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## **A Mixed Methods Approach to Study the Effects of a Naturalist Summer Program on the Perceptions of African American Children about Nature**

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A MIXED METHODS APPROACH TO STUDY THE EFFECTS OF A NATURALIST  
SUMMER PROGRAM ON THE PERCEPTIONS OF AFRICAN AMERICAN  
CHILDREN ABOUT NATURE

by

Kendrick D. Buford

A Dissertation  
Submitted to the Graduate School,  
the College of Arts and Sciences  
and the Center for Science and Mathematics Education  
at The University of Southern Mississippi  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy

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## ABSTRACT

African Americans have been reported to have a more negative outlook on nature than people of other races. Much work has been done to explain this phenomenon through the lenses of social and environmental justice. However, most of this information pertains to adults, and little to no exploration has been done to understand how children could be affected. This lack of information creates a novel research topic. This study addressed the problem using a mixed method analysis to better understand both the narrative of the children and any generalizable conclusions to better understand their attitudes in a summer program titled “*Helping Make Nature Natural for African American Urban Children.*” This research was designed to address those attitudes using self-efficacy as a guide, and the information gathered was used to test the effectiveness to reduce the children’s fear or lack of desire to be in nature. Previous research has demonstrated that increasing a person’s self-efficacy can help to alleviate both fear and aversion by reducing the stress response.

During the four-week program, 22 campers ranging in age from four to eight years old were exposed to a program designed to slowly raise awareness of the environment around them while treating stressors on their terms. The five children aged four to five were not included as the study targeted children in Piaget’s Concrete Operational Stage of Development. Nine parents of the 17 children in the study also completed a brief questionnaire to determine what attitudes they held about nature. Semi-structured interviews with two campers and 346 pieces of artwork from 17 eligible students were analyzed.

Results revealed that the parents had a significantly higher-than-expected level of comfort in nature ( $p = < 0.001$ ). The children's attitudes were closer to a negative outlook ( $p = .369$ ). Interviews with two campers depicted a modest fear response. However, the fear response was reduced for these two and two others as revealed by a highly significant difference between the pre/post test scores ( $p = .01$ ). Analysis of the artwork produced by 17 campers showed that the artifacts introduced in the storybooks persisted into the children's future artwork. Finally, a McNemar's analysis was used to determine whether a career component of program featuring minority representation in science could change each camper's choice of career. The change in career aspirations of the four was not significant ( $p = .500$ ). Results revealed that the program reduced fear of nature in the four children who completed both pre and posttests but not their career aspirations, and it increased 17 children's awareness of nature as revealed by their artwork.

## ACKNOWLEDGMENTS

First, I would like to thank Janet Baldwin, Director of the Osceola McCarty Youth Development Center. This study could not have taken place without the foundation that she had already established and, more importantly, the trust she has earned in the community. It is my hope that the program studied in this dissertation continues for years to come. I also hope that she continues to offer the community the support it needs, as her drive and fervor are what the African American community needs the most.

Without my mentor and advisor, Dr. Sherry Herron, I would have been lost in a philosophical oasis, pondering with no direction. As a person who wants to see change in the world, it is nothing short of wonderful to meet a person with the same dreams. Her experience in the world of education and life tempers me on my daily journey to be a better man than I was the day before. Thank you for entrusting me with the program you started; I can only hope that my examination thereof helps it grow into something more. The other members of my committee are no less important. Dr. Shearer has been a mentor in my scientific career, and his support was invaluable in my transition to a true educator. Dr. Mohn made statistics fun, bringing a joy to them that I have only seen when I am discussing educational psychology or molecular genetics. I owe a great deal to Dr. Shelley, as I began my journey into educational statistics with a fear of failure, which she replaced with confidence, thereby reducing my own stress response. Lastly, Dr. Herring has been a pillar for me in the qualitative world. This is where I needed the most guidance, and I am thankful that she was up to the task.

My friends and family have helped me through some troubled times as a graduate student. I am sure I have vented to them plenty of times, never quite explaining the issue;

however, they listened all the same. As I have grown from a curious child into a curious adult, I can only hope that the journey was as much fun for you as it was for me. Thank you for the support, and I will try to be more attentive going forward.

