Children often just talked to each other about what they were doing at the time. On a few occasions, kids with similar interests gravitated to each other based on observing what the other was doing and then they, as a pair, began a conversation or activity together. Children frequently engaged each other in discussions about their surroundings and the natural life and items they collected.

Functioning in the social realm requires individuals to have a strong sense of self-efficacy (Bandura 1993). The children in the vignette above interacted with each other freely. They initiated conversation, offered help to each other and often exchanged ideas. These children likely had a strong sense of social confidence. In that environment and at that particular time the children felt comfortable enough to approach other children, share ideas with each other and display natural items the found and or created in nature.

## **Displayed Sense of Inquiry**

Children were frequently observed walking in either water or in the woods with their heads down. The children's eyes were focused on what they could find in the water or on the ground. Children often handled and examined insects, stones, and other natural items. Some children collected old bottles, while others collected fresh water mollusk shells and still other children gathered rocks of different varieties. Conversations erupted between children when they found a creature, point out something to look at, or discover something foreign to them. Children regularly asked questions about their surroundings and engaged in exploratory behaviors.

Self-efficacy was evident in the children's desire to know and learn about their surroundings. Bandura (1993) talks about how having confidence in one's intellectual efficacy is paramount to children's success in life. Children who hold strong beliefs about their ability to learn may be less likely to miss social and occupational opportunities later in life (Bandura, 1993). The children demonstrated intellectual curiosity when they examined objects and investigated their surroundings. Not one time did anyone say they had nothing to do or that they were bored. They were engaged either cognitively or physically with the land, a creature or some other natural item. Strong cognitive confidence is a component of self-efficacy. Children in the vignette above showed self-driven, internally motivated, intellectual exploratory behavior.

## Summary

The children in this study played in different habitats throughout their time in the study. These varied environments offered different challenges and opportunities for the children to express their talents, engage their minds, and explore their surroundings. Patterns and behaviors emerged and were observed that could not be captured via a questionnaire. Many of the observations noted were of children using their five senses, motor skills, social skills, leadership skills, and background knowledge. Self-efficacy is a phenomenon that encompasses all of the aforementioned constructs. The following table represents the observable behaviors that were noted in the different experimental environments during the study period. The children's actions have been categorized into one or more of the self-efficacy frameworks described by Bandura (1993).

Table 1

*Forested Area*

Goals	Abilities/ Competencies	Ability to Affect Change	Motivation	Emotional Stability	Academics
Some children demonstrated leadership (“Raise your hands if you want to gather grass with me”).	Children worked together to build stick forts.	Children worked together to build stick forts.	Some children demonstrated leadership (“Raise your hands if you want to gather grass with me”).	One child worked with a former adversary on building a portion of the fort	Children worked together to build stick forts.
	Children found natural items and relics and shared them with others.	Children shared the locations of interesting finds.			
	Children shared the locations of interesting finds.	Children used nature to decorate the fort (leaves, straw, sticks)	Some children demonstrated leadership (“Raise your hands if you want to gather grass with me”).	Children often offered assistance to peers after seeing someone struggling (carrying heavy item).	Children shared the locations of interesting finds.
	Children showed adults what they had found while exploring the woods.	Children often asked other children for help if they needed help doing something (lifting, gathering straw for fort, positioning sticks, digging for bugs).			
	Children balanced on, and climbed logs.	Children worked together to place large logs on forts.	Children exchanged ideas about what may or may not work as fort supports		
	Children worked together to place large logs on forts.	Children exchanged ideas about what may or may not work as fort supports			

Table 2

*Varying Depth Stream With Wooded Banks*

Goals	Abilities/ Competencies	Ability to Affect Change	Motivation	Emotional Stability	Academics
Children searched for crayfish and other creatures in water.	<p>Children crafted tools out of natural objects (fishing rod out of stick and found line).</p> <p>Children joined novel peers in conversations and activities (talked about creatures and finding and sharing rocks)</p> <p>All children immediately headed to rapid area after entering water (as if drawn to rapids). Children identified and labeled creatures.</p> <p>Children engaged in discussions about creatures known and unknown.</p> <p>Children joined novel peers in conversations and activities (talked about creatures and finding and sharing rocks).</p>	<p>Children crafted tools out of natural objects (fishing rod out of stick and found line).</p> <p>Children used bugs for bait.</p> <p>Children searched for crayfish and other creatures in water.</p>	<p>Children crafted tools out of natural objects (fishing rod out of stick and found line).</p> <p>Children used bugs for bait.</p> <p>Children searched for crayfish and other creatures in water.</p>	<p>Children searched for crayfish and other creatures in water.</p>	<p>All children immediately headed to rapid area after entering water (as if drawn to rapids). Children identified and labeled creatures.</p> <p>Children engaged in discussions about creatures known and unknown.</p> <p>Children joined novel peers in conversations and activities (talked about creatures and finding and sharing rocks).</p>

