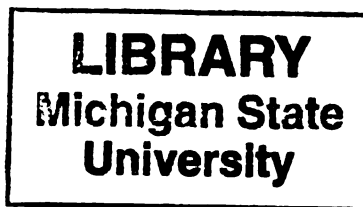




3 1293 01413 8907



This is to certify that the

thesis entitled

Children's Exposure to the Natural
Environment As Related to Their
Environmental Attitudes
(An Exploratory Study)

presented by

Ann M. Castle

has been accepted towards fulfillment
of the requirements for

Master's degree in Child Development

Major professor

Date May 6, 1996

**PLACE IN RETURN BOX to remove this checkout from your record.
TO AVOID FINES return on or before date due.**

DATE DUE	DATE DUE	DATE DUE
NOV 18 1998	_____	_____
NOV 19 1998	_____	_____
JUN 12 2000 63	_____	_____
JUL 09 2000	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

MSU is An Affirmative Action/Equal Opportunity Institution

c:\ch\dtdue\pm3-p.1

**CHILDREN'S EXPOSURE TO THE NATURAL ENVIRONMENT
AS RELATED TO
THEIR ENVIRONMENTAL ATTITUDES
(AN EXPLORATORY STUDY)**

By

Ann M. Castle

A THESIS

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

MASTER OF ARTS

Department of Family and Child Ecology

1996

ABSTRACT

CHILDREN'S EXPOSURE TO THE NATURAL ENVIRONMENT AS RELATED TO THEIR ENVIRONMENTAL ATTITUDES (AN EXPLORATORY STUDY)

By

Ann M. Castle

Twenty five second grade children and their parent(s) participated in an exploratory study that examined their attitudes about the natural environment. Children's environmental attitudes were correlated with their parents' environmental attitudes and with their prior exposure to the world around them. The results indicate that environmental attitudes of children and parents were similar in the majority of items on the measurement tool. In addition, the majority of children were willing to participate in activities in the natural environment, regardless of the prior exposure they had toward it. The results of this study were limiting, however, because the assessment strategies used were not sufficiently refined to identify substantial variation in results.

Copyright by
Ann M. Castle
1996

To my husband, David, for encouraging me to complete this project.

ACKNOWLEDGMENTS

I would like to express my appreciation to Dr. Alice Whiren, my advisor and chairperson of my committee, for her input and expertise as I ventured through the many phases of this project. I would also like to thank the members of my committee, Dr. Marjorie Kostelnik and Dr. Anne Soderman, for their encouragement and assistance.

My sincere gratitude also goes to the Department of Family and Child Ecology for guiding me through my graduate program, teaching me so much about the development of children, and preparing me to educate young children and their families.

I would like to express my gratefulness to Judy Pfaff for assisting me in analyzing the data of my project. Her knowledge of statistics and use of computers assisted me in making sense of the data I collected.

I am truly thankful to the teachers, parents, and children who volunteered to participate in this project. The committed teachers, willing families, and eager children made this project a reality.

TABLE OF CONTENTS

INTRODUCTION AND PROBLEM STATEMENT.....	1
INTRODUCTION	1
PROBLEM STATEMENT	2
CONCEPTUAL DEFINITIONS	4
OPERATIONAL DEFINITIONS	5
LIMITATIONS OF THE RESEARCH	6
REVIEW OF THE LITERATURE	8
INTRODUCTION	8
ENVIRONMENTAL ATTITUDES	9
HOW CHILDREN LEARN ABOUT THE ENVIRONMENT	11
AN ECOLOGICAL VIEW OF CHILDREN	15
THE ISSUE.....	18
METHODS	20
SUBJECTS	20
SELECTION OF SUBJECTS	20
DESCRIPTION OF INSTRUMENTS.....	21
<i>Children's Environmental Response Inventory (CERI)</i>	22
<i>Children's Environmental Response Inventory Revised (CERIR)</i>	22
<i>Parent Survey</i>	24
DESCRIPTIVE INFORMATION.....	28
RELIABILITY FOR EACH INSTRUMENT	28
RESEARCH QUESTIONS	29
DATA ANALYSIS	30
<i>Assess Attitudes and Exposure</i>	30
<i>Relate Attitudes and Exposure</i>	31
DATA COLLECTION	32
<i>Adult Data</i>	32
<i>Child Data</i>	33
<i>Coded Data</i>	34
ANALYSIS OF RESULTS AND DISCUSSION	35
INTRODUCTION	35
DESCRIPTIVE INFORMATION.....	35
RESEARCH QUESTIONS	41
<i>Research Question 1</i>	41
Scoring the CERI and CERIR	41
Item Analysis	42
Significance Level	43
Paired T-Tests.....	43
Correlation Coefficients	47

<i>Research Question 2</i>	47
Environmental Exposure	47
Environmental Exposure and Environmental Attitudes	48
DISCUSSION, PERSONAL OBSERVATIONS, AND	
DIRECTIONS FOR FUTURE RESEARCH	50
DISCUSSION	50
PERSONAL OBSERVATIONS	53
DIRECTIONS FOR FUTURE RESEARCH	54
<i>Children's Environmental Response Inventory Revised (CERIR)</i>	54
<i>Parent Survey</i>	55
<i>Sample Size and Diversity</i>	56
IMPLICATIONS FOR PRACTICE	56
AN ECOLOGICAL VIEW OF CHILDREN	57
APPENDIX A: COMMUNICATION WITH PARENTS	58
APPENDIX B: PERMISSION SLIPS	59
APPENDIX C: INSTRUMENTS	60
PARENT SURVEY	60
ADULT ENVIRONMENTAL ATTITUDES	65
CHILDREN'S ENVIRONMENTAL ATTITUDES	68
APPENDIX D: UCRIHS APPROVAL	72
LIST OF REFERENCES	73

LIST OF TABLES

TABLE 1: EXPOSURE TO THE NATURAL ENVIRONMENT CATEGORIES	27
TABLE 2: DESCRIPTIVE DATA	37
TABLE 3: DEMOGRAPHIC DATA	40
TABLE 4: RELIABILITY ANALYSIS	42
TABLE 5: ATTITUDES OF MOTHERS AND CHILDREN	45
TABLE 6: ATTITUDES OF FATHERS AND CHILDREN.....	46
TABLE 7: ENVIRONMENTAL EXPOSURE.....	48
TABLE 8: ENVIRONMENTAL EXPOSURE AND ENVIRONMENTAL ATTITUDES	49

LIST OF FIGURES

FIGURE 1: CERIR RESPONSE SCALE.....	24
--	-----------

Chapter 1

INTRODUCTION AND PROBLEM STATEMENT

INTRODUCTION

Promoting environmental awareness in children is an increasingly important topic in society today. Adults and children alike “need to effect changes in attitude and behavior directed toward better conservation of our limited, natural resources” (Cohen, 1992, p. 259). Researchers need to generate knowledge regarding how to achieve these changes.

The goal of environmental education, according to Hines, Hungerford, and Tomera (1986/87), is “the development of environmentally responsible and active citizens” (p. 1) and according to Harvey (1989), it is to instill an environmental ethic in children. Children develop this ethic through instruction in environmental education which includes “the development of positive attitudes and the acquisition of knowledge” (Jaus, 1984, p.33). Learning in the affective and cognitive areas of environmental education may lead to behavior changes (Jacobson & Padua, 1992).

Children should develop environmental concepts at an early age because their attitudes and learning habits develop early in life (Strickland, Robertson, Jettinghoff, & Diener, 1983/84). The development of environmental attitudes and awareness in children is

important because it may help generate “individuals who behave responsibly toward the environment” (Hines et al., 1986/87, p.1).

According to Francis, Boyes, Qualter, & Stanisstreet (1993), “children now at school will become decision-making citizens at a time when major environmental problems will be of increased importance to society and of increased impact on the community” (p. 375).

They found that global environmental problems are difficult to teach children accurately because they are abstract in nature and many times must be taught without direct experience or demonstrations, which makes them difficult for children to perceive. Also, many children form misconceptions about the issues when they hear inaccurate information. The authors found such misconceptions with children’s ideas about the greenhouse effect and concluded that we must begin teaching children about the environment early “before complex alternative conceptual frameworks are established and before attitudes and prejudices based on those alternative ideas harden” (p. 391).

PROBLEM STATEMENT

Studies about children and the environment are limited. Even though environmental education is important to teachers, from preschool through college, more studies have been conducted with high school and college students, than with younger students (Jaus, 1984). The newness of this topic is evident in the “lack of vocabulary, theoretical framework, or research agenda to deal with children’s experience with nature” (Chawla, 1988, p. 19). This is reflected in the terms that are used interchangeably and the limited

research tools available. Many of the reported studies have been exploratory in nature, justifying the need for further investigation.

There are many variables that influence the development of environmental dispositions, according to Harvey (1989). Such variables include “personality factors, other experiences in the natural and constructed environment, education, and the views of significant others” (p.43). Harvey believes it is necessary for researchers to search for additional variables that influence the formation of environmental dispositions.

The discovery of variables that affect the development of children’s environmental attitudes such as the environmental attitudes of their parents and exposure to the natural environment, could have significant implications for the experiences provided for children by educators and caregivers. For children to grow up as responsible citizens toward their environment, attitudes must be developed early in life. Children’s experiences with significant others and experiences with nature may help them develop positive attitudes.

The primary focus of this study is to measure the environmental attitudes of children’s parents and gather information about children’s exposure to the natural environment to see if those two variables are related to children’s environmental attitudes. Favorable parental attitudes and positive experiences with the natural environment could help children develop positive environmental attitudes themselves. These attitudes, in turn, may eventually affect behavioral habits toward the environment in adulthood.