## DEDICATION

I would like to dedicate this dissertation to my mother. My desire to help others, my stubbornness about not quitting and my quiet indignation all stem from her teachings. My first questions were asked while sitting in her lap, and she always pushed me one step further than I thought I could go. Over time, those steps have led me to the person I am today. I still remember you wanting to make it to my college graduation and the sadness it brought me to know it may have been the last one for you to see. However, I cannot help but know that you are watching me even now as your words resonate without my head anytime, I feel myself slowing down. Even now, I look to the poem you shared with me many years ago titled “Don’t Quit” – I never will.



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## LIST OF ABBREVIATIONS

<i>AA</i>	African American
<i>BLT</i>	Behaviorist learning theory
<i>CLT</i>	Constructivist learning theory
<i>CRT</i>	Critical race theory
<i>EIC</i>	Environment as an integrating context
<i>EJ</i>	Environmental Justice
<i>EPA</i>	Environmental Protection Agency
<i>GLOBE</i>	The Global Learning and Observations to Benefit the Environment
<i>NDD</i>	Nature deficit disorder
<i>NEEF</i>	The National Environmental Education Foundation
<i>NEETF</i>	The National Environmental Education and Training Foundation
<i>NWF</i>	The National Wildlife Federation
<i>MM</i>	Mixed-methods
<i>PLT</i>	Project Learning Tree
<i>QUAL</i>	Qualitative
<i>QUAN</i>	Quantitative
<i>SCT</i>	Social cognitive theory
<i>SLT</i>	Social learning theory
<i>SES</i>	Socio-economic status



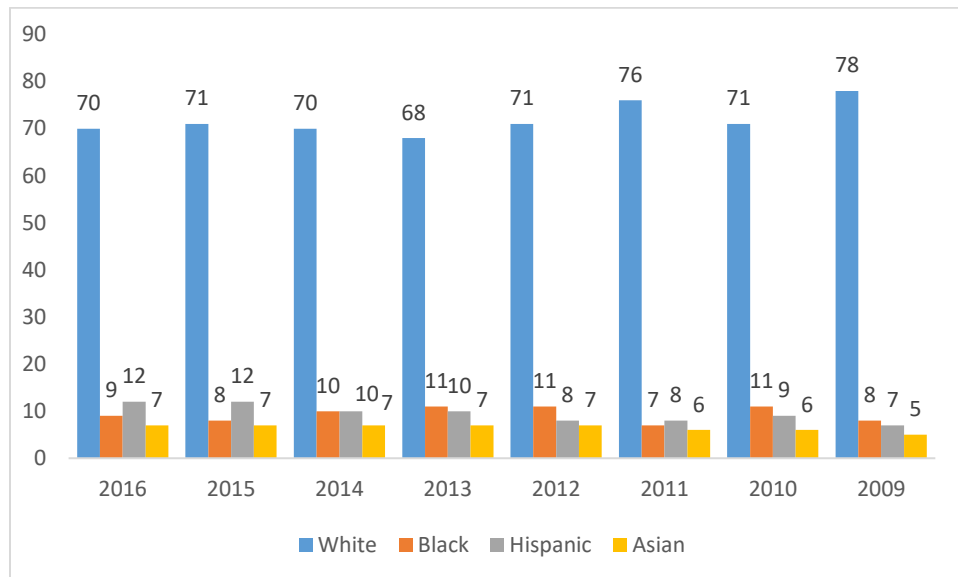
## CHAPTER I - INTRODUCTION

### Background

The adverse perceptions of African Americans in nature is not a novel idea. Articles ranging from The New York Times to scientific journals (Byrne et al., 2009; Byrne & Welch, 2009; Chesney, 2007; Finney, 2014; 2012; Mock, 2014 & Outdoor Participation, 2017) all agree that African Americans do not enjoy nature as much as other races and ethnicities. African American people have a wide range of reasons for not wanting to go outside, including fear of wildlife, fear of racial retaliation, and a lack of interest in nature (Larson, