

INFLUENCES OF ENVIRONMENTAL EDUCATION PROGRAMS
ON THE PARTICIPANT'S AFFINITY FOR NATURE

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ABSTRACT

Influences of Environmental Education Programs on the
Participant's Affinity For Nature

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This study was conducted to determine the change, and the factors influencing the change, in the participant's affinity for nature resulting from an environmental education experience. In addition, this study also examined the change and factors of change in aspects of the participant's affinity for nature that directly relate to marine and coastal resources and environments. An adapted version of the Affinity for Nature scale, an outcome measuring instrument used by the American Camp Association was used to collect data from participants ($n=529$) at Rancho El Chorro Outdoor School and Camp Ocean Pines, whose experience included an overnight component and a marine science component in the curriculum. Comparisons of overall mean scores were used to determine if affinity for nature changed due to participation in the environment education program. Analysis of variance was used to determine which participant characteristic and experiential variables had a significant influence on affinity for nature index scores. Findings indicated that participation in environmental education experience had a positive change on affinity for nature scores. Residence, ethnicity/language, and gender were also found to significantly influence sense of community various affinity for nature index scores.

Keywords: affinity for nature, environmental education, outdoor education, experiential education, nature based experience, biophilia hypothesis, nature deficit disorder

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Chapter 1 Introduction

Introduction

A twinkle of emotional affinity toward nature in a child can evolve environmental values and attitudes and foster positive social development. Unfortunately, our advancing culture appears to be driving children toward a more sedentary lifestyle indoors. Do environmental educators hold the key to create the spark that invokes an influential life experience grounded in a connection to nature? This thesis is a report of a quantitative study on the influences of environmental education programs on the participant's affinity for nature. The study used a questionnaire to measure changes to participant's affinity for nature resulting from environmental education participation as well as participant characteristic and experiential variables. This chapter presents the background and need of the study, the study's purpose and research questions, definition of terms, and the delimitations and limitations of the study.

Background

In the midst of our rapidly developing society, a very distinct transformation is occurring in our newest generation's relationship with nature. Its impact has the potential to be socially detrimental. Early Americans relationships with nature were based on dependence. People lived off the land, basing their survival on the ability to interact with the dynamic natural world. Led by historical figures like Lewis and Clark, the expansion of American territory required exploration and discovery of the harsh, unknown West. In 1890, Fredrick Jackson Turner argued that this first frontier, an interface of savagery and civilization, was dissolving as US territorial borders expanded (Louv, 2005). The extinction of the first frontier gave way to the birth of the second frontier in which a

connection with nature was not essential to one's life but instead captivated it. Nature became a symbolic image of marvel and wonder, as Americans increased their preservation of and recreation in the natural environment. Figures of the first frontier like cowboys and explorers, who braved the harsh world, became iconic in media and make believe as the romanticized perception of the natural world solidified itself in American culture. However, the idealism and nostalgia that is prevalent in baby boomers and the WWII generation looks very different in newer generations. Young adults are becoming disconnected with nature while youth are even less aware of it.

From 1997 to 2003, there was a 50 percent decline in the amount of time spent hiking, walking, fishing, gardening and playing at the beach by children age nine to twelve (Hofferth and Sandberg, 2001). There are a number of factors that are held responsible for the separation of children and nature. Development that impacts natural areas along with municipal, federal and organizational ordinances is limiting the opportunities for children to freely explore nature. Louv (2005) also recognizes that natural play is becoming a less familiar and less attractive experience to youth. "In the United States, children ages six to eleven spend about thirty hours a week looking at a TV or computer monitor" (Louv, 2005, p.47). The accessibility and constant stimulation of electronic entertainment has expanded from households to children's pockets and seemingly has more appeal than outdoor play. The active, outdoor experiences that children do get tend to be rooted in busy schedules and rigid structure. Fear is also a culprit that separates youth from the natural world. Sharks, bears, pollution and the dark are just some nature-related images that keep youth in their safety bubble. Parental fear can also keep children from maximizing their potential in nature. With the perception of

“stranger danger” and injury around every corner, parents perceive inside to be much safer. All too often we hear about the idealized opportunity and freedoms our parent’s and grandparent’s generations use to have. Those opportunities appear to be minimal and less appealing to youth.

The byproduct of this occurring phenomenon is introduced by Louv (2005) as nature deficit disorder. Nature deficit disorder is described as the collection of impacts on children who are separated from interactions in nature. Before looking at how the removal of nature in our lives impacts us, we must understand the innate relationship with nature that already exists. Wilson (1984) suggests the concept of biophilia as our genetic and natural connection with the elements of the natural world. The range of human intelligence and potential is even rooted in our connection to nature (Louv, 2005). Whether it’s the need to ski down a mountain, watch the sunrise, or love and care for a pet, humans are emotionally drawn in to interact with nature.

Because nature is viewed as a foundational element of our existence, we must consider the influence it has on human development and the consequences when that relationship is interfered with. The development of a child’s knowledge and value system is critically impacted by nature. Kellert (2002) notes values are established at the convergence of knowledge and an emotional connection to nature. Kals, Schumacher & Montada (1999) defines this emotional affinity for nature as our feelings of freedom, safety, oneness and love of nature. A strong affinity for nature facilitates a greater desire to spend time in nature. By instilling this in youth, we combat the diminished use of the senses, attention difficulties, emotional illness and other social, health and mental impacts that an extensive body of research relates to a sedentary, indoor lifestyle.

One of the most accessible means in which youth can be introduced or re-connected with nature is through environmental education programs. In 2003, California's Education and Environment Initiative (EEI) was passed into law. Its main objective is to design, develop and disseminate a K-12 standards-based curriculum to teach standardized environmental principles and concepts to California's K-12 students. Current efforts between California's Department of Education and Environmental Education (EE) programs are being made to establish greater corresponding objectives based on a universal curriculum.

The definition of environmental education can be interpreted in a variety of ways. The loose term was conceptualized during the early stages of the environmentalism movement at the UN Conference for the Human Environment in Stockholm, Sweden in 1972. Environmental education was seen "as a way to inspire and guide the peoples of the world in the preservation and enhancement of the human environment" (NGO Committee of Education, Para. 1). In 1978, the Tbilisi Declaration clarified the Stockholm Declaration by including new goals, objectives, characteristics, and guiding principles for environmental education. The environmental education definition was refined

as a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action (UNESCO, 1978, Para. 7)

In contrast, the Environmental Protection Agency (EPA), a federal agency that oversees the Environmental Education Division (EED) and the Office of Children's Health

Protection and Environmental Education (OCHPEE), perceives environmental education as a means to increase public awareness and literacy about environmental issues or problems. Research relative to this study broadly views environmental education as a curriculum or program that aims to teach people about how the natural world and its elements function and the value it has in our lives.

Regardless of definition, the goals of environmental education related programs and organizations tend to be acutely aligned. Environmental education programs often aim to develop awareness and sensitivity to the environment and environmental challenge, knowledge and understanding of the environment and environmental challenge, attitudes of concern for the environment and motivation to improve or maintain environmental quality, skills to identify and help resolve environmental challenges, and participation in activities that lead to the resolution of environmental challenges (United Nations Environmental Programme, 2003, p.2).

Environmental education exists in a variety of formats. In its rawest form, environmental education can be self-learned through books, television or the Internet. Nature experiences with friends, family or organizations can also provide environmental education related opportunities. In the school system, teaching environmental concepts is the simplest form of environmental education. Lessons are enhanced as experience and interaction with natural elements are integrated into the activity. One of the most common ways of doing so is through offsite field trips. Offsite field trips can be to any place, indoor or outdoor, as long as there are elements involved that are relevant to the environmental education goals. This can include aquariums, ecosystems, landfills, or

nature-urban interfaces. Residential programs are one of the more complete forms of environmental education. Participation in most residential programs lasts between two and five days. These programs specialize their curriculum based on their natural surroundings and consist of experiential learning in specialized classrooms and the outdoor environment.

Environmental education gains heavy support from a wide range of related non-profit and governmental organizations. One particular organization relevant to this study is the California Coastal Commission (CCC). Their mission is to “protect, conserve, restore, and enhance environmental and human-based resources of the California coast and ocean for environmentally sustainable and prudent use by current and future generations” (2009, para. 1). Their Public Education Program performs coastal restorations, beach cleanups and stewardship programs. The Whale Tail Grant Program of the CCC funds and supports projects and programs that teach Californians to value and take action to improve the health of California’s marine and coastal resources, especially in under-served communities. Grant money, which comes from the sales of whale tail license plates in California, is allocated to beach cleanups, public programs and youth programs. In 2007, \$9,993 was allocated by the Whale Tail Grant Program to evaluate residential environmental education programs in San Luis Obispo County (CCC, 2008). This research was included in the evaluation.

Need for the Study

Young generations are growing up during an extremely critical time in the history of our planet. The need for environmental action is deeply rooted in our current political issues to minimize impact on the environment. Many of California’s environmental

issues such as water quality and consumption, off shore drilling, urban sprawl, and air quality may potentially unravel with an upcoming generation that is disconnected from nature, despite their future significant influence. Instead of spending time outside, youth spend countless hours in front of computer and television screens. Free play and experience in nature also becomes less appealing and seems less accessible. Detachment from nature also eliminates the possibility of establishing sense of place with the natural world. Attachment to a specific location generally leads to greater concern and accountability and promotes socially active behavior. If children can be reconnected with nature, we can help raise nature conscious and socially responsible citizens for California's future.

Hundreds of thousands of students throughout California participate in environmental education activities every year to enhance the classroom curriculum. The California Environmental Protection Agency's work in progress, known as the Education and Environment Initiative (EEI), is the foundation in which these educational experiences are being offered and standardized. As of 2010, the EEI had developed five Environmental Principles & Concepts and aligned them with California's academic content standards. The Science Content Standards for California Public Schools, K-12 "represent the content of science education and includes the essential skills and knowledge students will need to be scientifically literate citizens in the twenty-first century" (California Environmental Protection Agency, para. 1). The EEI's objective is to enhance environmental education and to "make learning relevant to today's world and prepare students to be knowledgeable citizens who can make informed decisions about California's future" (para. 4).

Residential environmental education programs, just one of the many avenues for environmental education, are an accessible and immediate solution to connect youth with the natural world while meeting California's EEI. These programs often provide powerful and positive educational experiences for young people. Studies continue to show participation benefits, emphasizing impacts on social, cognitive and physical health and development. These programs provide greater opportunities for these gains because students are immersed within nature-based curriculum for two to five days. California sixth graders who attended a week-long residential outdoor education programs raised science scores by 27 percent, retained that knowledge six to ten weeks following the experience, and made classroom gains in problem solving and higher order thinking (American Institute of Research, 2005). Bradley, Waliczek, and Zajicek (1999) also found correlations between residential program participation and high school student environmental attitudes and knowledge.