The following research questions were investigated to learn more about children's attitudes about the natural environment.

Question 1: How do parental attitudes about the natural environment relate to their child's environmental attitudes?

Question 2: How does children's exposure to the natural environment relate to their environmental attitudes?

CONCEPTUAL DEFINITIONS

An Environmental Attitude is defined as the "values, attitudes, and predispositions ... considered to represent an individual's environmental personality" (Bunting & Cousins, 1983, p. 3).

Exposure to the Environment is defined as the environmental context in which children are regularly exposed; their routine contact with the natural environment.

A family "usually is made up of individuals related to one another by strong reciprocal affections and loyalties, comprising a permanent household that persists over time" (Kostelnik et al., 1988).

OPERATIONAL DEFINITIONS

Environmental Attitudes of Parents will be measured by one of the eight domains from Bunting and Cousin's (1983, 1985) *Children's Environmental Response Inventory* (CERI) in its original form. The one domain, Pastoralism, is a "positive responsiveness to natural environments, outdoors, and open spaces" (Bunting & Cousins, 1985, p. 731).

Environmental Attitudes of Second Grade Children will be measured by one of the eight domains from Bunting and Cousin's (1983, 1985) *Children's Environmental Response Inventory* (CERI) in an adapted form that is suitable for use with second grade children. The one domain, Pastoralism, is "a positive responsiveness to natural environments, outdoors, and open spaces" (Bunting & Cousins, 1985, p. 731).

Exposure to the Natural Environment will be measured by a survey administered to parents. The survey will ask parents to identify their geographic location in the community and their type of housing. They will also be asked questions about their outside experiences such as if they have a yard, a garden, or participate in environmental movements. The parents will be asked how frequently they spend time at parks, beaches, or campgrounds.

Second Grade Children are defined as children who are enrolled in second grade

Parents are defined as mothers and/or fathers of the second grade children in the study.

LIMITATIONS OF THE RESEARCH

This is an exploratory study aimed at investigating children's exposure to the world around them and how that exposure is related to their attitudes about the environment. It describes and relates children's attitudes about the environment, the environmental attitudes of their parents, and children's exposure to the natural world. The information gathered served as a basis for understanding variables that influence the development of environmental dispositions in young children.

The main limitation of this study was the difficulty in finding an appropriate measurement tool. It was discovered, through the review of the literature, that one problem in the study of children's attitudes toward the environment is the lack of appropriate tools for measurement. According to Chawla (1988), this field needs the "creation and adoption of common measures" (p. 18).

Bunting and Cousin's (1983, 1985) CERI is a tool that measures children's attitudes about the environment, but it is only valid when used with children aged 9 and upward. This tool, therefore, had to be adapted for use with younger children in this study. The adaptation of measurement tools is limiting because instruments lose their reliability and validity once they are modified from their original form.

The CERI was adapted for use with second grade children to make it less abstract for young children. The test was narrowed down to 15 from 22 questions to shorten it for young children, it was administered on a one-on-one basis instead of in mass to an entire

group, the text was lengthened to better describe and explain what each question asked, and pictures were added to the text to assist children who cannot read. The adaptation of a measurement tool was needed in this exploratory study because no such tool could be found to investigate young children's attitudes about the natural environment.

Teaching children about the environment and providing them with positive experiences is important for the future of our planet. The next chapter discusses children's environmental attitudes and how children learn about the world around them.

Chapter 2

REVIEW OF THE LITERATURE

INTRODUCTION

True environmental education, according to Nabhan and Trimble (1994), still exists for some children today. In the book, *The Geography of Childhood*, Nabhan points out that children of ranch families, desert dwellers, Indians, and Mexicans have environmental education everyday of their lives. With opportunities to explore the world around them combined with adults who pass down oral stories from generation to generation, “tens of thousands of generations of children have become ecologically literate about their home ground” (Nabhan & Trimble, 1994, p.83). Children of these families are raised with positive attitudes, hands-on experience, vast amounts of knowledge, and people who care about the world around them.

Unfortunately, most children who are born and raised in the United States today, are not given the above opportunities. Trimble (Nabhan & Trimble, 1994) sees a distinct difference between city and rural children. He believes that children from big cities “may have virtually no experience with native plants and animals” (Nabhan & Trimble, 1994, p. 123). The closest that affluent children will come to “wildness” may be a trip to summer

camp which may spark their interests to explore further. Most likely, poor city children will not get to go to camp at all.

The following review of the literature focuses on children's environmental attitudes and how they are developed, examines how children learn about the natural environment, and looks at children from an ecological perspective - that the people and exposure that children receive during their childhood influences them.

ENVIRONMENTAL ATTITUDES

In a study about environmental attitudes of third graders, Jaus (1984) posed the question: "Can positive attitudes toward the environment be developed in children?" (p. 34). And if so, do they last over two years? Jaus points out the importance of teaching and developing attitudes in young children because they become established when the children reach high school. Jaus concluded that teaching children about the environment is beneficial. Just two hours of instructional time positively affected children's attitudes toward the environment. In addition, the children retained these positive attitudes over a period of two years.

Shepard and Speelman (1985/86) analyzed the effects of environmental attitudes through outdoor education. An attitude, according to Shepard and Speelman (1985/86), is a "mental system of cognitive and affective components, combined with a behavior tendency, directed toward a person, object, or idea" (p. 21). The purpose of this study was to determine if outdoor education had an impact on environmental attitudes. The

authors pointed out that attitudes of children toward the environment need to be developed early because they are formulated between the ages of 7 and 12. Shepard and Speelman concluded that outdoor education programs do positively influence attitudes in children toward the environment.

In a “Meta-Analysis” by Hines et al. (1986/87), the attitudinal variable included “those factors which dealt with the individual’s feelings, pro or con, favorable or unfavorable, with regard to particular aspects of the environment or objects related to the environment” (p.4). They studied attitudes toward ecology and environment as a whole and attitudes toward taking environmental actions. It was concluded that individuals with positive attitudes were more likely to carry out responsible environmental behaviors than those who did not have positive attitudes.

The above three studies analyzed children’s attitudes toward their environment by implementing an author created instrument, a combination of existing instruments, and an analysis of existing data. One problem with the study of children’s attitudes toward the environment is the lack of an appropriate tool for measurement. According to Chawla (1988), this field needs the “creation and adoption of common measures” (p.18).

Bunting and Cousins (1985) pioneered the development of an instrument that examines children’s attitudes about their natural world. The *Children’s Environmental Response Inventory* (CERI) measures environmental dispositions of school-age children, which are

the “values, attitudes, and predispositions ... considered to represent an individual’s environmental personality” (Bunting & Cousins, 1983, p.3).

Harvey’s 1989 study implemented the CERI to determine if “children’s early contact with vegetation plays a role in the development of an environmental ethic” (p. 41). She used a questionnaire to discover the past experiences children had with vegetation and described them according to gender, age, and socio-economic status. Next, she compared the past experiences to the children’s environmental dispositions measured from two domains of the CERI. Harvey found that children’s past experiences with vegetation, in home and play environments, strengthen the development of environmental dispositions. It was concluded that “providing varied opportunities for children to be in contact with plants, parents and teachers can contribute to the prevention of environmentally detrimental attitudes in their children to some extent” (Harvey, 1989, pp. 41-42).

HOW CHILDREN LEARN ABOUT THE ENVIRONMENT

Many variables influence children’s environmental attitudes. Harvey (1989) chose to analyze children’s past experiences with vegetation in their home and play environments. However, these direct types of experiences with nature can also occur in educational settings that take into consideration how children learn about their environment.

Increasingly, more information is available about how children learn and how they should be educated about their environment. A pretest and posttest given to preschool children to compare their knowledge about energy incorporated activities that take into

consideration how children learn. “All activities were based on the principles that children learn best through first-hand experiences, by manipulating materials, by discussing what is happening as it takes place, and by modeling examples set by adults” (Strickland et al., 1983/84, p. 34). The results showed that groups of children had significantly higher scores on the posttest in comparison to the pretest after the implementation of an energy education program.

Piburn and Baker (1993) concluded that children’s attitudes toward science in general get worse as they go from earlier to later grades in school. This decline in attitudes has to do with the kinds of teaching strategies used in the classroom. At the elementary level they found that written work was associated with negative attitudes and hand-on activities were associated with positive attitudes.

According to Cohen (1992), there are specific principles emerging from the research on children and ecology.

1. Activities must be developmentally appropriate.
2. Information derived from an understanding of scientific principles and processes is best acquired through active, rather than passive, learning opportunities.
3. Learning, including ecological understanding, is best fostered through direct, rather than abstract, experiences with nature and natural systems.
4. Scientific knowledge, including ecological understanding, is best acquired within a context of free exploration and where adult teachers instill and model a respect for nature and all living things. (pp. 259-260).

A common thread running through the above principles and many other studies about how to promote ecological awareness in children is the need for direct, hands-on involvement

with nature. Cohen (1992) states that “children’s real involvement with nature is an essential component in fostering ecological understanding” (p. 259). James (1992) believes that children should have “direct experiences with their world” (p. 262). In addition, Chawla (1988) maintains that children’s concern for the natural environment “is shaped by opportunities for direct contact with nature” (p. 18).

There is a concern that children today do not have exposure to any “wildness” places with which to have hands-on experiences. Kirby (1989) investigated preschool children’s use of enclosed spaces in their natural environment. She examined the setting preferences of preschool children in a half-acre playground and found that children preferred small, covered refuges (both vegetated and built) instead of large play areas (with fixed wooden structures). She concluded that “refuges, both natural and built, were highly preferred over traditional play equipment” (Kirby, 1989, p. 7).