Table 3

*Stick Fort Area in Woods*

Goals	Abilities/ Competencies	Ability to Affect Change	Motivation	Emotional Stability	Academics
Children helped each other when requested and worked side by side to add onto existing stick fort.	Children contributed to the group project (building stick fort) by carrying out individual building tasks on the fort.	Children helped each other when requested and worked side by side to add onto existing stick fort.  Some children told others what to do and independently initiated tasks. Other children offered ideas as to how to add to the stick fort.	Some children told others what to do and independently initiated tasks. Other children offered ideas as to how to add to the stick fort.	Children who needed help asked others for assistance.	Children contributed to the group project (building stick fort) by carrying out individual building tasks on the fort.
Some children told others what to do and independently initiated tasks. Other children offered ideas as to how to add to the stick fort.	Children worked together to pick up and transport heavy logs too big for one person to carry.  Children used natural items to imitate real life objects (trees to serve as a fence).	Children contributed to the group project (building stick fort) by carrying out individual building tasks on the fort.  Children used natural items to imitate real life objects (trees to serve as a fence).	Children contributed to the group project (building stick fort) by carrying out individual building tasks on the fort.		Children worked together to pick up and transport heavy logs too big for one person to carry.
Children worked together to pick up and transport heavy logs too big for one person to carry.	Children shared ideas until a group consensus was reached on building the fort.	Children who needed help asked others for assistance.	Children worked together to pick up and transport heavy logs too big for one person to carry.		Children shared ideas until a group consensus was reached on building the fort.
Children shared ideas until a group consensus was reached on building the fort.			Children shared ideas until a group consensus was reached on building the fort.  Children who needed help asked others for assistance.		Children who needed help asked others for assistance.

Table 4

*Shallow Creek with Wooded Banks*

Goals	Abilities/ Competencies	Ability to Affect Change	Motivation	Emotional Stability	Academics
Boys and girls used cups and nets to catch creatures and shared the same.	Boys and girls used cups and nets to catch creatures and shared the same.	Some children talked other children into entering the water.	Boys and girls used cups and nets to catch creatures and shared the same.		Children were collecting natural items (shells, rocks, unknowns) together and alone and talked to each other about what they had found
Children entered the water to varying degrees.	Children entered the water to varying degrees.	Children gathered rocks together and alone to build a small water dam.	Children asked permission to enter the water.		
Boys and girls asked how far they could go into the water.	Boys and girls asked how far they could go into the water.		Boys and girls asked how far they could go into the water.		
Children balanced on logs, skipped rocks, and walked in the woods.	Children balanced on logs, skipped rocks, and walked in the woods.		Children branched out into small groups to walk the stream and stream banks.		
Children gathered rocks together and alone to build a small water dam.	Children gathered rocks together and alone to build a small water dam.				

Table 5

*Varying Depths Stream with Wooded Banks*

Goals	Abilities/ Competencies	Ability to Affect Change	Motivation	Emotional Stability	Academics
	Children worked together to catch a turtle and crayfish.	Children worked together to catch a turtle and crayfish.	One child created a fishing tool out of line and a found lure to use.		Children worked together to catch a turtle and crayfish.
	One child created a fishing tool out of line and a found lure to use.	One child created a fishing tool out of line and a found lure to use.	Children assisted boy fishing for approximately 35 minutes until child caught a fish with handcrafted tools.		Children discussed how to take care of captured animals
	Girls and boys tried numerous times to catch crayfish and did not give up trying until they captured a crayfish.	Girls and boys tried numerous times to catch crayfish and did not give up trying until they captured a crayfish.	Girls and boys tried numerous times to catch crayfish and did not give up trying until they captured a crayfish.		
	One child was scared by a crayfish but kept trying to catch one and eventually did.	One child was scared by a crayfish but kept trying to catch one and eventually did.	Girls and boys tried numerous times to catch crayfish and did not give up trying until they captured a crayfish.		
	Children voluntarily shared a net and talked about ways each could get a turn with the net.	Children voluntarily shared a net and talked about ways each could get a turn with the net.	One child was scared by a crayfish but kept trying to catch one and eventually did.		
	Children discussed how to take care of captured animals.				