The issue is that the development of knowledgeable citizens through residential programs tends to focus heavily on academics, indirect nature experiences, and curriculum-based objectives. Indirect nature experiences are interactions in nature that are rigid and structured. California's EEI and the various related studies that measure cognitive related results is representative of the comprehension-based outcomes desired from California's educators. Schools tend to focus more on these outcomes and with good reason. Not only are our educational institutions striving to educate young minds and meet California's EEI, but they are also in competition for budget increases based on standardized test scores. With fiscal intent as the driving force, the emphasis is placed on indirect experience to meet academic standards. The experience with nature that appeals

to human emotion becomes secondary.

Educators, statewide curriculums and environmental program objectives have the same mission as they prepare California's future. However, comprehension-based learning and indirect experience is not the only way to achieve this goal. Research shows that a child's emotional connection to nature helps develop values and more responsible behavior. Direct experiences, characteristic of physical contact with nature in an unstructured format in an environmental education program, provide an opportunity to create and nurture a child's affinity with nature. Exploring and sensing nature occurs in residential camp settings because the camp is located in the natural environment. Indirect experience can account for influences on affinity for nature also, but direct experience has a stronger presence in residential environmental education programs than most formats. Though the time children spend in residential programs is relatively short, there are countless moments with the potential to appeal to the innate human-nature connection and enhance a participant's love, comfort, freedom and oneness with nature. With connection and attachment to nature, comes concern and accountability for the environment, facilitating socially responsible behavior for the future.

If environmental education programs can influence a participant's affinity for nature, then greater attention should be given to the importance of residential environmental education programs and the direct nature experience. The present study examined influences on an environmental education program participant's freedom, attraction, comfort and oneness with nature. This study aims to add to the body of environmental education research through the discovery of participation and influential variables impact on affinity for nature. Influencing a child's affinity for nature would

help to enhance California's EEI mission. It would also help combat nature-deficit disorder, a phenomenon described as a separation of experience and understanding between children and nature. For California's educators, this means encouraging and facilitating nature experience in conjunction with attaining academic curriculum standards. This research would also reemphasize the importance and need for more consistent and widespread participation in environmental education programs and give justification for greater program funding from federal, state and private stakeholders. California's environmental future may lie in the hands of public education. By providing outdoor experiences, parents, teachers and environmental educators hold the key to molding a child's perception and values toward nature. Beneficial social, emotional and physical outcomes are also cultivated from outdoor experiences. If children can be reconnected with nature, we can help to reverse nature deficit disorder and give the environmental future of California a fighting chance.

Purpose Statement

The purpose of this study was to determine the change, and the factors influencing the change, in the participant's affinity for nature resulting from an environmental education experience. In addition, this study examined the change and factors of change in aspects of the participant's affinity for nature that directly relate to marine and coastal resources and environments.

Research Questions

This study answered the following research questions:

1. Does an environmental education experience change a participant's affinity for nature?

2. Do the participant characteristic variables (e.g., gender, grade level, place of residence, ethnicity, language spoken in the home, environmental education program attended) influence change in the participant's affinity for nature due to the environmental education experience?
3. Do the participant's previous experiential variables (e.g., participation in other camp-related programs, feelings about the ocean, number of visits to the ocean in the last year, where they learned or were exposed to marine science) influence change in the participant's affinity for nature due to the environmental education experience?

Definition of Terms

Definitions are included to provide a common language and understanding of the terms used in this study.

1. *Affinity for nature*: the emotional feelings of love, freedom, safety and oneness in and towards nature (Kals et al.,1999).
2. *Environmental attitudes*: emotional and cognitive judgments or beliefs made pertaining to the natural world
3. *Environmental behaviors*: action or reaction made pertaining to the natural world
4. *Environmental education*: curriculum and programs, based on experience in an outdoor setting, which aims to teach and influence people about aspects of the natural world and our interactions with the natural world
5. *Environmental values*: a set of emotional rules followed to help make decisions pertaining to the natural world

6. *Nature*: the abundant wildness and biodiversity present that surrounds us
(Louv, 2005)

7. *Nature-based experience*: interaction with or among a natural setting or components of a natural setting

8. *Nature deficit disorder*: human costs of an alienation from nature and experiences in nature

Delimitations

This study had the following delimitations:

1. Data collection took place at Camp Ocean Pines in California during September 2009 through December 2009
2. Data collection took place at Rancho El Chorro Outdoor School in California during January 2009 through June 2009
3. Limited to schools that were willing to participate in the study
4. Limited to students who volunteered to participate in the study
5. Limited to students who attended the last school group meeting during the environmental education experience

Limitations

This study had the following limitations:

1. Two environmental education programs participated in the study
2. The instrument used for this study was a modified version of Sibthorp's (2008) Affinity for Nature Scale
3. Marine related questions utilized the Affinity for Nature Likert scale and were not tested for reliability

Chapter 2 Review of Literature

Introduction

The biophilia hypothesis is the foundational theory for and provides a bridge to much of the developmental psychology research pertinent to this study. Most of the research has come from the fields of environmental psychology, behavior and education. This chapter will include a review of the literature pertinent to the study.

The Biophilia Hypothesis

The term “biophilia” originated from Erich Fromm’s work in the mid 1960’s, exploring the innate and unique needs of humans. Described as the counter to “necrophilia,” Fromm’s non-sexual character orientation emphasizing destructiveness, biophilia directly translates to “love of life” and is a productive psychological orientation of humans to life (Eckardt, 1994). Fromm’s concept of Biophilia was expanded and popularized by E.O. Wilson’s Biophilia Hypothesis in 1984. “The biophilia hypothesis asserts the existence of a fundamental, genetically based, human need and propensity to affiliate with life and lifelike processes” (Kahn, 1997, p.1). According to Wilson (1984) “the biophilic instinct emerges, often unconsciously, in our cognition, emotions, art, and ethics and unfolds in the predictable fantasies and responses of individuals from early childhood onward” (p.85). Kaplan and Kaplan (1989) found people heavily influenced by a combination of the mystery and familiarity when judging and selecting landscape photos. They went on to infer that the preference of these accessible but intriguing sceneries most likely evolved from the selection process of early humans based on the need to seek new information (mystery) within a certain level of comfort (familiarity). Kahn (1997) reviews a number of studies that historically and consistently connects our

biophilic nature with our innate affiliation with animals. The biophilia hypothesis emerges as the basis of investigating the existence and development of environmental attitudes, reasoning and the human connection with nature, in adults and more importantly for this study, in children.

Nature and Evaluative Development

Evaluative development is one of three modes of learning in childhood development. Evaluative development refers to a child's maturing ability to form values, beliefs and moral perspective and associate concepts of worth, importance and benefits toward the environment (Kellert, 2002). Previous research yields nine basic values of the natural world. Described as weak biological tendencies or genetic inclinations, Kellert's (1996, p.77) nine nature values are "a range of physical, emotional, and intellectual expressions of the biophilic tendency to associate with nature." The taxonomy of nature values include utilitarian value, naturalistic value, ecologist-scientific value, aesthetic value, symbolic value, humanistic value, moralistic value, dominionistic value, and negativistic value (See Table 1). These values are greatly shaped by the influence of learning, culture, and experience (Lumsden & Wilson, 1983). Several studies utilize Kellert's taxonomy as a framework for evaluating different environmental values and attitudes. Kellert notes four characteristics of progression developing nature values go through. Typically, nature values move from concrete perceptions of to abstract levels of thinking and experience, egocentric concern to social interest, a local perspective to a global perspective and from emotional values of nature to rational and logical perspectives.

Table 1. Taxonomy of nature values (Kellert, 1996)

Value	Definition	Function
Utilitarian	Practical and material exploitation of nature	Physical sustenance and security
Naturalistic	Direct experience and exploration of nature	Curiosity, discovery and recreation
Ecologistic-Scientific	Systematic study of structure, function	Knowledge, understanding, observational skills
Aesthetic	Physical appeal and beauty of nature	Inspiration, harmony, security
Symbolic	Use of nature for language and thought	Communication and mental development
Humanistic	Strong emotional attachment and "love"	Bonding, sharing, cooperation, companionship
Moralistic	Spiritual reverence and ethical concern for nature	Order, meaning, kinship, altruism
Dominionistic	Mastery, physical control, dominance of nature	Mechanical skills, physical prowess, ability to subdue
Negativistic	Fear, aversion, alienation from nature	Security, protection, safety, awe

Kellert & Westervelt (1983) note three life stages of development in which environmental values are established. The empathy stage of development occurs during the ages of 3-6. This stage is characteristic of exploration, unstructured play and curiosity. The utilitarian, dominionistic and negativistic values are the most emphasized values during the empathy stage of development (Sobel, 1996). Environmentally related activities, such as recycling, gardening and general immersion in nature are determinants of positive environmental attitudes in preschool age children (Musser & Diamond, 1999).

Hoyt and Acredolo (1992) echo this, revealing the development of environmental attitudes, values and the preference of nature are all strongly influenced by experience in natural settings. Not only do empathy stage values develop with surrounding natural environments but also with a child's perception and connection with animals (Kellert, 1985).

The exploration stage of evaluative development occurs during ages 8-11. Described as the "bonding of the earth stage," children in this stage experience nature within their spheres of influence by exploring and learning about natural systems and environments around their communities and neighborhoods (Kellert, 2002). Humanistic, symbolic, aesthetic and knowledge values are heightened during this developmental stage. Emotions of wonder within early childhood stages transforms into a sense of exploration during the middle childhood stage (Sobel, 1993). According to results of a UK study focusing on student's knowledge and awareness of environmental issues, environmental understanding is high and local environmental issues are most important to children of this age cohort (Strong, 1998). Moore and Young's (1978, p. 92) introduction of range extension, the "on-going...exploration, manipulation, and transformation of newly acquired territory..." and surrounding natural systems, and its correlation with age parallels the characteristics of the exploration stage.

Social action, the third stage of nature values development, begins at age 12 and continues beyond age 17. Through the development and discovery of the self, children feel and develop their connectedness to society and manifest it through action. The nature value emphasis becomes placed on the enhancement of moralistic, naturalistic, and ecological values (Kellert, 2002). The transition between stage two and stage three is

pivotal as adolescents' proenvironmental attitudes can accurately predict adolescents' proenvironmental behaviors (Meinhold & Malkus, 2005). Opportunity in nature also becomes more comprehensive and challenging which leads to the possibility of personal growth (Kellert, 2002). This opportunity can manifest in structured outdoor programs. Participation in nature related programs such as National Outdoor Leadership School (NOLS), Outward Bound (OB) and the Student Conservation Association (SCA) have major impacts on a participant's personality, character development, problem solving abilities and interpersonal skills, not only in the short run, but over an extended period of time (Kellert & Derr, 1998).