Nabhan (Nabhan & Trimble, 1994) agrees with Kirby (1989) regarding the need for nature centered playgrounds. He is concerned that many playgrounds today are covered with large plastic playground equipment and the ground surfaces are covered with pavement. This is detrimental because running and playing outside at recess may be one of the few places where children can have exposure to the natural world. Nabhan believes that “to counter the historic trend toward the loss of wildness where children play ... we need to find ways to let children roam beyond the pavement, to gain access to vegetation and earth” (Nabhan & Trimble, 1994, p. 9).

Although growing information exists on how children learn about their environment, there is still little research on their understanding of ecological issues. Cohen (1992) states two specific reasons for this: 1) children have little direct contact and experience with living things and 2) learning about ecology requires real interaction with nature, which is difficult to come by in many learning settings. Children today are not given direct, hands-on opportunities with nature, which may be a key element in the development of their ecological awareness.

Kidd and Kidd (1990), concerned about the number of unwanted pets in our country, did a study about the social and environmental influences on children's attitudes toward pets. The variables they found that influence children's ideas and attitudes about pets were parents, peers, neighbors, schools, the media, and environmental experiences. Furthermore, they stated that "childhood experiences with animals were extremely important in forming their adult attitudes" (Kidd & Kidd, 1990, p. 817). This study showed that contact with animals that modeled attitudes of people (i.e. parents) and other sources (i.e. animal experiences) "may significantly influence children's attitudes toward animals and pets" (Kidd & Kidd, 1990, pp. 809-810). The above variables that influence children's attitudes about pets may be applicable to children's attitudes about other aspects of the environment. Two variables that may significantly affect young children's attitudes toward the natural environment are 1) attitudes of parents and 2) exposure to the environment through environmental experiences.

Because the study of children and nature is so new and narrow, it is important to conduct further studies in this area. The attitudes of people close to children, such as parents, may be an important factor in developing their ecological awareness. In addition, research has shown that children's direct contact with nature, through education programs and past experiences, is an essential factor in developing their ecological awareness. However, studies on how these variables are related to children's environmental attitudes, as defined by Bunting and Cousins (1983, 1985), are limited.

AN ECOLOGICAL VIEW OF CHILDREN

The natural world has a lot to offer young children; it is comforting, peaceful, and full of potential discoveries. It can help children continue to develop a positive self-esteem.

According to Trimble (Nabhan & Trimble, 1994), "the natural world does not judge; it exists" (p. 23), unlike people, who can challenge the self-esteem of young children. He strongly believes that "by forging connections with plants, animals, and land, by finding ways to experience some relationship to the Earth, individuals can gain a sense of worth" (Nabhan & Trimble, 1994, p. 22).

Karmozyn, Scalise, and Trostle (1993) believe that "positive early experiences with self, with others, and with the environment help form the foundation for the individual's appreciation of the world" (p. 225). These levels of environmental understanding occur in succession; children must appreciate themselves first, then move on to others, and finally to the environment.

Young children are egocentric. Their learning begins with the most important person in their lives, themselves. Only after they have gained respect for themselves and others will they be able to be concerned with more global issues. Environmental goals for young children, according to Karmozyn et al. (1993), are “respecting our planet Earth, beautifying our surroundings, and demonstrating responsibility for all living things” (p. 228).

The people in young children’s lives who interact with them on a daily basis (parents, neighbors, teachers, and peers) must provide them with positive experiences with nature and model the above environmental goals themselves. Young children have the ability to explore nature and make simple discoveries, which will prepare them for the more abstract and difficult environmental concepts they will encounter later in life. “Learning about ecological issues, like all learning, is a continual process and not merely a product” (Karmozyn et al., 1993, p. 225).

While traveling in the wilderness with his family and friends, Nabhan (Nabhan & Trimble, 1994) noticed that children and adults often have different agendas in mind when enjoying what the natural environment has to offer. On one such excursion, he realized “how much time adults spend scanning the land for picturesque panoramas and scenic overlooks” (Nabhan & Trimble, 1994, p. 5). Kids, on the other hand, “were on their hands and knees, engaged with what was immediately before them” (Nabhan & Trimble, 1994, p. 5). While

the adults were interested in the “oversized scenes” and the bigger picture, the children wanted to explore the smaller things like the rocks and pine cones.

Children, while scouring around the ground, are fulfilling the above goals of respecting, beautifying, and showing responsibility for the world around them. It is essential for them to make these simple discoveries. Children must explore these very basic elements of the Earth and have supporting adults who let them do so.

In order for children to be able to get on their hands and knees to explore the natural world, someone has to expose them to it. According to Trimble (Nabhan & Trimble, 1994), “connection to the natural world can begin with snakes, shells, or stars, birds, beetles, or blackberries” (p. 18). For Trimble, the connection started with the land itself. Since his father was a field geologist, he was exposed to the land at a very young age and came to value it. Trimble says, “with my father as a guide, I noticed the land” (Nabhan & Trimble, 1994, p. 21). Children who are exposed to the land and made aware of its resources will notice it and learn about it.

The ecological view of children by Kostelnik, Stein, Whiren, and Soderman (1988) illustrates the many influences the social systems have on children and how they affect their attitudes about the environment. Individual microsystems include the microsystem of the home, the classroom, the neighborhood, and the peer group. The mesosystem is combination of microsystems which would include the relations between the home, the school, the neighborhood, and the peer group. The exosystem and macrosystem are large

social systems which indirectly affect children, which in turn affect their attitudes about the environment. Children have many variables in their lives that influence their attitudes about issues.

THE ISSUE

It can be concluded from this review of the literature that children's attitudes about the environment can be measured; however, a tool needs to be developed to be used with young children. In addition, many variables influence children's attitudes about the environment and two significant ones may include the environmental attitudes of parents and children's exposure to the world around them. Finally, looking at children with an ecological perspective may answer questions about how the microsystem of the family affects children's attitudes about the natural environment.

To what extent does the microsystem of the family build the foundation for children's attitudes about the natural environment? The purpose of this study is to find out if parents' environmental attitudes and children's exposure to the natural environment are significant variables that are related to children's attitudes about the natural environment. Does a relationship exist between parents' and children's attitudes about the environment? Does a relationship exist between children's exposure to the natural environment and their attitudes about it? Does a relationship exist between children's living circumstances and their attitudes about the environment?

Research about young children and the environment is limited. This exploratory study focuses on children's attitudes about the natural environment and things that are related to those attitudes. In this study, environmental attitudes of parents will be measured and information will be gathered about children's exposure to the natural environment to see if those two variables are related to children's environmental attitudes.

The information gathered in this exploratory study may be a beginning step in helping teachers, parents, and caregivers provide appropriate experiences for young children in the natural environment. The next chapter discusses the methods by which information was gathered and analyzed for this project.

Chapter 3

METHODS

SUBJECTS

The subjects in this study were 25 second grade students and their families (mothers and/or fathers). There were 10 girls and 15 boys. They were recruited from one large school district outside of a medium sized city in Michigan. Two elementary schools (out of seven) were chosen from this district to be in the study.

Of the two schools selected, one is in a rural area and one is in a suburban area. It was the intent of this study to select children and their parents from different geographic locations. Demographic information about the participants can be found in chapter 4.

SELECTION OF SUBJECTS

Subjects for the research were selected in different ways. In the beginning, the Assistant Superintendent for Elementary Education of the school district was contacted and gave the researcher approval to proceed. With this approval, the researcher contacted the principals of the two schools to be used in the study. The researcher then followed the procedures given by the building principals as to the protocol for contacting teachers and parents of second grade children. In both schools, the researcher contacted the second

grade teachers directly and received a class list with names and addresses of parents and children.

Parent and child participants were recruited by contacting families of children in two second grade classrooms. Each family received an information letter and survey booklet inviting them to participate (Appendix A). Both parent consent and child assent were required for a particular family to be involved in the research (Appendix B). The survey booklet included the permission slips for parents and children, the survey for parents, and the adult attitude test (one for the mother and one for the father).

As parents finished and returned the survey booklets, their involvement in the study was complete. How data was collected from the children is described later in this chapter. Twelve children from the class in the rural school and 13 from the class in the suburban school were involved in the research.

DESCRIPTION OF INSTRUMENTS

The instrumentation for this study consisted of three tools. Two environmental attitude tests were used to measure the attitudes of adults and attitudes of children in the study. In addition, a survey completed by parents assessed the second grade children's exposure to the natural environment and demographic information.

Children's Environmental Response Inventory (CERI)

The first instrument used in this study consisted of a portion of a psychometric test called the *Children's Environmental Response Inventory* (CERI), "a broad test of values, attitudes, and predispositions toward the external environment" (Bunting & Cousins, 1983, p. 3). This test was used to measure parents' environmental attitudes in the domain of Pastoralism which consists of a 22 Likert-type scale. The parents were asked 15 of the 22 questions to correspond with the adapted version of the test the second grade children were given. Ten questions were from the Pastoralism Domain and 5 were from other domains (to vary the questions being asked). A high score in Pastoralism means "sympathy and identification with the environment" (Harvey, 1989, p. 37). The CERI is appropriate for classroom administration at the fourth grade level (age 9) and upward, according to Bunting and Cousins (1985).

The questions represent situations in which people could find themselves when in the natural environment. Such situations include walking in the woods, seeing the sun rise, going to a nature camp, and listening to the sounds a stream makes. Participants were asked to respond to each situation by circling an answer on the five point scale. Choices on the scale for each question ranged from disagree very much, disagree, don't know/don't care, agree, and agree very much (Appendix C).