## CHAPTER 5: DISCUSSION

This study examines the relationship between self-efficacy and unstructured play in nature as measured by the modified SES, the ESES and as seen through the eyes of the researcher and recorded in field notes. Contrary to the hypothesis posited in the quantitative part of this study, which relied on the modified SES and the ESES, study data revealed a negative relationship between self-efficacy and unstructured time spent in nature. Statistical analysis showed no positive relationship between the amount of time spent in nature and self-efficacy. Relationships were sought between age and gender and change in self-efficacy. No relationships were discovered. The ESES, developed by the dissertation committee, yielded an unacceptable internal consistency rating of .34 suggesting that it may not have been an accurate measure of self-efficacy. The modified SES, broken down into two sub scales, the social and general scales, had a better internal rating of .74 for the general subscale and .70 for the social subscale. This suggests that the questions on the modified SES were approaching a similar phenomenon in their questioning. Because the modified SES is a new scale, and it has never been used before, the validity of the measurement tool remains unknown. Further application of the scale may enable researchers to more accurately determine what the scale is actually measuring. Caution should be exercised when interpreting the negative relationship captured by the modified SES and the ESES as the children had a very small amount of exposure to nature, (the experimental condition). Additionally, the children enrolled in the study came from a general, non-clinical population and most likely had intact self-efficacy prior to the study.

A secondary data source, field observations, provided multiple and rich findings related to self-efficacy. The children displayed a number of key components of self-efficacy while being challenged in the unstructured outdoor setting. As Gibson (1979) described in his work, the concept of affordance was apparent throughout the study period. The children, once introduced to the varied environments had their activities somewhat guided by what the land and environment had to offer. Each play environment offered a different level of affordance. For example, the stream environments offered several different areas of exploration for the children. Water of varying depths, rocky stream banks, wooded stream borders, rapids of varying degrees, and obstacles in the water all presented the children with physical and mental challenges and encounters.

Children chose their daily, unstructured outdoor time in nature based on the experience they desired that day. Each play habitat enabled the children to engage the land and themselves in different ways. The observational data were categorized into six different aspects of self-efficacy (see Appendix B).

The children in this study were 8 to 12 years of age. At these ages, children are beginning to struggle with sharing, mediation, planning, and experimentation (Erickson, 1994). Many of the behaviors and activities observed involved socialization, sharing, and planning. Children were documented offering assistance to novel peers (help carrying logs, etc.), asking for help from peers (help to problem solve fort building tasks, or identifying a natural find), and coming to the aid of peers in need (offering a hand in the water or helping to catch a crayfish, fish, or some other creature).

Between the ages of 5 and 12, children are grappling with the developing competence and mastering tasks. Children at this developmental stage work hard and

expect to see the results of their hard steadfast work. It is during this time in their lives that children develop a sense of perseverance (Erikson, 1994). Children were observed making repeated attempts to catch various animals, and constructing wood forts out of nature made objects where placing materials on the fort involved trial and error to see if a stick or log made a good fit. Perseverance was observed when a team of boys worked for approximately an hour trying to catch a fish without a store bought fishing rod.

Additionally, a girl was observed searching for insects to use as bait on her fishing rod and then the same girl made several attempts to secure the insect to a discarded piece of fishing line.

Erickson (1994) theorized that at the ages of 6 to 12, children can develop a sense of inferiority if they do not master the production of “things.” The aforementioned examples of perseverance also ended in the creation of useable objects and/or tools. A group of boys created a fishing apparatus and on a different occasion a girl crafted a fishing rod out of a stick and discarded fishing line. In both cases, the children also searched for and found live insects to use as bait. The natural settings in which the children played offered many opportunities to develop perseverance, mastery of tasks, and the development of “things.” The natural landscape and environment offered children many opportunities to develop a strong sense of competence and self-efficacy. As the children experimented with natural items, they discovered that they could produce functional tools, accomplish group goals such as building a collective stick fort and working as a group to catch animals.