In relation to the social action development stage and the moralistic nature value, Kahn & Friedman (1995) and Kahn (1996) showed two reoccurring forms of environmental reasoning in youth in his studies of inner city student's conception of the local environment as well as student's reaction to the Prince William Sound oil spill. Homocentric reasoning was revealed as ethical thinking that appeals to the personal interests, aesthetics, physical welfare of humans, and the justification of protecting the environment. For example, one student response, categorized as homocentric, stated "It's not alright to pollute the bayou because if it's dirty, I might get sick" (Kahn, 1997, p.38). The second form of environmental reasoning is biocentric reasoning. Biocentric reasoning gives value to the environment through its own merit perceived by the individual, separating its existence from attached, human based value. In contrast to the homocentric justification of a classmate, another student shared, "I think that neither one should throw their trash in the bayou because the bayou has been clear for a whole lot of years" (Kahn, 1997, p.39).

Though not an emphasis of this study, it should be noted that the second mode of learning childhood development is cognitive development. Cognitive development is the intellectual development of a child and includes information processing, conceptual resources, perceptual skill and language learning (Kellert, 2002). A six-stage taxonomy of cognitive development (See Table 2) in children begins at normal, intellectual development, moving from relatively simple to more complex levels of understanding, problem solving, and thinking (Bloom, 1956).

A wide range of research has captured the cognitive benefits of direct and indirect,

Table 2. Taxonomy of cognitive development in children values (Bloom, 1956)

Stage	Level	Definition
One	Knowledge	Understanding facts and terms and applying this knowledge to the articulation and presentation of ideas, developing broad classificatory categories and systems, and recognizing of causal relationships
Two	Comprehension	Interpreting and paraphrasing information and ideas and extrapolating these understandings to other contexts and circumstances
Three	Application	Applying knowledge of general concepts, ideas, and principles to various situations and circumstances
Four	Analysis	Examining and breaking down knowledge into elements and categories and discerning underlying structural and organizational relationships
Five	Synthesis	Integrating and collating parts or elements into patterned, organized and structural wholes and identifying and generating understandings of relationships and interdependencies
Six	Evaluation	Rendering judgments about the functional significance and efficacy of varying elements and functions based on careful examination of evidence and impacts.

outdoor-based experiences. The American Institutes for Research (2005) measured cognitive impacts of week-long residential outdoor education programs for at-risk sixth graders in California and found participants raised science scores by 27 percent, retained that knowledge six to ten weeks following the experience, and made classroom gains in problem solving and higher order thinking. Bradley, Waliczek, and Zajicek (1999) also found high school student's participation in a ten-week residential outdoor program yielded 22 percent higher scores between pre and post-tests,

Nature and Affective Development

Though there is significant overlap with evaluative development, affective development, can be noted as the third mode of childhood development, referring to the feelings and emotions of a child. Kellert (2002) notes that evaluative development is a phenomenon of human experience based on the convergence of affective and cognitive development and requires its own distinction. Krathwohl, Bloom and Masia (1964) defined five levels of emotional development, within the context of educational objectives, that are functional and relevant to the emotional maturation related to nature; receiving, responding, valuing, organizing, and characterization by a value (See Table 3). Kellert (2002, p.126) notes that contact with nature "occupies a surprisingly important place in a child's emotional responsiveness and receptivity". For a child the emotional connection with nature encompasses enthusiasm, fascination, curiosity and joy but can also invoke fear, challenge and struggle (Kellert, 2002). The emotional significance and impact nature has tends to manifest itself most in an adult's recollection of the experience (Cobb, 1977).

Kals et al. (1999) study of emotional motivation to protect nature defined emotional affinity for nature as a category of emotion that is separate and distinct from

cognitive interest and emotions that were responsibility related. Though a definition is not yet established in the literature, Kals et al. (1999) developed a construct of emotional affinity for nature based on four primary domains; love of nature, feelings of freedom, feelings of safety and feelings of oneness. Emotional affinity for nature, though a difficult

Table 3. Five levels of emotional development in children (Krathwohl et al., 1964)

Stage	Level	Definition
One	Receiving	Being aware and sensitive to facts and situations involving attentiveness and willingness to receive information
Two	Responding	Reacting and gaining satisfaction from receiving information and responding to situations
Three	Valuing	Attributing worth or importance to information and situations that reflect clear and consistent preferences and commitments
Four	Organization	Internalizing and organizing preferences and assumptions of worth and importance into consistent patterns and sets of values and beliefs
Five	Characterization by value	Holding general patterns or sets of beliefs and values that constitute a coherent and consistent worldview or philosophy of life

category of emotion to explicate, is assembled by these four different nuances through our past and present experience, curiosity, attitudes, values, and innate biophilic tendencies. “Writers and speakers have long referred to a personal relationship with the natural environment using phrases like communing with nature, living in harmony with the environment, and feeling a personal connection to the natural world...” (Davis, Green, & Reed, 2009, p.173). Other studies have revealed a similar human connection

with nature and are considered analogous with the emotional affinity for nature concept. Dutcher et al. (2007) presented evidence that perception of the connectivity to nature predicts environmental concern and behavior. Through a lesser sense of self-focus, this experiential connection can also be enhanced by promoting pro-environmental values and pro-environmental personality characteristics (Frantz, 2005).

A human's affinity for nature has also been evaluated through the lens of interdependence theory, one of the most influential theories of relationship interaction. The natural environment, when viewed as a relationship partner, can take on a certain degree of dependence in which the partner either fulfills or does not fulfill important needs of the individual. Place dependence on certain recreational sites has shown the effect of dependence on the enhancement of an individual's feelings toward that particular setting. Commitment, another key component of interdependence theory, is the subjective experience of that need fulfillment. Davis et al. (2009, p.2) suggests that "individuals experience a subjective level of commitment to the natural environment..." defined as a "psychological attachment to and long-term orientation to the natural world." A high degree of these relationship components between close partners soon become magnified in the self and represents the overlap between being interconnected with something and close with someone (Aron & Aron, 1986).

Affinity For Nature Scale

In 2008, affinity for nature was added to seven additional age appropriate outcome measures for the American Camp Association. The Affinity for Nature Scale was developed to quantitatively measure the four domains for affinity for nature among youth in a camp program setting. The Affinity for Nature Scale is based on the

framework of emotional affinity to nature (Kals et al., 1999) with adaptations made to two of the four domains. To make the scale appropriate for its intended audience, love of nature was renamed “general feelings of attraction to nature and the feelings of safety was broadened to “feelings of comfort” (Sibthorp, 2008). The Nature Relatedness Scale (Nisbet, Zelenski, & Murphy, 2009), Connectedness to Nature Scale (Mayer & Frantz, 2004) and Connectivity with Nature Scale (Dutcher, 2007) were also assessed in the construct of the Affinity for Nature scale, however none of the scales were considered age appropriate.

The desire to measure a child’s perceived status and perceived change in their affinity for nature lead to two different formats of the Affinity for Nature scale, each consisting of a five item short version and ten item long version. “The Current Status Plus Retrospective Change format was created to offer both perceived and perceived change variables for the affinity for nature outcomes” (Sibthorp, 2008). The current status portion is a ten-item instrument based on a 6-point true false scale. The retrospective change portion of this format is a 5-item instrument based on a 6-point scale (1=a lot less; 6=a lot more).

The Increase format only addresses affinity for nature changes directly related to the camp experience. The pilot instrument consisted of twenty-four items and was reduced to ten based on optimal item performance during the pilot study. Both the five item and ten item scale of this format are based on a five point response option: decreased; did not increase or decrease; increased a little bit; increased some, I am sure; and increased a lot, I am sure. The ten-item scale contains four items from the “general feelings of attraction to nature” domain and two items from the freedom, comfort and

oneness domains. The five-item form contains two items from the “general feelings of attraction to nature” domain and one from each of the other three (Sibthorp, 2008).

Influences of Nature Based Experience

Kellert (1996) classifies the experience of children with nature in three ways in; direct, indirect and symbolic. Direct experience is characteristic of physical contact with the natural environment in an unstructured format. When children experience nature with the body, senses and awareness, the interaction is likely to become a significant memory paired with a sympathetic attitude toward nature (Sebba, 1991). Louv (2005) references studies that show even the most simplistic, unstructured experiences in nature can reduce stress, anxiety, behavioral disorders, depression and foster healthy development. Eagles and Muffitt (1990) found no difference in attitude toward wildlife between Canadian children who participated camping, an indirect experience, once a year and those that did not. However, there was a positive correlated change with attitude and interaction with viewing films and reading about wildlife. Kellert (1996) notes these experiences as symbolic experiences. Symbolic experience is the interaction with symbolic, metaphorical or stylized characterizations of nature through various types of media.

Indirect experience, like direct experience requires physical contact with nature, but occurs in a managed and organized format. This format can include interaction at zoos, aquariums, nature centers or other structured environmental, outdoor or experiential education experiences. Experiential, outdoor and environmental education experiences tend to be viewed as interchangeable terminology, and while there is a great deal of overlap, each field has a unique focus. According to Adkins & Simmons (2002, p. 2),

Outdoor education is a direct antecedent of environmental education but can include other subject matter than learning about the environment. Experiential education often employs outdoor settings but can take place anywhere individuals learn by doing. Environmental education can take place outdoors using experiential approaches or indoors using a standard textbook.

The body of research, in which these three definitions converge into one blanket theme of environmental education programming, represents a range of influences on the participant. Dresner and Gill (1994) found increases in self-esteem, outdoor skills, environmental issue awareness and enthusiasm for nature in children participating in a summer camp program. California sixth graders participating in week long residential outdoor programs were found to have significant gains in cooperation, conflict resolution, self-esteem, relationship with peers, motivation to learn, and behavior in class while the control group had significant losses in the same areas (American Institute of Research, 2005).

Jaus (1982) examined the effectiveness of a ten-week environmental education program on fifth graders and found significant differences in environmental attitude scores of the participants. However, Shepard and Speelman (1986), Keen (1991) and Eagles & Demare (1999) found that environmental attitudes did not increase with participation in an environmental program. Gillett et al. (1991) found similar results on environmental attitudes, despite an impact on self-concept and environmental knowledge.

In regards to the lack of impact environmental education programs have on environmental attitudes, Eagles and Demare (1999, p. 35) note

The explanation probably lies in Dresner and Gill's (1994) finding that 'previous environmental experience seemed to diminish attitude and behavior change' (p. 40). Lisowski and Disinger (1991) concluded that 'students with the lowest pretest scores showed the greatest gains' (p. 23). Therefore, low levels of environmental experience and low levels of attitude scores are precursors to change.