Children's Environmental Response Inventory Revised (CERIR)

The second instrument used in this study consisted of revised version of the *Children's Environmental Response Inventory* called the CERIR. It was adapted from the original

CERI because second grade children fell below the age range created by the CERI. The test was narrowed down to 15 from 22 questions (the same number of questions given to adults) to make it a reasonable length for young children. Ten questions were from the Pastoralism Domain and 5 questions were from other domains (to vary the questions being asked).

A multi sensory approach was used in the CERIR. Children in the second grade are in the preoperational and concrete operational period of development (Hendrick, 1990) and respond well to activities that incorporate many senses. The following revisions to the CERI included the use of visual, verbal, and tactile modalities.

The questions that children were asked paralleled those questions asked of adults. For example, question number one on each tool asked about walking in the woods, question two asked about walking through leaves in the fall, question three asked about getting up early to see the sun rise, etc. Even though the content of each question was similar for both adults and children, more text was added to the CERIR to better explain to children what each question was describing and asking.

The children were expected to respond to each item by pointing out how much they wanted to do the activity on a five point iconic scale, that showed five circles which ranged in size from .25 of an inch to 4 inches in diameter. Each circle had a corresponding caption, that paralleled the responses on the adult scale, which consisted of don't want to at all, not really, it would be okay (neutral), yes definitely, and really want to do it. The

researcher used a varying tone of voice when describing the smallest circle on the iconic scale “I don’t want to do the activity at all” to the largest circle “REALLY WANT TO DO THE ACTIVITY.” Figure 1 displays this response scale.

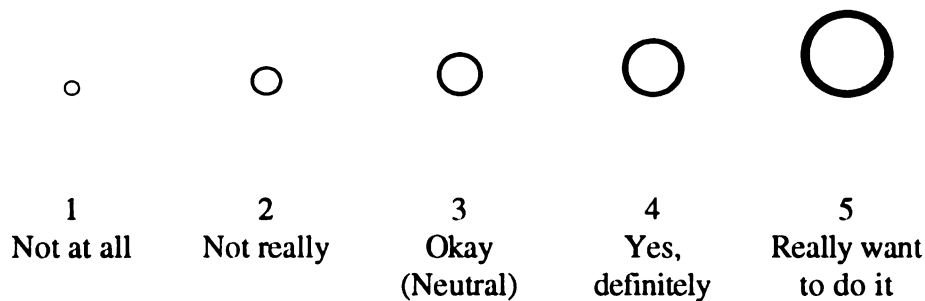


Figure 1: CERIR Response Scale

In addition, children were able to see pictures of places in the natural environment to help them visualize what each question was asking. The pictures were from pages of the book America, by Marvin Karp. Finally, the CERIR was administered on a one-on-one basis by the primary investigator of the research project (Appendix C).

Parent Survey

The “Parent Survey” (PS) was a tool created by the researcher to measure parental assessment of the second grade children’s exposure to the natural environment. The

questions on the survey were designed to obtain information about how much contact the children had with the natural environment. The PS was used to collect information about each child's exposure to vegetation, environmental movements, parks, beaches, and camping. In addition, it provided information about each child's current living situation including type of housing, size of yard, and length of residence in current home. Finally, the PS was used to identify demographics about where the child lived in the community, and whether their family home was in a rural, suburban, or urban area. The PS consists of 19 multiple choice questions. Parent participants chose from a set of two to seven possible answers when responding to each question of the survey (Appendix C).

The information from four of the first six questions of the survey was used to determine if each child had high, medium, or low exposure to the natural environment. These questions asked where each child lived in the community, if their housing situation provided them with a yard, if they planted a garden, and to what extent the family was involved in environmental movements. An environmental exposure score was calculated for each child based on their parents' responses to the survey questions. Three points were given to "high exposure" responses which included living in a rural (farm or non-farm) community, having a large yard, and planting both a vegetable and flower garden. Two points were given to "medium exposure" responses which included living in a subdivision, having a medium yard, and planting either a vegetable or a flower garden. One point was given to "low exposure" responses which included living in a town or city, having a small yard or no yard, and not planting a garden. In addition, one point was given for each of the environmental movement choices which included composting yard

waste, recycling things from around the house, discussing current news/issues with children, and “other”. A total environmental exposure score of 13 was possible. Those participants with a score of 11-13 points were considered to have high exposure, those with a score of 7-10 were considered to have medium exposure, and those with a score of 3-6 were considered to have low exposure.

Questions 1, 3, 5, and 6 of the parent survey (mentioned above) were used to describe which level of exposure children had to the world around them. Questions 7, 8, and 9, which asked how often the families spent time at parks, beaches, and campgrounds, were not used to determine children’s level of environmental exposure. Most families, (70% or more) rarely or occasionally spent time at those places. See Table 1 for the exposure to the natural environment categories.

Table 1: Exposure to the Natural Environment Categories

Survey Questions	High Exposure	Medium Exposure	Low Exposure
Q1: Where do you live in the community?	Rural farm Rural non-farm (3 points)	Subdivision (2 points)	Town or City (1 point)
Q3: Does your housing situation provide you with a yard?	Large yard (3 points)	Medium yard (2 points)	Small yard No yard (1 point)
Q5: Do you plant a vegetable garden or flower garden?	Both vegetable <u>and</u> flower garden (3 points)	Either vegetable <u>or</u> flower garden (2 points)	No gardening (1 point)
Q6: To what extent is your family involved in environmental movements?	Compost yard waste Recycle items Discuss news/issues Other _____ (1 point for each; family does 3 or 4 of the above items)	Compost yard waste Recycle items Discuss news/issues Other _____ (1 point for each; family does 2 of the above items)	Compost yard waste Recycle items Discuss news/issues Other _____ (1 point for each; family does 1 of the above items)
Total Possible Score=13	High Exposure Range 13 - 11	Medium Exposure Range 10 - 7	Low Exposure Range 6 - 3

DESCRIPTIVE INFORMATION

Descriptive information about each student and parent(s) was collected from the families in the study. The information was obtained through questions on the survey given to parents and was requested to assist in describing the environmental exposure of subjects in the sample.

The questions on the survey asked for the following information:

1. Rural, suburban, or urban community
2. Type of housing
3. Size of yard
4. Length of time in current home
5. Types of vegetation in the yard
6. Extent of involvement in environmental movements
7. Time spent in parks
8. Time spent at beaches
9. Time spent camping
10. Time spent with grandparents
11. Grandparents' type of community
12. Grandparents' type of housing
13. Grandparents' size of yard
14. Grandparents' types of vegetation in the yard
15. Grandparents' extent of involvement in environmental movements
16. Age of mother and age of father
17. Occupation of mother and occupation of father
18. Education of mother and education of father
19. Family income

RELIABILITY FOR EACH INSTRUMENT

Bunting and Cousins (1983, 1985) adapted an adult Environmental Response Inventory to be used with children and called the new test the *Children's Environmental Response Inventory* (CERI). They found that their CERI measured "environmental personality" as well as the adult test. According to Bunting and Cousins, the "CERI scales are statistically robust ... , [with] Cronbach's α ... ranges from .78 to .91" (1985, p.737). In

addition, test-retest statistics “coefficient shows a range from .87 to .94, indicating good stability of measurement over time” (Bunting & Cousins, 1985, p. 737).

Rater reliability was insured by the primary investigator of this research project because she was the only adult involved in the distribution and administration of the measurement tools to parents and students. This was done to standardize the scoring of each question with children. The PS and the CERI were both sent to parents via the mail, self administered at home, and then mailed back to the researcher for scoring. The CERIR was administered to students on a one-on-one basis by the primary investigator on site at the child’s school.

The CERI was adapted for use with young children and called the CERIR. The pictures, questions, and response scale used in this adapted test were shared with a panel of experts who know about children and nature. Experts said the test had content validity.

A test-retest was done with a subgroup of $n=5$. No difference in means was found in a four week period.

RESEARCH QUESTIONS

The main purpose of this exploratory study was to measure the environmental attitudes of children’s parents, investigate children’s exposure to the world around them, and determine if those two variables were related to children’s attitudes about the

environment. The following research questions were investigated to learn more about children's attitudes about the natural environment.

Question 1: How do parental attitudes about the natural environment relate to their child's environmental attitudes?

Question 2: How does children's exposure to the natural environment relate to their environmental attitudes?

DATA ANALYSIS

Assess Attitudes and Exposure

As outlined above, the first purpose of the research was to assess the environmental attitudes of second grade children and their parents, and assess the children's exposure to the natural environment.

To determine the environmental attitudes of parents and children, two tests were used.

The CERI measured parents' attitudes about the natural environment. Their responses were classified into disagree very much, disagree, don't know/don't care, agree, and agree very much. The CERIR measured children's attitudes about the natural environment.

Their responses were classified into don't want to do it at all, not really, it would be okay, yes definitely, and really want to do it.

The PS measured the parental assessment of the second grade children's exposure to the natural environment. Parent responses on the survey were scored and the children were classified as having high, medium, and low environmental exposure.

Relate Attitudes and Exposure

The second purpose of this study was to determine if a relationship exists between the environmental attitudes of parents and the environmental attitudes of their children, and to determine if a relationship exists between children's exposure to the natural environment and their environmental attitudes.

To determine if a relationship exists between parental and child environmental attitudes, paired t-tests were run between the environmental attitudes of parents (mothers and fathers) and children. In addition, correlation coefficients were calculated between the environmental attitudes of mothers, fathers, and children.

To determine if a relationship exists between children's environmental exposure and their environmental attitudes, the environmental exposure score was analyzed with the children's responses to the CERIR using a frequency count.

The statistical package used to analyze the data was SPSS for Windows 6.1 (1994).

DATA COLLECTION

Three measurement tools were used in this project; two environmental attitude tests adapted from the *Children's Environmental Response Inventory* (CERI), one for adults and one for children, and one survey for parents to assess children's exposure to the natural environment.

Each family who chose to participate in the study consisted of a second grade child and his or her parents (mother and/or father). Each family completed the above three measurement tools for the project. Adults filled out the PS and the CERI at home; children took the CERIR at school.

Adult Data

A total of 56 survey booklets were sent to families of second grade children. About two weeks after the first mailing of survey booklets, a reminder postcard was sent to all families who did not respond. A total of 24 families responded with a willingness to participate. There were 25 children in the study because one of the families had twins who took part.

Once the survey booklets were returned, two of the three measurement tools were already completed for each family. Parents filled out the survey, completed the CERI (completed by both the mother and/or father), and signed the permission slips for themselves and their child to be involved in the project (refer to appendix B for permission slips). When 25 survey booklets were returned, dates were set to work with children on site at their

school. The testing of the children's environmental attitudes took place within 4-6 weeks after the original mailing.

Child Data

Children were tested at their school, in a place that was familiar to them. The primary investigator worked one-on-one with each child.

Each child was told about the project, asked if he or she wanted to participate, and invited to look at pictures of places in the natural environment. The testing took about 10 minutes for the child and the researcher to complete. When each child entered the room they were given the following instructions:

Hello, my name is Mrs. Castle. I have some pictures of different things from outdoors such as trees and water that I want to show you. When I show you a picture of something, I'm going to ask you how much you'd like to do the activity. If you would really like to do the activity then point to the biggest circle. If you wouldn't like to do this activity at all, then point to the smallest circle. You could point to the circles in-between if doing the activity would be okay or all right.

When each child completed the CERIR, he or she was thanked for looking at the pictures and answering the questions. As a token of appreciation for participating in the activity, each child was given a book about nature to take home. The teachers who were involved in the study were thanked for their time and effort as well.

The parents who participated in the study were thanked for their help, assured that the confidentiality of all participants would be maintained, and given the opportunity to ask

questions by contacting the primary investigator via the telephone. A summary of the data from this study was offered to all families who completed the survey booklets and will be sent to those who requested it when the results are completed.

Coded Data

The permission slips, survey booklets, and children's environmental attitudes tests were coded with a family number (F1-F25) and a letter (B or G) to identify if the child was a boy or a girl. The permission slips were removed from the survey booklets and stored in a separate place. For example, the first family in the study was coded F1-B, which meant family one, boy. This system allowed the data from the measurement tools to be entered into the computer without the families being identified by name. This maintained the participants' confidentiality.

The process of procuring subjects, collecting data from parents and children, and scoring the data took about six months. The next chapter analyzes the results and discusses the findings of the research.

Chapter 4

ANALYSIS OF RESULTS AND DISCUSSION

INTRODUCTION

This chapter is divided into two parts. The first section is devoted to analyzing the descriptive information which describes the participants in the study. The second section is devoted to analyzing the results of the research questions that were presented in chapter 3.

DESCRIPTIVE INFORMATION

The sample consisted of 24 families of 25 second grade children. Twenty-four mothers and 19 fathers participated in the study. The student population consisted of 15 boys and 10 girls. The children in the study were all in the second grade. ✓

The most common age of the mothers and fathers ranged from 36-45 years of age. The educational levels for mothers and fathers were similar. About 38% of the mothers and fathers had attended college. Another 28% of the parents had completed college. The final third was made up of mothers and fathers who completed high school and those who completed graduate/professional school.

Almost half of the 25 families (48%) lived in a rural (farm or non-farm) community, while 36% lived in a subdivision, 12% lived in a town or city, and 4% did not respond. In addition, most of the families (21) lived in a house, while only 3 lived in a trailer and 1 lived in an apartment. About two-thirds of the families (16) had a large yard. Of the remaining families, 7 had a medium yard, 1 had a small yard, and 1 had no yard. Almost half of the families (48%) had lived in their homes for more than five years.

When asked about planting a vegetable or flower garden, 10 families reported planting both a vegetable and flower garden, 12 of the families reported planting one kind or the other, and 3 of the families did not plant a garden at all.

All of the families except one were involved in environmental movements. Eleven compost yard waste, 19 recycle things from around the house, and 9 discuss new/current issues with children. Three families reported doing “other” environmental practices such as hanging bird feeders, planting trees, and being involved in wildlife management.

Most of the families (80%) rarely or occasionally spend time at parks, while only 20% go to parks often or as much as possible. In addition, most of the families (88%) rarely or occasionally spend time at beaches, while only 12% go to the beach often (0% go as much as possible). A similar trend was found in families who go camping; 72% of the families go camping rarely or occasionally and 28% go camping often or as much as possible. Complete descriptive data is in Table 2 and demographic data is in Table 3. ✓

Table 2: Descriptive Data

Variable	Family
Home setting	
Rural/farm	8
Rural/non-farm	4
Subdivision	9
Town or city	3
Missing	1
Type of housing	
House	21
Trailer	3
Apartment	1
Size of yard	
No yard	1
Small yard	1
Medium yard	7
Large yard	16

Table 2 (cont'd)

Variable	Family
Time in home	
Less than a month	0
Less than a year	0
1-3 years	6
3-5 years	7
Over 5 years	12
Gardening	
No	3
Flower garden	9
Vegetable garden	3
Both	10
Environmental issues	
Compost yard waste	11
Recycle	19
Discuss news	9
Other	3
None	1

Table 2 (cont'd)

Variable	Family
Time spent at parks	
Rarely	4
Occasionally	16
Often	3
As much as possible	2
Time spent at beach	
Rarely	7
Occasionally	15
Often	3
As much as possible	0
Time spent camping	
Rarely	13
Occasionally	5
Often	6
As much as possible	1

Table 3: Demographic Data

Variable	Family	Mother	Mode	Father	Mode
Age					
18-25 years					
26-35 years		8		6	
36-45 years		16	36-45 yrs.	16	36-45 yrs.
46-up		1		2	
Missing				1	
Education					
High school graduate		5		5	
Some college		10	Some College	9	Some College
College graduate		7		7	
Grad. or prof. school		2		4	
Missing		1			
Family Income					
Less than \$10,000	1				
\$10,001 - 20,000	2				
\$20,001 - 30,000	0				
\$30,001 - 55,000	8				
\$55,001 - 75,000	4				
Over \$75,000	7				
Missing	3				

RESEARCH QUESTIONS

Research Question 1

How do parental attitudes about the natural environment relate to their child's environmental attitudes?

Scoring the CERI and CERIR

Parents' scores on the CERI were classified into disagree very much, disagree, don't know/don't care, agree, and agree very much. A value of 1 to 5 was given to each response; 1 for disagree very much, 2 for disagree, 3 for don't know/don't care, 4 for agree, and 5 for agree very much. The composite score includes the nature items only. The score can be reported as a net score or average score.

Children's scores on the CERIR were classified into don't want to do it at all, not really, it would be okay, yes definitely, and really want to do it. A value of 1 to 5 was given for each response; 1 for don't want to do it at all, 2 for not really, 3 for okay, 4 for yes definitely, and 5 for really want to do it. The composite score includes the nature items only. The score can be reported as a net score or an average score.

The 10 nature items were tested for reliability for mothers, fathers, and children. The score ranged from 1 to 5 on any given question. The overall mean for mothers was 4.3 with a Chronbach's α of .78. The overall mean for fathers was 4.1 with a Chronbach's α of .78 (this corresponds to the original, longer version of the CERI which had an α of .78). The overall mean for children was 4.2 with a Chronbach's α of .43. Because the

reliability for children was so low, an overall scale was not used to analyze the data. Table 4 reports the reliability analysis.

Table 4: Reliability Analysis

Scale	Mean	Cronbach's α
Mother's Scale N=24	4.3	.78
Father's Scale N=19	4.1	.78
Child's Scale N=25	4.2	.43

Item Analysis

The items on the CERIR were analyzed by examining the responses of a third of the children having the highest scores and the responses of a third of the children with the lowest scores. The nature focused children, those with the highest attitude scores, responded to all of the nature questions with a neutral, yes, or really want to response. The item analysis showed a strong relationship between children who like nature and how they responded on the CERIR.

Those children less focused on the natural environment, those with the lowest attitude scores, responded in a variety of ways to the nature questions. Their responses on the nature questions were random and did not show a pattern of consistency; some responses were low and some responses were high.

This adapted instrument was a good predictor of children who like nature, however it was not a good predictor of children whose attitudes were less positive. Further work needs to be done on this instrument to make it more discriminating.

Significance Level

The significance α of $\leq .05$ was selected for this study based on convention. Within this field an α of $\leq .05$ is an appropriate level for a pilot study.

Paired T-Tests

Paired t-tests were performed to look at the relationship between the means of the mothers' and children's items, and between the fathers' and children's items. Table 5 reports the mothers' and children's attitudes, and Table 6 reports the fathers' and children's attitudes.

In general, mothers' and children's attitudes about the natural environment were similar in items 2, 4, 5, 7, 8, 10, 13, and 14. They were significantly different in item 1 (walking in the woods) and item 11 (listening to the sounds that a stream makes).

In general, fathers' and children's attitudes about the natural environment were similar in items 1, 2, 4, 7, 10, 13, and 14. They were significantly different in item 5 (live in a cabin in the woods), item 8 (go to a nature camp), and item 11 (listening to the sounds that a stream makes).