## **Children's Activity Levels**

The children in the unstructured play condition spent at least 30 minutes being active in a natural setting. Burdette and Whitaker (2005) attempted to address the issue of possibly getting kids to be more active by changing the verbiage from getting kids to “increase activity level” to “getting outside and playing.” The experimental group in this study received instructions to do whatever they wanted during their time in the unstructured play condition. Since this unstructured play in nature experience was part of a day camp schedule, it was listed as an elective. The elective was listed as “free play in nature,” and the kids referred to it as the same. Only once was a child observed being sedentary. On this one occasion, a girl sat below a tree within the forested area and attempted to fall asleep. After a period of approximately 15 minutes, the girl rose to her feet and joined a group of girls who were creating and furnishing a stick fort.

## **Unstructured Play**

Vecchioni (2008) defined unstructured play as children playing and establishing their own objectives. That definition embodies the unstructured play in nature group. The children were free to do whatever they wanted during their free play time.

Boeree (2006) points out that children struggle with industry versus inferiority between the ages of 6-12 years of age. Social success, feelings of self worth, motivation, attention to task, competence, and learning to actively problem solve are paramount at this stage of development. Howell (2009) purports that highly structured play does not advance children's critical thinking and problem-solving skills. Evidence of children using problem-solving in the unstructured play condition frequently observed. Children figured out how to build a water dam. Several children worked together to craft fishing

tools and actually caught fish. Two girls over time figured out how to catch a backwards-swimming crayfish. Still other children figured out how to design stick forts that would support large sticks, logs, and natural weather coverage.

### **Social Interactions**

While in the natural areas, children could be seen initiating conversation, joining work groups, asking each other for assistance with tasks, offering unsolicited assistance with tasks, and discussing the natural landscape and items they discovered. Berman (2007) reported that during unstructured play, children learn valuable social skills.

The self-efficacious benefits of unstructured play in this study are supported by Bandura (1983). Bandura believed that one's belief in one's ability to affect change is critical to the development of self-efficacy. Children in this study frequently used their attributes to create change by way of personal effort. Children created things out of raw materials (fishing poles, bait, weather cover for forts), built structures from the ground up and interacted with other children to accomplish group or shared goals (dam, stick fort, capturing live creatures). Frequently, children volunteered ideas to peers about how to create structures, identified animals and other natural objects, and advised or took advice from each other on work details related to building something or catching something.

## **Limitations**

A scale used in this study yielded results that indicated a negative relationship between self-efficacy and frequency of unstructured free play in nature. The quantitative section of this study was longitudinal in design. Consequently, without a control group to address possible confounding/intervening variables, this part of the study was left vulnerable to internal and external threats to validity. Each subject, after taking the pretest was immediately exposed to the free play condition. After the 45-minute time frame, subjects continued their day at camp. They all returned to their homes and returned to camp the next day. Events that may have taken place between the pretest and posttest may have influenced the subjects' responses and/or negative change in responses.

The subjects had from one to five days between pretest and posttest which may have allowed for changes in the subjects' person. There was an unexpected negative relationship between time spent in nature and self-efficacy. Uncovering an explanation for this relationship is difficult as there was no control group to which the experimental group could be compared. The length of time the subjects spent in free play elective mirrored the amount of time they spent at the camp. For example, subjects who spent two weeks in the experimental group also spent at least two weeks at camp. Some students left camp and returned to camp at a later date after family vacations. Subjects who spent the longest amount of time in the experimental group, five exposures, also spent at least five weeks at camp. The conditions at the camp during the experiment were tough and unforgiving. The average temperature over the 7-day experimental period was 89°F, with a range of 78 to 100 degrees (researcher's measurements). The elective was

also offered during the mid-afternoon hours. The continued exposure to the heat and elements may have affected the children's attitudes and responses to the questionnaire.

Perhaps the self-efficacy questionnaire was not actually capturing self-efficacy but rather some other measure of emotion or attitude. The negative relationship between self-efficacy and time spent in nature may have actually been a representation of the subjects' feelings regarding their time at camp, their mood during their last week at camp, and/or their dissatisfaction with their known last day in the free play in nature elective. Camp staff reported that children and staff continued to request, and expressed strong feelings for the unstructured play in nature elective after the experiment was over. It is also quite possible that as the amount of time spent in the unstructured nature condition and camp in general increased, the children began to increasingly internalize negative feelings about themselves. The scales may have actually captured a legitimate lowering of self-efficacy. Dealing with being outside in the high temperatures towards the end of each day may have taken a toll on the children. The researcher observed a shift in affect in the children from the time they gathered at the fire pit to decide on electives to the time they engaged the land for the unstructured nature condition. At the fire pit, the children appeared somewhat aloof and with low energy. It was during this time that they filled out the self-efficacy scales. Once the children reached the nature site for the day, they began to explore their surroundings and became more active.