This inference is in line with AIR's (2005) study in which 56% of outdoor participants were experiencing nature for the first time. Wells and Lekies (2006, p. 20) suggest this may be due to the idea that we have "tapped into relatively structured modes of environmental education, rather than more engaging, hands-on versions" that may be more influential. Rickinson (2001) also points out that these studies do not detail the type of environmental education experienced, hindering the predictability of desired positive outcomes.

Summary

This chapter identified literature pertinent to this study. This included evaluative and cognitive development as well as affective development, instruments used to measure affinity for nature and influences from nature based experiences. A majority of this research came from the fields of developmental psychology, environmental psychology and environmental education.

Chapter 3 Methodology

Introduction

This chapter describes the instrument selection, the design of and additions to the instrument, pilot study, sample, procedures, data analysis, and a summary of the methodology of the study.

Instrument Selection

A questionnaire was used to collect quantitative and qualitative data that measured participant characteristics and changes in affinity for nature following environmental education program participation. The survey instrument was adapted from Sibthorp's Affinity for Nature Scale (2008). A copy of Sibthorp's Affinity for Nature Scale as well as the survey instrument adapted for this study can be found as Appendixes A & B. The Affinity for Nature Scale was selected because of its appropriateness for youth participants and its development within the context of the American Camp Association outcome measurements. The Affinity for Nature Scale has two formats; Status plus Retrospective Change and Increase. Each format has a short version consisting of 5 questions, and a long version, consisting of 10 questions. The Increase format was selected for this study for its appropriateness measuring changes after program participation. The longer version was selected as it provided more coverage over the four domains of affinity for nature and because time was not a limiting factor for survey participants.

Instrument Design

The version of the Affinity for Nature Scale used for this study was adapted from the original Affinity for Nature Scale (Sibthorp, 2008). In addition to the ten unmodified

Affinity for Nature Scale questions, seven additional questions were added to the scale to learn about the change in participant's affinity and attitude towards California's coastal environment and resources. Three of the additional seven questions utilized exact wording of the original Affinity for Nature Scale questions to differentiate from concepts of "nature" and "outdoors" present in the Affinity for Nature Scale. Two of the three added questions pertaining to enjoyment and time spent, changed the word "outdoors" to "ocean." The other added question, pertaining to feelings of safety, changed the word "nature" to "ocean and beaches." The other four added questions to the Affinity for Nature Scale emphasized outcomes of the marine science component of the environmental education programs. Participants were asked how much their desire to learn more, concept of stewardship, amount of learning and respect for California's coastal environment and resources changed, within the format of the Affinity for Nature Scale. Question concepts and wording were developed with Naturalists at Rancho El Chorro Outdoor School based on their program's desired outcomes for the participant.

Ten questions related to characteristics of the participant were also included on the survey instrument. Four variables related to experiences and feelings prior to participating in the environmental education program. These variables were participation in other camp related programs, feelings about the ocean, number of visits to the ocean in the last year, and where they learned or were exposed to marine science concepts. Five variables were demographic questions. These included gender, grade level, place of residence, ethnicity and language spoken in the home. One variable related to the participation in the program asked participants to recall the name of their naturalist. The

purpose of all ten variables was to determine if relationships existed between specific characteristics of the participant and the change in a participant's affinity for nature.

Pilot study

Two pilot studies were conducted to determine the appropriateness of the questionnaire's length and to refine the participant's comprehension of the questionnaire. The initial pilot study took place at Rancho El Chorro Outdoor School in early January of 2009. The questionnaire was administered by the researcher to approximately 70 students on the final day of their environmental education program. Surveys were completed in less than fifteen minutes. It was determined that no changes to the length of the survey instrument would need to be made. Observations from the initial pilot study resulted in two changes to the questionnaire. The item regarding the name of the participant's naturalist was removed from the instrument because a majority of participants could not recall the name of their naturalist or listed all naturalists they interacted with throughout the program. The Affinity for Nature Scale was also moved to the second page of the instrument after the researcher observed that most participants flipped over their survey instrument to complete the participant characteristics first. It was also observed during the initial pilot study that some students had similar questions to the items regarding other programs participated in, the number of times visiting the ocean in the last year and the Affinity for Nature Scale. A second pilot test was conducted in late January of 2009 at Rancho El Chorro Outdoor School with the modified instrument from the first pilot study and a script adapted from the verbal directions of observed questions about the questionnaire from the initial pilot study. The lead faculty member administered the questionnaire to 65 students. Based on new observations from this pilot study, no new

changes were needed to the survey instrument or the script. Observations made by the researcher during the second pilot study led to the approval of the script.

Sample

The questionnaire was administered to sixth grade students attending Rancho El Chorro Outdoor School in San Luis Obispo, California between January 2009 and June 2009 and Camp Ocean Pines in Cambria, California between September 2009 and December 2009. These outdoor schools were selected based on their multi-day, residential program, the existence of marine science education and trips to the ocean within their curriculum and their willingness to participate in the study. Groups of schools that attended both outdoor programs were selected based on their willingness to participate and ability to complete questionnaires during the time allotted by the participating organizations. Between January 2009 and June 2009, 38 schools attended Rancho El Chorro Outdoor School. Of these 38 schools, 8 schools were surveyed and 30 were not. Reasons for not participating in this study included choosing not to participate, being unable to participate due to time constraints, schools not attending the residential program, or attending a multi-day program without a marine science educational component. Between September 2009 and November 2009, two schools attended Camp Ocean Pines. Of those two schools, both were surveyed. The main objective in the data collection process for this study was to collect data from as many participants as possible from both environmental education programs. A total of 408 questionnaires were collected from Rancho El Chorro Outdoor School, and 121 questionnaires were collected from Camp Ocean Pines.

Data Collection Procedure

The content of the questionnaire was approved by the Research Committee Chair, and naturalists from Rancho El Chorro Outdoor School and the Program Director at Camp Ocean Pines. Following approval from the California Polytechnic State University Human Subjects Committee, Executive Directors at Rancho El Chorro Outdoor School and Camp Ocean Pines approved the data collection process. The questionnaire was administered to eight participating schools at Rancho El Chorro Outdoor School between January 2009 and June 2009 and two participating schools at Camp Ocean Pines between September 2009 and December 2009. At Rancho El Chorro Outdoor School, questionnaires were administered following the last evening program activity on the night before departure. At Camp Ocean Pines, questionnaires were administered following the last morning program activity before that day's afternoon departure. Questionnaires and golf pencils were distributed to all students attending the environmental education program by supervising faculty of the school. The lead faculty member of the school read through the provided script, informing the students of their rights regarding the study, purpose of the study, clarification of the directions and a walk through of the first Affinity for Nature Scale question (See Appendix A). Students were allowed up to 20 minutes to complete the questionnaire. Questionnaires and golf pencils were collected upon completion by supervising school faculty. Rancho El Chorro Outdoor School and Camp Ocean Pines staff collected and sorted questionnaires by schools for coding purposes.

Data Analysis

Following the completion of data collection, data were coded and entered into a Microsoft Excel database. Place of residence, ethnicity and language were the three participant characteristic variables recoded for the data analysis. Place of residence was recoded as distance based on the average driving distance a participant lived from the beach. Because many of the ethnicity categories were underrepresented, all ethnicity besides “white” and “Hispanic” were merged into the “other” category. The language variable was combined with the ethnicity based on the variable leaving four distinct categories for the analysis; White ethnicity/English spoken in the home, Hispanic ethnicity/English or English and Spanish spoken in the home, Hispanic ethnicity/Spanish only spoken in the home, and all other ethnicities/English, other languages, or combination of English and other languages spoken in the home. Number of visits to the ocean in the past year and previous feelings toward the ocean were the two experiential characteristics that were recoded for the data analysis. Number of visits to the ocean in the last year were recoded into four categories (0 visits=haven’t been in the last year; 1-6 visits=visits every other month/once a month per summer; 7-24 visits= visits once or twice a month/multiple times a month per summer; 25 or more visits= frequent ocean visitor). Previous feelings about the ocean prior to the EE experience were interpreted two ways. It was determined first if open-ended answers were positive, neutral or negative in nature. Open-ended answers were also coded into the following categories related to feelings toward the ocean; attraction, comfort/safety, connectedness/freedom, general characteristics describing the ocean, and general comments that didn’t warrant any of the other categories.

Index scores were created for Sibthorp's (2008) ten affinity for nature questions. Four indices emerged based on the four affinity for nature domains (attraction, comfort, connectedness, freedom). The "attraction" index was made up of four questions from the affinity scale. The remaining three indices were made up of two questions. Each index scores was determined by the average Likert scores (1=decrease; 2=did not increase or decrease; 3=increased a little bit, maybe; 4= increased some, I think; 5= increased a lot, I am sure) from the corresponding questions. Because the attraction index was made up of the most questions, participants missing more than two of the four responses from the attraction domain were removed from portions of the analysis related to attraction. Participants were only required to have one of the two questions answered, for the remaining three indices, to be included in related analysis. From the seven remaining ocean related affinity questions, only two questions were indexed. They were related to the attraction domain and labeled as "ocean attraction" domain index. All other questions could not appropriately be combined for index purposes under the four affinity domains.

The data analysis for this study used Minitab 15 statistical package. Descriptive statistics were determined for all participant characteristic and experiential variables. These factors were analyzed to determine any influence on the participant's affinity for nature. The factors that were analyzed were environmental education program attended, gender, grade, ethnicity/language, distance of residence from the ocean, participation in other camp-related programs, previous feelings about the ocean, number of visits to the ocean in the last year and where participants previously learned about marine science concepts. In addition to descriptive statistics, mean scores and standard deviations were determined for all 17 affinity for nature response variables. The data were analyzed using

an analysis of variance to determine what participant characteristic and experiential variables influenced the affinity for nature index scores. Gender, Ethnicity/Language and distance of residence from the ocean were kept in the analysis of variance during the analysis of other predictor variables to account for any confounding effects.

Summary

A questionnaire based on the Affinity for Nature Scale (Sibthorp, 2008) was used to measure change in environmental education participant's affinity for nature and characteristic and participant factors that potentially influence that change. A pilot study was conducted to improve the reliability of the instrument. A sample was taken from the population of residential environmental education program groups participating at Rancho El Chorro Outdoor School from January 2009 to June 2009 and participants of Camp Ocean Pines from September 2009 and December 2009 (n=529). The survey was administered to eight groups participating in Rancho El Chorro Outdoor School programs and two groups participating in Camp Ocean Pines programs. The results of the questionnaire appear in the following chapter.

Chapter 4 Results

Introduction

This chapter begins with the descriptive statistics of the sample, and then reports the findings of this study in order of the research questions.

The participant $n=529$ characteristics are highlighted in Tables 4-15. The characteristics include: the environmental education (EE) program attended, school attended, length of program attended, gender, residence, grade level, ethnicity, language spoken at home, ethnicity/language variable, previous program experiences, number of program experiences, number of visits to the ocean in the last year, feelings about the ocean prior to their EE experience, previous exposure to marine science, number of sources exposed to marine science concepts.