Table 5: Attitudes of Mothers and Children
Paired T-Test (N=24)

Attitude Questions	Mothers' Mean	Children's Mean	Significant ($\alpha \leq .05$)
1. Walking in the woods	4.7	4.2	.009*
2. Walking through leaves in the fall	4.8	4.5	.137
4. Get up early to see the sun rise	4.1	4.0	.753
5. Live in a cabin in the woods	3.8	4.3	.091
7. Visit places with lots of plants and trees	4.5	4.6	.627
8. Go to a nature camp	4.0	4.5	.056
10. Sitting beside a quiet pond	4.4	4.1	.162
11. Listening to sounds that a stream makes	4.6	3.8	.007*
13. Walking in the rain or snow	3.9	3.9	.901
14. Looking at pictures of birds and animals	4.1	4.3	.528

* $\alpha \leq .05$

Table 6: Attitudes of Fathers and Children
Paired T-Test (N=19)

Attitude Questions	Fathers' Mean	Children's Mean	Significant ($\alpha \leq .05$)
1. Walking in the woods	4.6	4.2	.465
2. Walking through leaves in the fall	4.5	4.4	.578
4. Get up early to see the sun rise	3.7	4.1	.344
5. Live in a cabin in the woods	3.8	4.5	.033*
7. Visit places with lots of plants and trees	4.1	4.4	.331
8. Go to a nature camp	4.0	4.6	.017*
10. Sitting beside a quiet pond	4.3	4.1	.385
11. Listening to sounds that a stream makes	4.5	4.1	.042*
13. Walking in the rain or snow	3.5	3.8	.209
14. Looking at pictures of birds and animals	4.1	4.2	.841

* $\alpha \leq .05$

Correlation Coefficients

Correlation coefficients were calculated between the children's, mothers', and fathers' items to examine the relationship between attitudes of parents and children. The only correlation for an item by item analysis between mothers and children was item 1 (walking in the woods). The correlation was .6366 ($p=.001$). The only correlation for an item by item analysis between fathers and children was item 13 (walking in the rain or snow). The correlation was .6241 ($p=.004$).

Research Question 2

How does children's exposure to the natural environment relate to their environmental attitudes?

Environmental Exposure

Children's exposure to the natural environment was assessed using the information collected from the PS. Environmental exposure was divided into high, medium, and low exposure. Of the 25 children in the study, 8 had high environmental exposure, 12 had medium environmental exposure, and 5 had low environmental exposure. The highest score was 13 (out of 13) which was given to one child. This child's family lived in a rural (non-farm) community, had a large yard, planted both a vegetable and flower garden, composted yard waste, recycled things from around the house, discussed current news/issues with their children and participated in other environmental movements. The lowest score was 4 which was given to one child. This child's family lived in a town or

city, had no yard, planted a flower garden, and did not get involved in any environmental movements. Table 7 describes how many children had high, medium, and low exposure.

Table 7: Environmental Exposure

Environmental Exposure	Number of Children	Percent of Children
Low Exposure	5	20%
Medium Exposure	12	48%
High Exposure	8	32%

Environmental Exposure and Environmental Attitudes

A frequency count was taken to analyze the children's environmental exposure with their environmental attitudes. Over two-thirds of the children in the study had attitudes that showed that they wanted to participate in activities in the natural environment, regardless of the prior exposure they had toward it. Table 8 describes children's willingness to participate in activities in the natural environment, within each level of environmental exposure.

Table 8: Environmental Exposure and Environmental Attitudes

Attitudes (How each child responded to the ten nature items)	Low Exposure Responses n=5 children	Medium Exposure Responses n=12 children	High Exposure Responses n=8 children
Not at all	6%	5%	3.75%
Not really	4%	2.5%	0%
Okay (neutral)	8%	19%	7.5%
Yes, definitely	26%	27.5%	31.25%
Really want to	56%	46%	57.5%
Total Number of Responses	50	120	80

The next chapter discusses these findings, addresses personal observations by the researcher, and gives suggestions for further research.

Chapter 5

DISCUSSION, PERSONAL OBSERVATIONS, AND DIRECTIONS FOR FUTURE RESEARCH

DISCUSSION

This exploratory study was undertaken so that eventually professionals could continue the promotion of environmental awareness and positive environmental attitudes of today's young children. Being a new topic of research, it was justified because of the need for further investigation about children's relationship to the natural world.

The purpose of this study was to find out if the environmental attitudes of children's parents and children's exposure to the natural environment were significant variables that relate to children's attitudes about the world around them. The information gathered in this study was to serve as a basis for understanding variables that influence the development of environmental dispositions in young children.

Bunting and Cousin's (1983, 1985) *Children's Environmental Response Inventory* (CERI) was adapted for use with second grade children because an appropriate measurement tool was not available to measure young children's attitudes about the environment. Original questions from Bunting and Cousin's CERI were used to measure

adult environmental attitudes. In addition, a Parent Survey was created to gather information about children's exposure to the natural environment.

The first research question looked at how parental attitudes about the natural environment related to their child's environmental attitudes. Because the reliability analysis showed a low Chronbach's α for children ($\alpha = .43$), an overall scale was not used to analyze the data. Instead, paired t-tests were run in an item by item analysis of mothers' and children's attitudes, and fathers' and children's attitudes.

A significant difference was found in two items for mothers and children; item 1 (walking in the woods) and item 11 (listening to the sounds a stream makes). Mothers were more interested in walking in the woods and listening to the sounds a stream makes than were the children. Why were the mothers more interested in walking in the woods than the children? Perhaps the mothers view this as a peaceful and quiet time away from a busy schedule. Children, on the other hand, may be willing to do it but may not see it as something very exciting.

A significant difference was found in three items for fathers and children; item 5 (living in a cabin in the woods), item 8 (going to a nature camp), and item 11 (listening to the sounds a stream makes). Children were more interested in living in a cabin in the woods and visiting a nature camp than were the fathers. Fathers, on the other hand, were more interested in listening to the sounds a stream makes. Why were the children so much more interested than the fathers in living in a cabin in the woods and going to a nature camp?

Perhaps the children see this as fun and adventurous, but fathers may view it as a lot of extra work. Fathers often get left with the chores at a cabin or camp site. Children, on the other hand, may view themselves as having more of a care free time.

Item 11 (listening to the sounds a stream makes) was significantly different for both mothers and children, and fathers and children. Both mothers and fathers were more willing to listen to the sounds a stream makes than the children. This sound is common on tapes to induce relaxation for adults. Young children in particular may not have had the life experience to appreciate the relaxing quality of this activity. In addition, young children in Michigan receive many warnings to keep away from water due to potential safety issues.

It is difficult to draw many conclusions as to why the children and parents were significantly different in their thinking on some of the items on the measurement tool. Perhaps changing the environmental attitudes instruments to include *why* parents and children responded in a particular way would give a more accurate picture of the reasons behind the attitudes. Knowing why fathers don't want to go to a nature camp and why children really want to go would be important information to gather in future studies.

The second research question looked at how children's exposure to the natural environment related to their environmental attitudes. An attempt was made to measure children's exposure to nature in their near environment. Of the children with high exposure, 89% responded with a willingness to participate in activities in the natural

environment and of the children with low exposure, 82% responded with a willingness to be involved in these activities. Of the medium exposure group, 74% were willing to participate in nature activities. It appears that many children were interested in participating in activities in nature. Even though conclusions cannot be drawn from this data, it does indicate that this field of study should be explored further.

PERSONAL OBSERVATIONS

The children responded in a variety of ways to the CERIR. Some took their time in pointing out responses, others were very quick to point to a response as soon as they saw the picture. Some children pointed to their responses silently, others went on and on with reasons for answering in a particular way.

The two items that had pictures of water elicited a variety of comments from the children. One of the questions showed a peaceful body of water and asked the children how they would like sitting by the quiet water. The other showed water in a stream and asked the children how they would like to listen to the sounds a stream makes. Children's comments included "I don't like water, I would be afraid of falling in" and "I might fall in the water off the boat." These responses about fear of water may be practical in the area in which the children live because there are many rivers, lakes, swamps, and ponds in their state. Children may receive caution from parents often, even if they are not often at risk. In both of these questions about water, the parents' means were higher than the children's.

DIRECTIONS FOR FUTURE RESEARCH

Three areas from this study that need refinement are the CERIR, the parent survey, and the size and diversity of the sample. The following recommendations address these concerns.

Children's Environmental Response Inventory Revised (CERIR)

The CERIR consisted of ten nature questions that were tested for reliability. The Chronbach's α was low ($\alpha = .43$) for children. Increasing the amount of items on this measurement tool may help increase the reliability of the instrument.

The item analysis showed that the CERIR is sensitive to children who are nature focused, but not as sensitive to children who are less nature focused. Further work with this instrument needs to be done to make it more discrete.

The results of the paired t-tests showed that children's means were lower than the parents' on both questions that asked about water. Perhaps the questions about water need to be reworded to represent situations in which children from Michigan could find themselves around water. Lakes, ponds, and swamps are common and deep fast moving rivers flow through many communities in Michigan. The CERI was developed in Canada where children may have different experiences with natural bodies of water than the children in this study.

Either this instrument needs to be expanded and refined or a new instrument needs to be developed that is more focused toward young children. An instrument that measures environmental attitudes of young children should be multi sensory, based on what is known about how children learn. In addition, it should also be developed for very young children because attitudes about many issues are developed early in life.

Parent Survey

The survey measured parental assessment of children's exposure to the natural environment. It gathered information about children's type of community, size of yard, participation in gardening, and involvement in environmental movements. The manner in which the questions were worded and scored, however, assumed that children who have large yards and gardens have more experience with nature than children who have small yards and no gardens. This survey needs to be refined and ask more specific questions about parents' and children's involvement in nature, not only their contact with it.

Questions that ask "How often does your child play in the yard?", "What does your child like to do in the yard?", and "What do you like to do with your child outdoors?" would give a more accurate picture of children's experiences with the natural environment.

In addition, the survey should ask why parents choose to live where they live. Do they live in the country around nature because of the aesthetic qualities or because it is close to family or place of employment. Knowing reasons why they live in a particular area would help answer questions regarding parents' and children's attitudes about nature.

Sample Size and Diversity

The population in this study consisted of 25 children and their parent(s). This small sample caused limitations in the analysis of data. Not only was the sample small, it was also not very diverse. The backgrounds of children in the study showed that a majority had similar exposure to the natural environment. Also, the majority of children responded with favorable attitudes about participating in activities in the natural environment. A larger, more diverse population in this study might increase the variance of responses.

IMPLICATIONS FOR PRACTICE

Even though there is still a lot more to be learned about children and nature, teachers of young children can begin making a difference now. The review of the literature points out many strategies that should be incorporated when teaching young children about the world around them. More importantly, these strategies can be implemented by both teachers and parents. Children need to have direct contact with nature and activities should involve hands-on manipulation of objects, discussion of concepts, and modeling of adult examples (Strickland et al., 1983/84). In addition, activities should be developmentally appropriate and should involve active learning, direct experiences, and free exploration (Cohen, 1992). Teachers and parents alike need to introduce children to the wonders of nature and use the above strategies as a guide.

AN ECOLOGICAL VIEW OF CHILDREN

Children are surrounded by the nature and beauty of our planet. It is important for them to be exposed to the world around them at a young age and develop positive attitudes about the environment. Does it appear that the ecosystem in which children live have any influence on their environmental attitudes? Does the microsystem of the home (attitudes of parents) or the microsystem of the child's near environment (exposure to nature) influence their environmental attitudes? These microsystems may or may not influence children's attitudes about the environment.

The results of this study indicate that environmental attitudes of children and parents were similar in the majority of items on the measurement tool. In addition, the majority of children were willing to participate in activities in the natural environment, regardless of their prior exposure toward it. The instruments used in this study, however, may not have been sensitive enough identify this information and may not have been sufficiently refined to identify a large variation in results. Further research needs to be carried out in the area of children and nature to reveal more information about this topic.

APPENDIX A

APPENDIX A: COMMUNICATION WITH PARENTS

Dear Families,

My name is Ann Castle and I am an elementary school teacher and I am also a graduate student at Michigan State University pursuing a masters degree in Family and Child Ecology. I am interested in young children's attitudes about the natural environment. Currently I am studying the relationship between young children's environmental attitudes and their family experiences. Some studies have been done with older children, but few have been done with young children.

I am looking for families of 2nd grade students to participate in this study. Participation involves parents filling out three survey forms about their experiences and ideas about the environment, which would take about 15 minutes. Children would be involved by looking at 15 pictures from the natural environment and telling how much they would like to participate in the activities. The children would work one-on-one with a trained graduate student for about 15 minutes to complete the activity. Your child will receive a book about nature to take home, as a token of appreciation for participating in the activity.

Attached you will find a permission slip that would give authorization for your child to participate in the activity at school and would have you fill out and return the surveys mentioned above. I cannot promise this will be beneficial to your child; however, children have enjoyed doing these activities. In addition, no child will be forced to participate in the activity, they may choose not to. The information gathered from this study will be used for the purposes of this project only and the confidentiality of all participants will be maintained. Filling out the permission slip does not obligate you to participate in the study, you may drop out at any time.

I would very much appreciate your cooperation and assistance with this project. Please take a few moments to fill out the attached permission slip and surveys. Please return this entire booklet in the return envelope one week from the date on which you received it. If you have any questions, please feel free to contact me. Thank you for your help.

Sincerely,

Ann M. Castle (517) 627-7484
Dr. Alice Whiren (517) 355-1900 (Graduate Advisor)

APPENDIX B

APPENDIX B: PERMISSION SLIPS**ADULT PERMISSION SLIP**

I have read the letter explaining the project about Children and The Natural Environment. I understand that I can discontinue my involvement in this project at any time without explanation. I voluntarily agree to participate in this research project.

Parent signature

Date

I choose not to be participate in this project at this time.

Parent signature

Date**CHILD PERMISSION SLIP**

I have read the letter explaining the project about Children and The Natural Environment. I hereby give permission for my child _____ to participate in this project. I understand that I can discontinue my child's involvement in this project at any time without explanation. I voluntarily agree to allow my child to participate in this research project.

Parent signature

Date

I choose not to allow my child _____ to participate in this project at this time.

Parent signature

Date

APPENDIX C

APPENDIX C: INSTRUMENTS**PARENT SURVEY**

The goal of this survey is to find out the past experiences that young children have with the natural environment. Please indicate your response to the questions below by placing a check mark in the box beside the best answer to each question. Please check one answer, unless otherwise stated. This survey should be filled out by the custodial parents.

1. Where do you live in the community?

- 1 () Rural/farm
- 2 () Rural/non-farm
- 3 () Subdivision
- 4 () Town or City

2. In which type of housing do you live?

- 1 () House
- 2 () Trailer
- 3 () Apartment
- 4 () Other _____

3. Does your housing situation provide you with a yard?

- 1 () No yard
- 2 () Small yard (less than 1 acre)
- 3 () Medium yard (between 1 - 2 acres)
- 4 () Large yard (2 or more acres)

4. How long have you lived in your current home?

- 1 () Less than a month
- 2 () Less than a year
- 3 () 1 - 3 years
- 4 () 3 - 5 years
- 5 () Over 5 years

5. Do you plant a vegetable garden or a flower garden at your home?

- 1 () No
- 2 () Flower garden
- 3 () Vegetable garden
- 4 () Flower garden and vegetable garden

6. To what extent is your family involved in environmental movements? (Check as many as apply).

- 1 () Compost yard waste
- 2 () Recycle things from around the house
- 3 () Discuss the news/current issues with children
- 4 () Other _____
- 5 () None

7. How often does your family spend time at the park?

- 1 () Rarely
- 2 () Occasionally
- 3 () Often
- 4 () As much as possible

8. How often does your family spend time at the beach?

- 1 () Rarely
- 2 () Occasionally
- 3 () Often
- 4 () As much as possible

9. How often does your family go camping?

- 1 () Rarely
- 2 () Occasionally
- 3 () Often
- 4 () As much as possible

10. How frequently do your children spend time with their grandparents?

Maternal Grandparents

- 1 () Daily
- 2 () Weekly
- 3 () Monthly
- 4 () 3 - 4 times a year
- 5 () 1 - 2 times a year
- 6 () Occasionally
- 7 () Rarely

Paternal Grandparents

- 1 () Daily
- 2 () Weekly
- 3 () Monthly
- 4 () 3 - 4 times a year
- 5 () 1 - 2 times a year
- 6 () Occasionally
- 7 () Rarely

11. Where do the grandparents live in their community?

Maternal Grandparents

- 1 () Rural/farm
- 2 () Rural/non-farm
- 3 () Subdivision
- 4 () Town or City

Paternal Grandparents

- 1 () Rural/farm
- 2 () Rural/non-farm
- 3 () Subdivision
- 4 () Town or City

12. In which type of housing do the grandparents live?

Maternal Grandparents

- 1 () House
- 2 () Trailer
- 3 () Apartment
- 4 () Other _____

Paternal Grandparents

- 1 () House
- 2 () Trailer
- 3 () Apartment
- 4 () Other _____

13. Does the grandparents' housing situation provide them with a yard?

Maternal Grandparents

- 1 () No yard
- 2 () Small yard (less than 1 acre)
- 3 () Medium yard (between 1 - 2 acres)
- 4 () Large yard (2 or more acres)

Paternal Grandparents

- 1 () No Yard
- 2 () Small yard (less than 1 acre)
- 3 () Medium yard (between 1 - 2 acres)
- 4 () Large yard (2 or more acres)

14. Do the grandparents plant a vegetable garden or a flower garden at their home?

Maternal Grandparents

- 1 () No
- 2 () Flower garden
- 3 () Vegetable garden
- 4 () Flower garden and vegetable garden

Paternal Grandparents

- 1 () No
- 2 () Flower garden
- 3 () Vegetable garden
- 4 () Flower garden and vegetable garden

15. To what extent are the grandparents involved in environmental movements? (Check all that apply).

Maternal Grandparents

- 1 () Compost their yard waste
- 2 () Recycle things from around the house
- 3 () Discuss the news/current issues with the children
- 4 () Other _____
- 5 () None

Paternal Grandparents

- 1 () Compost their waste
- 2 () Recycle things from around the house
- 3 () Discuss the news/current issues with the children
- 4 () Other _____
- 5 () None

16. What is your age?

Mother

- 1 () 18 - 25 years
- 2 () 26 - 35 years
- 3 () 36 - 45 years
- 4 () 46 - up

Father

- 1 () 18 - 25 years
- 2 () 26 - 35 years
- 3 () 36 - 45 years
- 4 () 46 - up

18. What is your occupation?

Mother

Father

19. What is the highest level of school you have completed?

Mother

- 1 () 8th grade or less
- 2 () Some high school
- 3 () High school graduate
- 4 () Some college
- 5 () College graduate
- 6 () Graduate or
professional school

Father

- 1 () 8th grade or less
- 2 () Some high school
- 3 () High school graduate
- 4 () Some college
- 5 () College graduate
- 6 () Graduate or
professional school

20. Please circle the number of the amount that comes closest to your total net income before taxes last year in 1994 (include all forms of income).

- 1 () Less than \$10,000
- 2 () \$10,001 - 20,000
- 3 () \$20,001 - 30,000
- 4 () \$30,001 - 55,000
- 5 () \$55,001 - 75,000
- 6 () Over \$75,000

ADULT ENVIRONMENTAL ATTITUDES

Children's Environmental Response Inventory (CERI)

"Adapted from the *Children's Environmental Response Inventory*,"

(Bunting & Cousins, undated).