Another plausible explanation for lowered self-efficacy scores may be due to children possibly feeling somewhat uneasy or unsure about their abilities and experiences in natural areas. Venturing into a natural environment can be foreign to many children. The skills required to effectively navigate one's way through natural areas may be

intimidating to some children. Following this line of thought, the longer children spent in nature, the more unsure of their capabilities they may have become. Natural areas present a variety of challenges to all who enter them. There are terrain challenges, temperature extremes, live creature encounters, orientation challenges, and everything that is unexpected and unknown in nature.

The negative relationship between self-efficacy and time spent in outdoor unstructured play may be attributed to not enough time spent in nature. The process of self-reflection and introspection may have begun in the children and the transformation to stronger more positively rating individuals was not given sufficient time. In other words, the children, given more time in the experimental condition may have actually experienced an upswing in their scores on the self-efficacy measure had they had enough time to work through their self-assessing thoughts and see themselves as more capable and positive beings.

It is possible that subjects tried to remember their pretest responses and in the process ended up underrating themselves. Subjects may have responded based on their mood that particular day. An additional threat to internal validity is testing. The mere fact that the subjects had to take a test may have altered the responses of the subjects. Subjects had to complete the pre-test and post-test at varying intervals. Since the comparison group had a definite amount of time to be in the free-play condition, it was important that the subjects complete the test as efficiently as possible. Some kids were left behind while those that had finished the test proceeded to the free-play condition. This may have placed undo pressure on the children to complete the test. Additionally, a factor which probably had a significant negative effect on the self-efficacy scores was the

fact that the pretest was completed by subjects after they were told it was their last day in the free-play elective. This information may have had a negative influence on their reporting as well. Occasionally the entire group waited for individual children to complete the scale before the activity began.

Self-selection may have played a role in the scores of subjects. Those students who signed up for the unstructured play in nature may have compared themselves to the other kids at camp who were taking part in other activities. Perhaps they saw themselves as outsiders or the “others” who are not as physically or socially as capable as other students who chose to take part in sports and other traditional summer camp activities. Their social efficacy may have been affected over time as they made daily comparisons of themselves to their peers.

Fatigue related to being at summer camp and taking part in a daily routine and being in the experimental condition may have influenced their reporting as well. Subjects may have been demotivated by constant exposure to the heat, peers, and activities at camp.

Additional limitations of this study are external threats to validity or generalizability. Included in this would be pretest-treatment interaction. This means that the pretest may have sensitized the subjects to the treatment and thus affected the posttest responses. Additionally, the non-randomization of the subjects to treatment conditions limits the generalizability of the results.

A factor which significantly influenced the design of this study and thus the outcome of the study was sample size. A larger sample size would have allowed for randomization of subjects to the control group and to the experimental condition. Due to

low “free play” elective selection, the researcher was forced to conduct the study as a pretest-posttest only design. Additionally, recruitment yielded approximately 50 possible subjects. Once children and parents had the opportunity to select electives for the camp experience, they often did not choose free play in nature. One reason may have been their perception of what it would be like to spend unstructured time in the woods. Some children may not have been comfortable with unstructured playtime.

A likely explanation for the low self-efficacy scores may be attributable to the fact that the children in the experimental group were frequently the last group to leave the camp staging area to go to their activity. They observed kids leaving the center staging area to take part in activities like arts and crafts, sports, structured nature, swimming, and other activities. Perhaps they experienced negative self-assessment based on their perception missing out on other activities or perception of being stuck in the free play group. Although the subjects had the option to withdraw from the experimental condition at any point, they may have felt obligated to stay because of the adult authority figures. Asking an adult to change activities can be intimidating for some children: the children may have blamed themselves and negatively assessed their worth and their abilities as a result.

As with all data collection methods, the field notes and the manner in which they were collected were susceptible to limitations. The use of a third party to conduct the observations would have increased objectivity. Anytime a researcher conducts part or all of the research in his or her study, the study is left vulnerable to personal and professional biases.

Using triangulation to theme the observations would have also strengthened the validity of what was observed. Another technique, videography, is often used to objectify observations. This study did not incorporate that technology.