Tables 16-18 highlight individual and index affinity for nature scores. Tables 19-36 highlight statistically significant relationships between affinity for nature index scores and participant variables.

Participant Characteristics

Participants at Rancho El Chorro Outdoor School made up 71.13% ($f=408$) of the sample. Participants at Camp Ocean Pines made up 22.87% ($f=121$) of the sample. A large majority of the sample participated in three day programs (85.63%, $f=453$). Only 14.37% ($f=76$) individuals participated in a five day program.

Participating schools came from both private and public schools from various areas throughout California (See Table 4).

Table 4

School of origin by frequency and percentage

Schools	<i>f</i>	%
Bullard Talent	84	15.76
Battles Elementary	77	14.45
Ledesma Elementary	75	14.07
Grover Heights	64	12.00
Taylor	62	11.65
San Berto	54	10.13
Fremont	39	7.32
Santa Monica Blvd Community Charter	37	6.94
Carpentaria Elementary	25	4.69
Shandon Middle School	16	3.00

The sample was made up of 80.53% ($f=426$) sixth grade students and 19.47% ($f=103$) fifth grader students. The gender composition of the sample was 50.67% male ($f=266$) and 49.33% female ($f=259$).

Participants resided in three clusters based on their proximity from the ocean. Participants lived as close to the beach as Malibu, California and as far inland as Fresno, California. One person did not respond to this question (See Table 5).

Table 1

Distance of participant's residence from the beach by frequency and percentage

<u>City</u>	<u>f</u>	<u>%</u>
Midrange Community (6 miles to 40 miles)	313	59.28
Inland Community (41 miles or more)	125	23.67
Coastal Community (5 miles or less)	90	17.05

A majority of the participants were Hispanic or White, non-Hispanic. Eight other ethnicity groups represented the remainder of the sample.

Table 6

Participant's ethnicity by frequency and percentage

<u>Ethnicity</u>	<u>f</u>	<u>%</u>
Hispanic	297	57.01
White, non Hispanic	161	30.90
Asian American	15	2.88
Native American	15	2.88
African American	14	2.69
Non White, Mixed Gender	10	1.92
Armenian	4	0.77
Indian	3	0.58
Arab American	1	0.19
Filipino	1	0.19

Over half of the participants in this study speak English in the home. The remainder of the sample speaks Spanish, a combination of English and Spanish, or a different language. Eight people did not respond to this question.

Table 7

Participant's language spoken at home by frequency and percentage

<u>Language</u>	<u>f</u>	<u>%</u>
English	296	56.81
Spanish	118	22.65
English and Spanish	93	17.85
Other, not English	14	2.69

With ethnicity and language variables combined, White/English speakers and Hispanic/Spanish and English speakers represents almost two thirds of the sample. Hispanic/Spanish speakers and Other/English or other speakers represent a third of the sample. Twelve people did not respond to this question.

Table 8

Participant's combined ethnicity language variable by frequency and percentage

<u>Ethnicity/Language</u>	<u>f</u>	<u>%</u>
Hispanic/Spanish and English	179	34.62
White/English Speaking	161	31.14
Hispanic/Spanish Speaking	116	22.44
Other/English or Other	61	11.80

After school programs is though program most participated in, though less than half of the sample have participated. A small percentage of participants had previously been involved with the other environmental education programs, including the one in attendance.

Table 2

Previous program experiences by frequency and percentage

Variables	Yes		No	
	<i>f</i>	%	<i>f</i>	%
After School Program	215	40.64	314	59.36
Overnight Camp	131	24.76	398	75.24
Summer Camp	117	22.12	412	77.88
Current EE Program	70	13.23	459	86.77
Another EE Program	38	7.18	491	92.82

Roughly two thirds of the sample had experienced at least one of the listed programs (See Table 10). The remainder of the sample was experiencing an experiential, structured camp-like program for the first time.

Table 10

Number of programs experienced by frequency and percentage

Number of Programs Experienced	<i>f</i>	<i>%</i>
None	187	35.35
One	209	39.51
Two	59	11.15
Three	56	10.59
Four or more	19	3.41

Half of the sample had been to the beach at least one to twelve times in the last year (on average, once a year to once per month). Less than ten percent of the participants were visiting the beach for the first time. Twenty-two people did not answer this question.

Table 11

Number of visits to the beach in the last year by frequency and percentage

Number of Days	<i>f</i>	<i>%</i>
1-12	256	50.49
12-24	99	19.53
25 or more	107	21.10
None	45	8.88

Over sixty percent of the sample made positive comments about their previous feelings toward the ocean. Less than ten percent had previous negative feelings toward the ocean. Sixteen people did not answer this question (See Table 12).

Table 12

Previous feelings about the ocean (general) by frequency and percentage

<u>General Feelings About The Ocean</u>	<u><i>f</i></u>	<u>%</u>
Positive	313	61.01
Neutral	154	30.02
Negative	46	8.97

The nature of participants' prior feelings toward the ocean was rooted in several unique themes. However, participants most frequently responded with general comments regarding previous feelings about the ocean. Sixteen people did not answer this question.

Table 13

Previous feelings about the ocean (detailed) by frequency and percentage

<u>Detailed Feelings Related To</u>	<u><i>f</i></u>	<u>%</u>
General comments about the ocean	135	26.26
Attraction to the ocean	107	20.82
Personal experience at the ocean	83	16.15
Connectedness/Freedom around the ocean	73	14.20
Comfort/safety around the ocean	65	12.65
Characteristics describing the ocean	51	9.92

School was indicated as the greatest source for learning about marine science prior to the environmental education experience. Television and books were also among the popular sources for previous marine science education (See Table 14).

Table 14

Source of exposure to marine science by frequency and percentage

Variables	Yes		No	
	<i>f</i>	%	<i>f</i>	%
School	336	63.52	193	36.48
TV	217	41.02	312	58.98
Books	216	40.83	313	59.17
Parents	186	35.16	343	64.84
Internet	145	27.41	384	72.59
Friends	90	17.01	439	82.99
First Time	39	7.37	490	92.63

A small percentage of participants were learning about marine science for the first time. Most participants had been exposed to marine science concepts through at least one of the listed formats

Table 15

Number of sources of marine science exposure by frequency and percentage

Number of Sources Exposed to	<i>f</i>	%
None	39	7.37
One	209	39.51
Two	77	14.56
Three	57	10.78
Four or more	147	27.78

Affinity for Nature Mean and Index Scores

On average, participants' affinity for nature had the greatest change in their enjoyment of the outdoors. Participants' affinity for nature saw the least amount of change in their feelings of safety in nature.

Table 16

Affinity for nature scale mean scores

<u>Affinity For Nature Questions</u>	<u>Mean</u>	<u>SD</u>
Enjoying the outdoors	4.02	0.97
Enjoying the freedom of being outside	3.92	1.15
Liking nature	3.91	1.00
Feeling free when I am outdoors	3.85	1.17
My desire to spend time outdoors	3.74	1.10
Feeling connected to the natural environment	3.68	1.11
Comfort in the outdoors	3.66	1.18
My attraction to nature	3.65	1.10
Feeling part of the natural world	3.65	1.14
<u>Feelings of safety in nature</u>	<u>3.52</u>	<u>1.21</u>

On average, participants noted the most change in how much they learned about marine environments. Participants noted the least amount of change with their feelings of safety around oceans and beaches (See Table 17).

Table 17

Affinity for nature mean scores (marine environment related)

<u>Marine Related Affinity For Nature Questions</u>	<u>Mean</u>	<u>SD</u>
How much I learned about marine environments	4.20	0.97
Respect for marine environments	4.18	1.01
Enjoying the ocean	4.04	1.13
Wanting to take care of marine environments	4.03	1.06
My desire to spend time at the ocean	3.92	1.14
Wanting to learn more about marine environments	3.87	1.14
<u>Feelings of safety around oceans and beaches</u>	<u>3.54</u>	<u>1.17</u>

Of the four affinity for nature domains, the most change was in the participant's attraction domain that related specifically toward the marine environment. The comfort domain saw the lowest amount of change.

Table 18

Affinity for nature scale index mean scores

<u>Affinity For Nature Domains</u>	<u>Mean</u>	<u>SD</u>
Attraction to Marine Environment	3.97	1.05
Freedom in Nature	3.88	1.07
Attraction to Nature	3.83	0.85
Connectedness with Nature	3.66	1.02
<u>Comfort In Nature</u>	<u>3.58</u>	<u>1.08</u>

Significant Results Among Index Scores and Participant Variables

The ethnicity/language variable had a significant influence on the change in the participant's general feelings of attraction to nature. Hispanic/Spanish only participants showed significantly higher mean index scores than White/English only participants.

Table 19

Significant variables that affect feelings of attraction to nature index score

Variable	¹ Mean	p-value
Ethnicity/Language		0.013
Other/Other	4.038 ^{AB}	
Hispanic/Spanish Only	4.003 ^A	
Hispanic/English and Spanish	3.823 ^{AB}	
White/English Only	3.711 ^B	

¹ Overall means (column) with different superscripts differ significantly

The residence and ethnicity/language variables had a significant influence on the change in the participant's feelings of comfort in nature (See Table 20).

Table 20

Significant variables that affect comfort in nature index score

Variable	¹ Mean	p-value
Residence		0.007
Inland Communities	3.842 ^A	
Coastal Communities	3.680 ^{AB}	
Midrange Communities	3.485 ^B	
Ethnicity/Language		0.015
Hispanic/Spanish Only	3.853 ^A	
Other/Other	3.748 ^{AB}	
Hispanic/English and Spanish	3.645 ^{AB}	
White/English Only	3.430 ^B	

¹ Overall means (column) with different superscripts differ significantly

The ethnicity/language and gender variables had a significant influence on the change in the participant's feelings of freedom in nature (See Table 21).

Table 21

Significant variables that affect freedom in nature index score

Variable	¹ Mean	p-value
Ethnicity/Language		0.002
Hispanic/Spanish Only	4.071 ^A	
Other/Other	3.982 ^{AB}	
Hispanic/English and Spanish	3.933 ^A	
White/English Only	3.615 ^B	
Gender		0.025
Females	4.021 ^A	
Males	3.809 ^B	

¹ Overall means (column) with different superscripts differ significantly

The ethnicity/language, gender, and residence variables had a significant influence on the change in the participant's feelings of connectedness to nature.