This survey measures the environmental attitudes of adults. Your child will be answering similar questions and telling how much they would like to participate in each situation. There are two of these attitude surveys included in this booklet. One should be completed by each parent. Please circle one answer to each question.

RESPOND:

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

1. Walking in the woods is a waste of time.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

2. I like walking through the leaves in the fall.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

3. I would like to know about fixing cars.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

4. I would like to get up very early to see the sun rise.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

5. I would like to live in a cabin in the woods.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

6. I like hobbies and things you can do by yourself.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

7. I like places where there are lots of different plants and trees.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

8. It would be fun to go to a nature camp for the weekend.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

9. I would enjoy living in a house that was 100 years old.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

10. I like sitting beside a quiet pond.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

11. I like the sounds that a stream makes.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

12. I would enjoy visiting a big city.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

13. It is fun to walk in the rain even if you get wet.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

14. I enjoy pictures of birds and animals.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

15. People should be able to cut down trees whenever they want to.

1	2	3	4	5
disagree	disagree	don't know	agree	agree
very		don't care		very
much				much

CHILDREN'S ENVIRONMENTAL ATTITUDES

Children's Environmental Response Inventory Revised (CERIR)

"Adapted for younger children from the *Children's Environmental Response Inventory*,"
(Bunting & Cousins, undated).

CHILD'S NAME: _____ AGE: _____






DIRECTIONS FOR ADULT:

This test tries to find out young children's attitudes toward the world around them. There are fifteen items with corresponding pictures in which children are asked to respond. Since young children may not be fluent readers, an adult will work one-on-one with each child and record their answers. Within each item the adult will define the picture, ask how much the child would like to participate in the activity in the picture, and ask the child to point to their response on a scale ranging from "I wouldn't like to do it at all" to "I'd really like to do it a lot." The adult will then record the child's response to each of the fifteen items. Three practice questions are provided below for the child to learn about the nature of the questions and how to respond. The adult giving the test will use the exact same wording with each child being tested. The entire script is provided below beginning with the next section called "Directions for the Child".

DIRECTIONS FOR THE CHILD:

Hello, my name is Ms./Mr. _____. I have some pictures of different things from outdoors such as trees and water that I want to show you. When I show you a picture of something I'm going to ask you how much you would like to do the activity. If you would really like to do the activity, then point to the biggest circle. If you wouldn't like to do this activity at all, then point to the littlest circle. You could point to the circles in-between if doing the activity would be okay or all right.

RESPOND:

				
1	2	3	4	5
Not at all	Not really	Okay (Neutral)	Yes, definitely	Really want to do it

PRACTICE QUESTIONS:

- A. (Demonstrate this question for the child)
This is a picture of a ball.
Show me how much you would like to play with this ball.
Point to the circle that tells me how much.
- B. (Let the child try this question on his or her own).
This is a picture of a bike.
Show me how much you would like to ride this bike.
Point to the circle that tells me how much.
- C. (Let the child try this question on his or her own).
This is a picture of a wagon.
Show me how much you would like to play with this wagon.
Point to the circle that tells me how much.

MEASUREMENT QUESTIONS:

1. This is a picture of a path in the woods where some people like to walk.
Show me how much you would like to walk in the woods with your family.
Point to the circle that tells me how much.
2. This is a picture of all different colored leaves.
Show me how much you would like to walk in the leaves in the fall.
Point to the circle that tells me how much.
3. This is a picture of a car.
Show me how much you would like to know about fixing cars.
Point to the circle that tells me how much.
4. This is a picture of the sun coming up in the morning.
Show me how much you would like to get up early and watch the sun rise.
Point to the circle that tells me how much.
5. This is a picture of a house in the woods where some nice people live.
Show me how much you would like to live with your family in a house in the woods.
Point to the circle that tells me how much.

6. This is a picture of a person reading by herself.
Show me how much you would like to play by yourself.
Point to the circle that tells me how much.
7. This is a picture of a yard with lots of different plants and trees where some children like to play.
Show me how much you would like to play in this yard.
Point to the circle that tells me how much.
8. This is a picture of a family camping in the woods. This is the tent where they sleep.
Show me how much you would like to camp in the woods with your family.
Point to the circle that tells me how much.
9. This is a picture of a really old house.
Show me how much you would like to live with your family in an old house.
Point to the circle that tells me how much.
10. This is a picture of a peaceful body of water.
Show me how much you would like to sit by this quiet body of water.
Point to the circle that tells me how much.
11. This is a picture of water that makes sound when it flows over these rocks.
Show me how much you would like listening to the water flow over these rocks.
Point to the circle that tells me how much.
12. This is a picture of a big city.
Show me how much you would like to visit a big city with your family.
Point to the circle that tells me how much.
13. This is a picture of a snowy day.
Show me how much you would like to walk in the snow on a nice day.
Point to the circle that tells me how much.
14. This is a picture of ducks in the water.
Show me how much you would like to look at pictures of birds and animals.
Point to the circle that tells me how much.

15. This is a picture of some trees.

Show me how much you would like people to cut down trees whenever they wanted.

Point to the circle that tells me how much.

APPENDIX D

APPENDIX D: UCRIHS APPROVAL

MICHIGAN STATE UNIVERSITY

September 14, 1995

TO: Ann M. Castle
7733 Cloverhill Dr.
Lansing, Mi 48917

RE: IRB#: 95-139
TITLE: CHILDREN'S AWARENESS OF THE NATURAL ENVIRONMENT
AS RELATED TO THEIR ENVIRONMENTAL ATTITUDES
REVISION REQUESTED: 08/17/95
CATEGORY: FULL REVIEW
APPROVAL DATE: 06/05/95

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project and any revision listed above.

RENEWAL: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

**PROBLEMS/
CHANGES:**

Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517)355-2180 or FAX (517)432-1171.

Sincerely,

David E. Wright
David E. Wright, Ph.D.
UCRIHS Chair

DEW:kaa/lcp

cc: Alice Whiren



OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES

University Committee on
Research Involving
Human Subjects
(UCRIHS)

Michigan State University
232 Administration Building
East Lansing, Michigan
48824-1046

517/355-2180
FAX: 517/432-1171

LIST OF REFERENCES

LIST OF REFERENCES

- Babbie, E. (1992). The practice of social research (6th ed.). Belmont, CA: Wadsworth Publishing Co.
- Bunting, T. E., & Cousins, L. R. (undated). Children's environmental response inventory. Unpublished Instrument.
- Bunting, T. E., & Cousins, L. R. (1983). Development and application of the "children's environmental response inventory." Journal of Environmental Education, 15, 5-10.
- Bunting, T. E., & Cousins, L. R. (1985). Environmental dispositions among school-age children. Environment and Behavior, 17, 725-768.
- Chawla, L. (1988). Children's concern for the natural environment. Children's Environments Quarterly, 5, 13-20.
- Cohen, S., & Trostle, S. L. (1990). This land is our land: Promoting ecological awareness in young children. Childhood Education Annual, 66, 304-310.
- Cohen, S. (1992). Promoting ecological awareness in children. Childhood Education Annual, 68, 258-260.
- Francis, C., Boyes, E., Qualter, A., and Stanisstreet, M. (1993). Ideas of elementary students about reducing the "greenhouse effect." Science Teacher Education, 77, 375-392.
- Harvey, M. R. (1989). Children's experiences with vegetation. Children's Environments Quarterly, 6, 36-43.
- Hendrick, J. (1990). Total learning: Developmental curriculum for the young child. New York: Macmillan Publishing Co.
- Hines, J.M., Hungerford, H. R., & Tomera, A. N. (1986/87). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. Journal of Environmental Education, 18 (2), 1-8.

- Jacobson, S. K., & Padua, S. M. (1992). Parks and pupils: Environmental education in national parks of developing countries. Childhood Education Annual, 68, 290-293.
- James, A. (1992). Will it hurt "shade"? Adopting a tree. Childhood Education Annual, 68, 262.
- Jaus, H. H. (1984). The development and retention of environmental attitudes in elementary school children. Journal of Environmental Education, 15, 33-36.
- Karmozyn, P., Scalise, B., & Trostle, S. (1993). A better earth: Let it begin with me! Childhood Education, 69, 225-230.
- Karp, M. (1987). America (pp. 25, 75, 135, 139, 157, 183, 199, 221, 227, 243, 265, 277, 291, 297, 324). New York: Portland House.
- Kidd, A. H., & Kidd, R.M. (1990). Social and environmental influences on children's attitudes toward pets. Psychological Reports, 67, 807-818.
- Kirby, M. A. (1989). Nature as refuge in children's environments. Children's Environments Quarterly, 6, 7-12.
- Kostelnik, M., Stein, L., Whiren, A., & Soderman, A. (1988). Guiding children's social development. Cincinnati: South Western Publishing Co.
- Nabhan, G. P., & Trimble, S. (1994). The geography of childhood. Boston: Beacon Press.
- Piburn, M. D., & Baker, D. R. (1993). If I were the teacher ... qualitative study of attitude toward science. Science Teacher Education, 77, 393-406.
- SPSS for Windows 6.1 (1994)
- Shepard, C. L., & Speelman, L. R. (1985/86). Affecting environmental attitudes through outdoor education. Journal of Environmental Education, 17, 20-23.
- Strickland, M. P., Robertson, E. B., Jettinghoff, C. R., & Diener, C. S. (1983/84). Pretest and posttest comparisons of preschool children's knowledge about energy. Journal of Environmental Education, 15, 32-35.

MICHIGAN STATE UNIV. LIBRARIES



31293014138907