## Conclusions

The incidence of children playing indoors and being plugged-in to some type of media is undeniably on the rise in the United States. While quantitative data from this study did not yield strong support for increased self-efficacy among children engaging in unstructured play in nature, the overwhelming evidence from the literature as well as in the field observation notes indicate that children can and do benefit in many ways from unstructured play in nature. This study revealed a number of important observations and relationships. Children used the natural environment as a playscape. They made use of the terrain, living creatures, and various other natural formations like water to create play, craft tools and structures, voice opinions, share ideas, and to facilitate social engagement. Children demonstrated ingenuity, problem-solving skills and social skills without adult direction. The unstructured part of their play time in nature allowed the children in this study to be themselves, to be self directed, and to let their minds guide their activities.

Biophilia theory introduced the idea that humans have an innate need to have a relationship with nature. In each of the experimental environments in this study, children interacted with nature in different ways. Children displayed aspects of biophilia throughout their time in nature. For example, the utilitarian domain of the biophilia hypothesis refers to human kind's need to use the environment to meet basic needs. The creation of stick fort shelters, emulating real living structures made from natural materials, is evidence of this concept.

Naturalistic experiences-pleasurable experiences derived from nature, were evidenced by children expressing their joy and pleasure about being in nature. The ecologicistic/scientific domain of the biophilia hypothesis stresses human kind's desire to

investigate, understand and research the living world. Children frequently gathered natural items or creatures for closer examination and research. Several children removed nature made items and took them home for further examination. The humanistic domain of the biophilia hypothesis describes the emotional attachment people form with living creatures. In one particular case a boy captured a newt. He pleaded with camp staff to be able to take the newt home and keep it as a pet. On another occasion a child caught an aquatic salamander. He too asked if he could keep the animal and take it home.

The moralistic dimension states that humans have a natural tendency to preserve and protect the natural world. Children in this study governed each other in this area. Children who caught, crayfish, turtles, salamanders and fish were all encouraged by their peers to release the creatures back into nature so that they would not die. The children wanted to preserve the lives of the animals. Finally, the negativistic domain encompasses human kind's fear of the natural world and its creatures. This would include the expression of fear of insects, snakes, and spiders. On many occasions throughout their time in nature children expressed uncertainty about different creatures they encountered. Adults and children alike questioned the identity of various plants to determine whether they might be harmful or not. A significant natural deterrent was the thunderstorm that approached the stick fort area. All involved in that project were concerned for their wellbeing and evacuated the area.

Activity levels remained consistently high throughout the experimental condition exposure. Children kept themselves mentally and physically engaged with the land and its creatures. Affording children the opportunity to play freely in nature appeared to be an effective way of getting children to be active. Such benefits of being active in nature

were noted by Fjortoft (2001). Children in his study showed increases in motor development as a result of having played on natural features like logs, trees, rocks and other varied terrain. Children in the current study were observed walking on logs, climbing downed trees, crossing streams and shallow rivers and navigating uneven terrain. It is likely that given more time in the unstructured play in nature condition, the children in the experimental conditions would have experienced similar motor gains.

Ginsburg (2007) referred to the tendency of children to be active, creative, and imaginative while playing. Observations from this study confirm all of the above. Building forts, and imagining that the forts are homes to be decorated with natural items available in the woods were all regular occurrences noted in this study. Children played in the rivers and streams alone and in groups. The activity level was steady. There were no demands from adults to be active but it happened. Children kept themselves moving for the duration of the unstructured play conditions. They may have been walking in a stream, exploring the woods, or turning over rocks and logs. Ginsburg (2006) emphasized the role of socialization in play. Similar to Ginsburg's findings throughout the play in nature rotations in this study children socialized with novel peers. Children asked of other children and they offered assistance to each other whenever necessary. There was an ongoing exchange of information in the unstructured play in nature group. These exchanges often involved natural items discovered by the children.

Previous studies evidenced the natural, physical benefits of playing outside. (Brender, Burke, & Glass, 2005 & Wirz et al., 1996). This study overall supports the claims and findings of these studies.

## **Implications**

This study informs clinical practice in a number of ways and on a number of different levels. Self-efficacy beliefs are important throughout the human lifespan. Findings from this study, consistent with developing self-efficacy in an unstructured play environment, more specifically a natural environment, suggest that agencies and institutions that serve young children review their policies and practices with regard to children and how they are allowed or expected to spend their time.