Table 22

Significant variables that affect connectedness to nature index score

Variable	¹ Mean	p-value
Ethnicity/Language		0.002
Hispanic/Spanish Only	4.000 ^A	
Other/Other	3.762 ^{AB}	
Hispanic/English and Spanish	3.635 ^B	
White/English Only	3.526 ^B	
Gender		0.010
Females	3.848 ^A	
Males	3.614 ^B	
Residence		0.053
Inland Communities	3.878 ^A	
Coastal Communities	3.700 ^{AB}	
Midrange Communities	3.614 ^B	

¹ Overall means (column) with different superscripts differ significantly

The ethnicity/language, residence, prior feelings toward the ocean (general) and gender variables had a significant influence on the change in the participant's feelings of attraction to the ocean.

Table 23

Significant variables that affect general feelings of attraction to the ocean index score

Variable	¹ Mean	p-value
Ethnicity/Language		0.000
Hispanic/Spanish Only	4.329 ^A	
Other/Other	4.087 ^{AB}	
Hispanic/English and Spanish	3.990 ^B	
White/English Only	3.621 ^C	
Residence		0.000
Inland Communities	4.358 ^A	
Midrange Communities	3.943 ^B	
Coastal Communities	3.719 ^B	
Prior Feelings Towards the Ocean (general)		0.023
Positive	4.070 ^A	
Neutral	3.988 ^{AB}	
Negative	3.626 ^B	
Gender		0.029
Females	4.105 ^A	
Males	3.909 ^B	

¹ Overall means (column) with different superscripts differ significantly

The ethnicity/language variable had a significant influence on the change in the participant's feelings of comfort around the ocean.

Table 24

Significant variables that affect comfort around the ocean

Variable	¹ Mean	p-value
Ethnicity/Language		0.000
Hispanic/Spanish Only	3.872 ^A	
Other/Other	3.739 ^A	
Hispanic/English and Spanish	3.537 ^A	
White/English Only	3.199 ^B	

¹ Overall means (column) with different superscripts differ significantly

The ethnicity/language, prior learning from TV, gender, and residence variables had a significant influence on the change in the participant's respect for marine environments.

Table 25

Significant variables that affect respect for marine environments

Variable	¹ Mean	p-value
Ethnicity/Language		0.000
Other/Other	4.307 ^A	
Hispanic/Spanish Only	4.492 ^A	
Hispanic/English and Spanish	4.217 ^A	
White/English Only	3.918 ^B	
Prior Learning from TV		0.008
No	4.326 ^A	
Yes	4.086 ^B	
Gender		0.009
Females	4.350 ^A	
Males	4.117 ^B	
Residence		0.026
Inland Communities	4.425 ^A	
Midrange Communities	4.153 ^B	
Coastal Communities	4.122 ^{AB}	

¹ Overall means (column) with different superscripts differ significantly

The gender variable had a significant influence on the change in the participant's desire to take care of marine environments.

Table 26

Significant variables that affect wanting to take care of marine environments

Variable	¹ Mean	p-value
Gender		0.000
Females	4.262 ^A	
Males	3.857 ^B	

¹ Overall means (column) with different superscripts differ significantly

The residence and gender variables had a significant influence on the change in how much the participant learned about marine environments.

Table 27

Significant variables that affect how much was learned about marine environments

Variable	¹ Mean	p-value
Residence		0.002
Inland Communities	4.447 ^A	
Midrange Communities	4.231 ^{AB}	
Coastal Communities	3.966 ^B	
Gender		0.003
Females	4.343 ^A	
Males	4.087 ^B	

¹ Overall means (column) with different superscripts differ significantly

The residence and ethnicity/language variables had a significant influence on the change in the participant's desire to learn more about marine environments.

Table 28

Significant variables that affect wanting to learn more about marine environments

<u>Variable</u>	<u>¹Mean</u>	<u>p-value</u>
Residence		0.001
Inland Communities	4.204 ^A	
Midrange Communities	3.850 ^B	
Coastal Communities	3.666 ^B	
Ethnicity/Language		0.011
Other/Other	4.110 ^A	
Hispanic/Spanish Only	4.038 ^A	
Hispanic/English and Spanish	3.825 ^{AB}	
White/English Only	3.653 ^B	

¹ Overall means (column) with different superscripts differ significantly

Chapter 5 Discussion

Introduction

This chapter summarizes the purpose, procedures, data analysis, significant results, and research questions. The discussion will then compare to how the results compare to previous research. This chapter also includes practical implications, research implications, and suggestions for future research.

Summary of the Purpose

The purpose of this study was to determine the change and factors influencing change in a participant's affinity for nature resulting from an environmental education experience. In addition, this study examined the change and factors of change in aspects of a participant's affinity for nature that directly relate to marine and coastal resources and environments.

Summary of the Procedures

This study used an adapted version of the Affinity for Nature scale originally developed by Sibthorp (2008). Additional questions were added to the Affinity for Nature Scale that was related to environmental education (EE) programs marine science focus. Questions were developed with environmental education program educators and were kept within the structure and context of the Affinity for Nature scale. Participant characteristic and participant experiential variables were also added to the instrument. Following Human Subjects Committee approval and consent from both EE program's Administration, the survey was administered participants at Camp Ocean Pines in Cambria, California and Rancho El Chorro Outdoor School in San Luis Obispo, California who attended a multi-day, residential program that included a marine science

component within their experience. The survey was administered to EE program participants on the last evening or day of completion of the EE experience. Data was collected at Rancho El Chorro Outdoor School between January 2009 and June 2009 and Camp Ocean Pines between September 2009 and December 2009. Following data collection, surveys were coded and entered into a Microsoft Excel spreadsheet.

Summary of the Data Analysis

The data were coded and entered into a Microsoft Excel spreadsheet, then copied into Minitab 15 for statistical analysis. Index scores were created for the Affinity for Nature Scale questions and two of the marine science related questions based on the four affinity for nature domains. An analysis of variance was used to calculate the influence of participant characteristics and participant experiences on affinity for nature scores.

Summary of Significant Findings

The results of the study indicated that there was some change in affinity for nature following participation in an environmental education program. Meaningful change in affinity for nature score was determined to be an index score of 3.5 or greater. This mean scoring is between Sibthorp's (2008) designation of "increased a little bit, maybe" and "increased some, I am sure". Overall, participants showed meaningful increases in all four affinity for nature domains as mean scores. The attraction to nature index score saw the most change followed by freedom in nature, connectedness to nature and comfort in nature. The ocean attraction index, as well as all marine related affinity questions, also showed meaningful increases.

Females showed greater changes than the males in the freedom and connectedness domains, as well as their attraction, respect for, and wanting to take care of marine

environments. The comfort and safety domains, as well as other related marine environment questions showed no significant differences.

Hispanic participants that only speak Spanish at home saw greater changes in all four affinity for nature domains and both marine environment affinity domains compared to White participants who spoke English. These participants also saw significant changes in their respect for the marine environment compared to White participants who spoke English. Hispanic participants, regardless of language, compared to White, English speakers, saw increases in their feelings of freedom in nature. Compared to White, English speakers, Hispanic participants that only speak Spanish at home saw the greater affinity changes across all four affinity domains in addition to their desire to learn more about marine environments. Other ethnicities, besides Hispanics, also possessed this increased desire to learn. All ethnicity groups regardless of language saw an increase in their change in attraction, respect and comfort around the ocean compared to White participants who spoke English.

Participants who lived in inland communities (41 miles from the nearest beach) saw greater changes in how much they learned, their desire to learn more, and their attraction to the marine environment compared to those who lived in coastal communities. They also had greater changes in their overall comfort in nature. Participants who lived in inland communities also saw greater changes in their respect for marine environments and connectedness with nature compared to participants living in mid range communities (6-40 miles from the beach).

The only significant experiential variable was in regards to participant's previous exposure to marine science concepts. Those who had not learned about marine

environments on television showed greater changes in their respect for marine environments compared to those who had. School, books, friends, the internet, and parents showed no significance in determining changes in the four affinity domains and the marine science related questions. No significant relationships were determined between affinity for nature changes and program participation, previous number of visits to the beach in the last year, or previous feelings toward the ocean.

Conclusions

The findings from this study led to the following conclusions based on the research questions:

1. An environmental education experience does impact a meaningful change across all four domains of a participant's affinity for nature.
2. Participant characteristic variables impact change in the participant's affinity for nature due to the environmental education experience. Gender, Ethnicity/Language and place of residence contributed to significant differences in change between affinity for nature index scores.
3. None of the participant's previous experiential variables impact a change in the participant's affinity for nature due to the environmental education experience. Participants who had learned about had not learned about marine environments prior to their environmental education experience saw greater scores in regards to respecting marine environments.

Comparing the Findings with Published Literature

Though most assessment regarding Sibthorp's (2008) Affinity for Nature has been self-evaluative for programs within the American Camp Association, some similarities and differences can be compared to other reliable studies. In this study, environmental education programs influenced some change in affinity for nature domains. Jaus (1984) reported intuitively reliable results that students who received instruction in environmental education possessed more positive attitudes toward the environment than those who did not. Kals et al. (1999) also found emotional affinity in adults to be a predictor for nature-protective behavior and having a general interest in nature. Emotional affinity toward nature is also dictated by experiences, past and present, in natural environments. Other research (Armstrong & Impara, 1991; Campbell, 1994), however, indicated no significant differences in participant attitudes following participation in environmental education programs.

This study also mirrored some of the gender related results found by research focusing on environmental attitudes and connectedness with nature. In an evaluation of children's attitude toward the environment, Eagles and Demare (1999) found that girls scored significantly higher on moralistic attitude scores than boys. Comparatively, this study found that females saw more change in their respect and desire to care for the marine environment, two areas characteristic of moralistic attitude in Kellert's Taxonomy of Nature Values (See Figure 1). Meinhold & Malkus (2005) also noted a stronger possible moderating effect of self-efficacy on environmental attitude-behavior relationship for females compared to males. Kellert (1985) found no difference between boys and girls and moralistic attitude but recognized that starting in 8th grade girls

develop an increased moralistic concern about animals. Dutcher et al. (2007) determined no gender effect among preschool age children's environmental attitudes. Musser & Diamond (1999) and Mayer & Frantz (2004) found no significant gender differences among adults connection to nature.

Very few studies from the body of research have indicated a focus on assessing variables related to a participant's ethnicity and language. One key finding that relates to this study in the AIR (2005) study of effects of outdoor schools on California youth. In this study, a majority of students who attended the outdoor schools were identified as English learner students. The AIR (2005) study reported EL students who participated in the outdoor school showed significantly greater gains in cooperation, leadership, relationships with peers, and motivation to learn than by non-EL students. This study also showed greater impacts in change to Hispanic/Spanish speaking only participants in all affinity for nature and affinity for marine environment domains as well as their desire to respect the marine environment. Kahn & Friedman (1995) found that moral reasoning was also high among African American youth, a contradiction to Kellert's (1985) findings of urban, African Americans low moralistic concern.