It is not uncommon for school districts to be operating on strained budgets and to be under scrutiny with regard to their test scores and student achievement. This study's qualitative component in tandem with significant support from prior studies, suggests that unstructured play in nature bolsters self-efficacy, a necessary ingredient in the development of student success. Additional research is needed to more conclusively understand the layers of potential benefits-and any challenges-posed by outdoor play among children. As such, school personnel should be encouraged to make exhaustive use of any and all play opportunities afforded to children.

The effects of green environments on children's attention, mood, self-efficacy, social skills, and physical health are well documented. Through education, social work advocacy, and data presentation it is hoped that schools will begin to move toward regulating and mandating free unstructured playtime. One such example is in process in Pennsylvania. To be moving to the Pennsylvania legislature is a proposal requiring public schools to implement a physical activity program that must include thirty minutes daily of moderate to vigorous physical activity. This requirement is in addition to regular physical education classes already required. Those schools with trees, shrubs and

grasslands have available to them a wonderful potential resource for children. They have the natural playscape to be used in unstructured play opportunities. Urban and suburban schools have playgrounds and school grounds with varying degrees of greenery and tree coverage. There are schools with woodlands, and schools with a few slivers of grass breaking through a macadam playground. Schools with land and natural environments surrounding their buildings can begin to make functional use of their land by creating conditions in those areas that make it safe, accessible, and practical for students to venture into the wooded areas.

Organizations that are responsible for children like scouts, summer camps, and other child focused businesses may want to consider examining their practices as well. Most user groups incorporate some type of nature activity into their activity rotation. That, in and of itself, is a good first step to breaking the barrier between indoors and outdoors and acclimating children to being outside in nature. More importantly, these organizations should consider incorporating an unstructured play-in-nature rotation into their schedules. Having such an initiative with supporting research is purposeful and cost effective. Little is involved in creating an unstructured play in nature group. Basic requirements are nothing more than a few tools to be used for child exploration and adults for supervision.

On a public health front, the data from this and prior studies can be used to support efforts to reduce childhood obesity. As the obesity rate continues to rise, healthcare professionals, parents, and other organizations look for ways to engage children and get them moving. As discussed earlier, encouraging children to play outside

may be a more fruitful way of encouraging large motor movement than telling children to “exercise,” a word that has an intimidating connotation and chore-like sentiment to many.

Families with children can begin to make use of this data by instilling early on in their children that nature has great rewards. Encouraging outdoor unstructured play in nature can become a way of life. Parents can join their children in outdoor play activities so that unstructured outdoor play in nature becomes a family activity and not something staged and arranged. It can “just happen.”

Furthermore, the benefits of free play in nature may elude science. The benefit sought by this study and other researchers may not have a name as of yet. It is accepted that nature exposure is good for us and feels good, but to quantify it may take some time or may not be possible at all. This is a real possibility.

In considering future research in this area, investigators may want to consider a longer study period. This study had children spend a maximum of five hours over five weeks in the unstructured play in nature condition. Having a significantly longer exposure period in nature coupled with a control group and randomization to treatment conditions may yield significant results. Future researchers should also consider having longer activity periods during each unstructured play in nature condition to allow the children to settle deeper into their experience. A 40-minute time frame for the children did not seem adequate. There were occasions that involved a walk to the site that wasted valuable free-play time. Having at least an hour for the children outdoors may prove to be much more efficient. Future researchers may want to investigate other outcome measures and potential benefits beyond the measured self-efficacy here. Potential

benefits like happiness, improved motor skills, and measures of mood are all measures to be considered.

Communications from the camp staff after the unstructured play in nature group ended were often referencing children and camp staff's disappointment that the free play in nature rotation had to end. Those types of comments represent the level of enjoyment had by all who were close to the project.

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## Enjoy Free Play in Nature!

Paradise Farm Camp has the opportunity to host a research project this summer exploring free play in nature! Paul Starling, a doctoral student in social work at the University of Pennsylvania, will be conducting this study. Paul is a full time school counselor at Exton Elementary School in the West Chester Area School District and has three children of his own under 9 years of age.

Your child, if selected for the free play group, will get to play in a variety of different natural environments while at camp. Children in the camp as usual group will be used for comparison. This is an opportunity to get your child “back to nature”. Kids these days don’t get to enough time to play freely in nature. This study investigates the effect that free play in nature has on children.

This study is seeking boys and girls ages 8-12 years of age for the study. Your child would be required to:

1. Complete a self-efficacy questionnaire at the beginning and the end of the 3 week study.
2. Submit name, age, and gender for tracking and data collection purposes. (All information will be kept confidential and will be destroyed after the data is analyzed).

Participation is voluntary and children may withdraw at anytime by informing staff. At the conclusion of the study you will receive a one page summary of the results and tips on how to use the results to help connect you and your child with nature as well as helpful parenting tips.

Please talk with your child about his/her participation and sign below if you agree to have your child participate in this study.

Child name: \_\_\_\_\_ Child  
Signature: \_\_\_\_\_

Parent Name: \_\_\_\_\_ Parent  
Signature: \_\_\_\_\_

Thank you for your consideration.  
Paul Starling, MSW, DSW candidate  
610 304 1664

Appendix B

University of Pennsylvania  
Office of Regulatory Affairs  
Yvonne Higgins, Executive Director Human Research Protections  
Emma Meagher, MD, IRB Executive Chair  
3624 Market St., Suite 301 S  
Philadelphia, PA 19104-6006  
Ph: 215-573-2540/ Fax: 215-573-9438  
**INSTITUTIONAL REVIEW BOARD**  
(Federalwide Assurance # 00004028)

23-Apr-2010

Ram A Cnaan  
Attn: Paul Staling  
Email: [cnaan@sp2.upenn.edu](mailto:cnaan@sp2.upenn.edu)  
[paulstar@sp2.upenn.edu](mailto:paulstar@sp2.upenn.edu)

PRINCIPAL INVESTIGATOR : Ram A Cnaan  
TITLE : An Investigation Of Unstructured Outdoor Play on Children's Self Efficacy  
SPONSORING AGENCY : No Sponsor Number  
PROTOCOL # : 811532  
REVIEW BOARD : IRB #8

Dear Dr. Ram Cnaan:

The documents noted below, for the above-referenced protocol, were reviewed by Dr. Emma Meagher, Executive Chair of the IRB (or her authorized designee) using the expedited procedure set forth in 45 CFR 46.110 and approved on 22-Apr-2010.

-HS ERA Modification Form, submission confirmation #dcggdgi  
-Subject Recruitment Flyer, submitted 4.19.10  
-Informed Consent Form, submitted 4.19.10  
-Subject Questionnaire, submitted 4.19.10  
-Summary of modifications, submitted 4.19.10  
-Memo re: Camp Director role in study, submitted 4.4.10

If you have any questions about the information in this letter, please contact the IRB administrative staff. Contact information is available at our website: <http://www.upenn.edu/regulatoryaffairs>.

Thank you for your cooperation.

Sincerely,

IRB Administrator

## Appendix C

Name: \_\_\_\_\_ Age: \_\_\_\_\_  
Date: \_\_\_\_\_

The questions below try to get an idea of how well you think you are able to “do things” and “get things done.”

Read each sentence below and decide which answer best describes how you think by writing a

1, 2, or 3. Look below and see what each number stands for.

1=Never  
2=Sometimes  
3=Always

- \_\_\_\_\_ 1. If I can't do something the first time I try, I keep on trying.
- \_\_\_\_\_ 2. It is hard for me to make new friends.
- \_\_\_\_\_ 3. I give up on things before I finish them.
- \_\_\_\_\_ 4. I try things that seem like they will be hard.
- \_\_\_\_\_ 5. If something looks too hard, I will not try it.
- \_\_\_\_\_ 6. If I am trying to learn something new and it is too hard, I stop doing it.
- \_\_\_\_\_ 7. When I am around a group of kids I talk to a lot of them.
- \_\_\_\_\_ 8. I have friends because I know how to make friends.
- \_\_\_\_\_ 9. I give up easily.
- \_\_\_\_\_ 10. When I have a problem I can usually figure out what to do.
- \_\_\_\_\_ 11. I can take good care of myself when I am alone.
- \_\_\_\_\_ 12. I know what to do if I am starting something new.
- \_\_\_\_\_ 13. I can do things well even when I am nervous.
- \_\_\_\_\_ 14. If I see a kid do something, I usually think I can do it too.
- \_\_\_\_\_ 15. If someone tells me I can't do something, I believe them.

1. Most days I feel   .
2. When I think about trying something new I feel   .
3. I feel \_\_\_\_\_ when I work hard to solve a problem.   .
4. When something is hard for me I usually feel   .
5. Meeting someone new makes me feel   .
6. If someone tells me I can't do something I feel   .
7. If I cannot do something the first time I try I feel   .