Eagles and Muffitt (1990) discovered that nature films and books had an influence on stronger environmental attitudes. Camping was also utilized as a predictor variable for environmental attitudes but no significant relationship was found. Despite Eagles and Demare (1999) redefinition of camping into "camping with family" and "summer camp" as predictors, still no significant relationship was found. The lack of camp experience on affinity for nature scores mirrors these two studies. In regards to other predictor variables, the Nature Relatedness Scale (Nisbet et al., 2009), Connectivity with Nature Scale

(Frantz et al., 2005) and Connectedness to Nature Scale (Dutcher et al., 2007) all emphasized income, education, political views, and broad behavior related concepts as predictor variables for their models rather than explicit experiential variables as in this study. Similarly, Kals et al. (1999) assessment of emotional affinity related to protecting nature established an extensive model encompassing childhood experiences, influence and behaviors related to nature in an open ended form, in addition to gender, age, education level and profession.

Practical Implications

Based on the results from this study, EE programs are influencing positive change in all areas of affinity for nature, regardless of the program attended. In this instance, the actual experience of attending the EE program is the potential catalyst for influencing emotional affinity for nature. Attraction to nature, the highest overall affinity index score change, could be attributed to the isolated outdoor environments of these educational experience and be a key component to enhancing emotional connections. Educators who are trying to enhance students learning could take this into consideration when planning their curriculum. Nature walks or trips to the beach could have the potential to be a more effective learning experience then trying to lecture on nature in the classroom. Likewise, the comfort in nature affinity index score, which showed the lowest change, could be representative of youth entering into an unknown environment that is different from their daily lives. Based on this research, it would be valuable for environmental educators to designate activities and learning opportunities that specifically focus on helping youth adjust and feel comfortable in these natural environments. For marine science

curriculums, this could include creating a greater awareness by experiencing fearful elements to alleviate discomforting notions.

Female participants showed greater changes related to their feelings of freedom and connectedness in nature. These two affinity for nature domains, compared to attraction and comfort, show potential and opportunity for girls to enhance that introspective relationship and experience with nature. Female participants also had greater affinity for nature changes in respect for, taking care of and overall feelings of attraction to the marine environment. Based on these results, it would be valuable to encourage girls to maintain their emotional connection through involvement in local related organizations such as the Surfrider Foundation or Adopt-A-Beach.

Hispanic participants, regardless of language saw increases in their feelings of freedom in nature. Compared to White, English speakers, Hispanic participants that only speak Spanish at home saw the greater affinity changes across all four affinity domains in addition to their desire to learn more about marine environments. Other ethnicities, besides Hispanics, also possessed this increased desire to learn. All ethnicity groups regardless of language saw an increase in their change in attraction, respect and comfort around the ocean compared to White participants who spoke English.

Participants who lived in inland communities (41 miles from the nearest beach) saw greater changes in how much they learned, their desire to learn more, and their attraction to the marine environment compared to those who lived in coastal communities. They also had greater changes in their overall comfort in nature. Participants who lived in inland communities also saw greater changes in their respect for marine environments and connectedness with nature compared to participants living in

mid range communities (6-40 miles from the beach). With potentially less exposure to marine environments, youth who reside inland appear to be making the most out of the learning experiences at the ocean. These results indicate the value for EE programs near the ocean to target this population.

Uniquely, the only previous knowledge factor that appeared significant was related to those who hadn't learned about marine environments on TV and the significant change it made on their respect for marine environments compared to those who had. All other educational sources had no significant influence on affinity for nature. Because the positive change occurred with those who hadn't watched TV, it is valid to consider the impact television media has already made on marine conservation and affinity for nature. For those who have learned through television media, perhaps youth have a perception that a direct or indirect nature based experience has occurred. This symbolic nature experience might have altering impacts, positive or negative, on direct and indirect nature based experiences. Based on this research, the impact is seemingly negative as no change on affinity for nature was influenced if television was a previous source of learning. Because television is so accessible and influential in today's culture, symbolic experience may appear to be a viable substitute for indirect or direct nature experiences. The contrary idea would be that television could be seen as an effective tool for promoting conservation and environmentalism. This would seem to be an alternative for outdoor schools to implement their curriculum to those who cannot overcome barriers to the experience. Further investigation would be needed to discover what types of programs are making a lasting impact and what environmentally respectful mentality is resulting.

Suggestions for Future Research

There are many directions future research could take to complement and enhance research regarding affinity for nature. This study considered converting the Affinity for Nature Scale into Likert scores more reflective of the actual change occurring in the associated Likert descriptions. For example, the value of one, representing a decrease in an affinity for nature domain, would have a new designated value of a negative number. A negative value would be more representative of the decreasing change associated in the description. Affinity domain scores that were represented by the value of two in this study and described as “not increasing or decreasing” would be scored as zero to accurately reflect no change. Re-evaluating the Likert scores on the Affinity for Nature Scale could potentially be a greater representation of the change following EE experiences that youth participants are conveying in the instrument.

Another simple recommendation would be for this same study to be duplicated and expanded to a greater number of outdoor schools located throughout the state to get a sample more representative of the youth population in California. The sample would also derive from a greater range of EE experiences, curriculums and regions while taking place over a school calendar year, helping to minimize any influential bias. The amount of change in affinity scores should also be assessed within different formats of nature-based experiences including movies, interactive computer learning (Winn et al., 2005), indoor/classroom experiences, one-day programs, zoo and aquarium trips, and recreation.

The Status format of the Affinity for Nature Scale should also be utilized with future research to assess the emotional connection youth has with nature without the influence of EE programs. A variety of new predictor variables could also be

incorporated, as assessing children's use of free time, time spent outdoors, barriers from nature experiences, influence from technology, and understanding of environmental issues allow researchers to further understand the disconnection youth have with nature.

Comparisons in affinity for nature change between Sobel's (1993) nature values development age cohorts could be evaluated for EE programs to correctly target youth populations. Similar to Wells & Lekies (2006) study of influences of childhood nature experiences on adult environmentalism, future research could also be expanded among high school and college students, as well as adults, to assess the degree of influence attending or not attending a residential EE program has had on their current environmental values, beliefs and actions.

EE program critics tend to question the lasting impact of these types of relatively short outdoor experiences. A longitudinal study assessing post EE experience affinity for nature change in children's affinity would be of value in evaluating the lasting impacts of these programs and how long after an EE experience educators need to facilitate children's encounters with nature.

Summary

This study revealed the influence of environmental education program participation on the participant's affinity for nature. This study also revealed a gender, ethnicity/language and place of residence as other influential factors on many of the affinity for nature domains. The results of this study were in line with the supporting field literature and prior hypothesizing by the researcher. Because the Affinity for Nature Scale is relatively new to the field of environmental education, continued evaluation of environment education programs, as well as other structured or unstructured nature based

experiences, should take place to understand the current status of our youth's relationship with nature nature. In addition to research driven studies, environmental education program administrators and staff should also utilize the Affinity for Nature Scale informally to evaluate their program's influence on the participant.

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Appendices

Appendix A

Modified Affinity For Nature Instrument



CAL POLY



CALIFORNIA
COASTAL
COMMISSION



The purpose of this study was to determine the impact of participating in an outdoor school program on the participant's affinity for nature and attitudes toward California's marine and coastal resources. This survey is anonymous and your participation is voluntary.

Please mark the bubble that corresponds with your answer.

1. *I am a* Boy Girl
2. *What city do you live in?* _____
3. *What grade are you in?* _____
4. *My ethnicity is* White Hispanic/Latino African American
 Asian American Native American Other _____
5. *What language(s) do you speak at home?* English Spanish Other _____
6. *I have been to the following camps/programs: (Mark all the circles that apply)*
 A Summer Day Camp Another Outdoor Science School An Overnight Camp
 An After School Program Camp Ocean Pines before this trip None of these
7. *Before coming to Camp Ocean Pines, how many times have you visited the ocean in the last year?*

8. *Before coming to Camp Ocean Pines, how did you feel about the ocean?*

9. *Where did you learn about oceans, tide pools, beaches, estuaries, and marine life before coming to Camp Ocean Pines? (Mark all circles that apply)*
 On TV At School My Parents Books A Friend
 The Internet Other _____ My First time learning about oceans, tide pools, beaches, and estuaries

Please turn over for page 2

10. How much, if any, has your experience at Camp Ocean Pines changed you in each of the following ways?

Please mark one circle for each question below and answer each question. Please think carefully about each of your answers. No answers are right or wrong.

For example, the camper below thought that she did not get better or worse in her ability to play soccer.

	Decreased	Did not increase or decrease	Increased a little bit, maybe	Increased some, I am sure	Increased a lot, I am sure
1. Becoming better at playing soccer.	0	<input checked="" type="radio"/>	0	0	0

	Decreased	Did not increase or decrease	Increased a little bit, maybe	Increased some, I am sure	Increased a lot, I am sure
Enjoying the outdoors	0	0	0	0	0
Liking nature	0	0	0	0	0
My desire to spend time outdoors	0	0	0	0	0
My attraction to nature	0	0	0	0	0
Feelings of safety in nature	0	0	0	0	0
Comfort in the outdoors	0	0	0	0	0
Feeling free when I am outdoors	0	0	0	0	0
Enjoying the freedom of being outside	0	0	0	0	0
Feeling part of the natural world	0	0	0	0	0
Feeling connected to the natural environment	0	0	0	0	0
Enjoying the ocean	0	0	0	0	0
My desire to spend time at the ocean	0	0	0	0	0
Respect for oceans, tide pools, beaches, estuaries, and marine life	0	0	0	0	0
Feelings of safety around the ocean and beaches	0	0	0	0	0
How much I learned about oceans, tide pools, beaches, estuaries, and marine life	0	0	0	0	0
Wanting to take care of oceans, tide pools, beaches, estuaries, and marine life	0	0	0	0	0
Wanting to learn more about oceans, tide pools, beaches, estuaries, and marine life	0	0	0	0	0

THANKS FOR TAKING OUR SURVEY!

Appendix B
Script For Data Collection

SURVEY SCRIPT

PLEASE READ THE FOLLOWING TO STUDENTS BEFORE ADMINISTERING THE SURVEY.

This survey is to find out information about your experience at Rancho El Chorro Outdoor School. You do not need to write your name on this survey. There are questions on both sides of the paper. Remember that there are no wrong answers. The right answer is whatever fits best with your feelings.

TEACHERS: Pass out surveys and golf pencils to all students. You will be walking through the first page with the students to get them started.

Question #1: My naturalist's name is. Write down one of the naturalists who you worked with. If you do not remember a naturalist's name, leave question 1 blank.

Question #2: How has your experience at Rancho El Chorro changed you in each of the following ways?

Let's look at the first one together. Enjoying the outdoors. So ...how did Rancho El Chorro change how you enjoy the outdoors?

-Has enjoying the outdoors decreased? If you enjoy the outdoors less after coming to Rancho El Chorro you would mark this circle.

-Has how much you enjoy the outdoors not increased or decreased? Then you would mark this circle.

-Do you enjoy the outdoors maybe a little bit more? Mark that circle.

-Did it increase some, definitely? Mark that circle.

-Or did your enjoyment of the outdoors increase a lot? Mark that circle.

TEACHERS: Repeat this for "Liking Nature" and maybe one more, depending on how quickly students understand the question. If students get it, they can move forward and complete the matrix. Be sure to remind students that there are questions on the back.

Other questions students may have trouble with

Question #8: If they haven't been to any of those programs, then leave the question blank

Question #9: Students should do their best to estimate the number of times then been to the ocean in the last year.

Please make sure students return their surveys and golf pencils back to the boxes.

If you have any questions or concerns regarding this study, please contact researchers

- Justin Schmillen Phone: 562.822.2934 E-mail: justinschmillen@gmail.com
- Dr. Jeff Jacobs Phone: 805.756.7628 E-mail: jacobs@calpoly.edu

Appendix C

Sample Research Involvement Letter For EE Programs

March 12, 2009

Recipient's Name
Organization
Address

Dear Recipient's Name,

I am currently conducting research at California Polytechnic State University in San Luis Obispo through the graduate program in the Recreation, Parks, and Tourism Administration department and would like to invite you to be a part of our study.

The purpose of my study is to determine an outdoor school/program participation impact on the participant's affinity for nature and attitude toward California's marine and coastal resources. A student's affinity for nature is determined by an individual's feelings of comfort, freedom, connection with, and attraction to nature and more specifically for this particular study, marine and coastal resources. This research is being funded through a grant provided by the California Coastal Commission's Whale Tail License Plate Program.

Data is being collected through an instrument based on Dr. Jim Sibthorp's *Affinity for Nature Scale*, which is currently utilized by the American Camp Association to determine camper outcome measures. This study is currently being conducted at the Rancho El Chorro Outdoor School in San Luis Obispo, California. Rancho El Chorro Outdoor School is a program through the San Luis Obispo County Office of Education and has been providing environmental education programs for over 26 years.

My hope is to involve more outdoor schools and programs in the study to get more input from participants in a variety of program settings. This would also allow me to expand my research objectives and make comparisons between programs based on the characteristics of each program and the participant's experience.

I have enclosed a sample questionnaire (currently being used at Rancho El Chorro Outdoor School), a document detailing how your outdoor school can be a part of this study, and a brief overview of the study for your viewing. I will follow up this letter with a phone call later in the month. If you are interested in participating in this study or have any questions, feel free to contact me at 562.822.2934 or at justinschmillen@gmail.com. Thank you for your time and consideration.

Sincerely,

Justin Schmillen

Involvement In This Study

How You Can Help

Environmental education programs and outdoor schools can participate in this study by administering the questionnaire to their participants. This study is designed to assess the experience of a participant **immediately following** his or her participation in the program. The length of educational experience offered can range anywhere from a one day program to week long overnights and anywhere in between. Ideally, data will be collected from all schools, groups, and organizations participating in your program through December of 2009.

The Process

As a partner in this study, your organization and staff would be responsible for administering and collecting the questionnaire near the conclusion of the participant's educational experience. When administering the survey, a time should be selected that is convenient and not disruptive to your program. Times that may work the best include during the last day's breakfast or lunch, a final group/cabin meeting, or during the organization's own evaluation period. The researcher will provide the partnering organization with blank questionnaires, golf pencils, and envelopes and postage for the return of completed questionnaires. It is my goal to figure a simple and efficient system to ensure that your organization's daily operations are not affected.

Modifications and Approval of the Questionnaire

Because each organization is different, the questionnaire will be tailored to fit the characteristics and curriculum of each organization. Organizations will also have the opportunity to suggest questions on the questionnaire that may have personal interest to them. I am aware that each organization has their own guidelines that will need to be met. I will seek final approval from required personnel within the organization for:

- a) the content of the questionnaire
- b) approval for distribution and completion of the questionnaire by your program participants.
- c) other necessary requirements by the organization

Appendix D

Counts for 17 Affinity For Nature Related Questions

Table A

Descriptive Statistics- Affinity for nature scale: Enjoying the outdoors

<u>Change In Affinity For Nature</u>	<u><i>n</i></u>	<u>%</u>
Increased a lot, I am sure	208	39.54
Increased some, I am sure	162	30.80
Increased a little bit, maybe	116	22.05
Did not increase or decrease	37	7.03
<u>Decreased</u>	<u>3</u>	<u>0.57</u>

Four people did not respond to this question

Table B

Descriptive Statistics- Affinity for nature scale: Liking nature

<u>Change In Affinity For Nature</u>	<u><i>n</i></u>	<u>%</u>
Increased a lot, I am sure	184	34.91
Increased some, I am sure	167	31.69
Increased a little bit, maybe	122	23.15
Did not increase or decrease	52	9.87
<u>Decreased</u>	<u>2</u>	<u>0.38</u>

Two people did not respond to this question.

Table C

Descriptive Statistics- Affinity for nature scale: My desire to spend time outdoors

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased a lot, I am sure	164	31.42
Increased some, I am sure	152	29.12
Increased a little bit, maybe	121	23.18
Did not increase or decrease	77	14.75
<u>Decreased</u>	<u>8</u>	<u>1.53</u>

Seven people did not respond to this questions

Table D

Descriptive Statistics- Affinity for nature scale: My attraction to nature

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased some, I am sure	150	29.07
Increased a lot, I am sure	143	27.71
Increased a little bit, maybe	128	24.81
Did not increase or decrease	88	17.05
<u>Decreased</u>	<u>7</u>	<u>1.36</u>

Thirteen people did not respond to this question.

Table E

Descriptive Statistics- Affinity for nature scale: Feelings of safety in nature

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased some, I am sure	141	27.43
Increased a lot, I am sure	137	26.65
Increased a little bit, maybe	119	23.15
Did not increase or decrease	87	16.93
<u>Decreased</u>	<u>30</u>	<u>5.84</u>

Fifteen people did not respond to this question.

Table F

Descriptive Statistics- Affinity for nature scale: Comfort in the outdoors

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased a lot, I am sure	163	31.35
Increased some, I am sure	146	28.08
Increased a little bit, maybe	99	19.04
Did not increase or decrease	97	18.65
<u>Decreased</u>	<u>15</u>	<u>2.88</u>

Nine people did not respond to this question.

Table G

Descriptive Statistics- Affinity for nature scale: Feeling free when I am outdoors

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased a lot, I am sure	199	38.49
Increased some, I am sure	148	28.63
Increased a little bit, maybe	79	15.28
Did not increase or decrease	75	14.51
<u>Decreased</u>	<u>16</u>	<u>3.09</u>

Twelve people did not respond to this question.

Table H

Descriptive Statistics- Affinity for nature scale: Enjoying the freedom of being outside

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased a lot, I am sure	225	42.94
Increased a little bit, maybe	90	17.18
Increased some, I am sure	124	23.66
Did not increase or decrease	77	14.69
<u>Decreased</u>	<u>8</u>	<u>1.53</u>

Five people did not respond to this question.

Table I

Descriptive Statistics- Affinity for nature scale: Feeling part of the natural world

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased a lot, I am sure	151	29.26
Increased some, I am sure	149	28.88
Increased a little bit, maybe	112	21.71
Did not increase or decrease	94	18.22
Decreased	10	1.94

Thirteen people did not respond to this question.

Table J

Descriptive Statistics-Affinity for nature scale: Feeling connected to the natural environment

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased some, I am sure	160	30.95
Increased a lot, I am sure	148	28.63
Increased a little bit, maybe	117	22.63
Did not increase or decrease	82	15.86
Decreased	10	1.93

Twelve people did not respond to this question.

Table K

Descriptive Statistics- Affinity for nature scale: Enjoying the ocean

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased a lot, I am sure	258	49.52
Increased some, I am sure	113	21.69
Did not increase or decrease	73	14.01
Increased a little bit, maybe	71	13.63
<u>Decreased</u>	<u>6</u>	<u>1.15</u>

Eight people did not respond to this question.

Table L

Descriptive Statistics- Affinity for nature scale: My desire to spend time at the ocean

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased a lot, I am sure	215	41.59
Increased some, I am sure	140	27.08
Did not increase or decrease	86	16.63
Increased a little bit, maybe	71	13.73
<u>Decreased</u>	<u>5</u>	<u>0.97</u>

Twelve people did not respond to this question.

Table M

Descriptive Statistics-Affinity for nature scale: Respect for oceans, tide pools, beaches, estuaries and marine life

<u>Change In Affinity For Nature</u>	<u><i>n</i></u>	<u>%</u>
Increased a lot, I am sure	264	50.77
Increased some, I am sure	138	26.54
Increased a little bit, maybe	69	13.27
Did not increase or decrease	45	8.65
Decreased	4	0.77

Nine people did not respond to this question.

Table N

Descriptive Statistics-Affinity for nature scale: Feelings of safety around oceans and beaches

<u>Change In Affinity For Nature</u>	<u><i>n</i></u>	<u>%</u>
Increased some, I am sure	164	31.36
Increased a lot, I am sure	132	25.24
Did not increase or decrease	115	21.99
Increased a little bit, maybe	96	18.36
Decreased	16	3.06

Six people did not respond to this question.

Table 0

Descriptive Statistics-Affinity for nature scale: How much I learned about oceans, tide pools, beaches, estuaries and marine life

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased a lot, I am sure	254	48.66
Increased some, I am sure	162	31.03
Increased a little bit, maybe	68	13.03
Did not increase or decrease	31	5.94
Decreased	7	1.34

Seven people did not respond to this question.

Table P

Descriptive Statistics-Affinity for nature scale: Wanting to take care of oceans, tide pools, beaches, estuaries and marine life

<u>Change In Affinity For Nature</u>	<u>n</u>	<u>%</u>
Increased a lot, I am sure	230	43.81
Increased some, I am sure	151	28.76
Increased a little bit, maybe	83	15.81
Did not increase or decrease	54	10.29
Decreased	7	1.33

Four people did not respond to this question.

Table Q

Descriptive Statistics-Affinity for nature scale: Wanting to learn more about oceans, tide pools, beaches, estuaries and marine life

<u>Change In Affinity For Nature</u>	<u><i>n</i></u>	<u>%</u>
Increased a lot, I am sure	209	39.58
Increased some, I am sure	129	24.43
Increased a little bit, maybe	110	20.83
Did not increase or decrease	70	13.26
<u>Decreased</u>	<u>10</u>	<u>1.89</u>

One person did not respond to this question.

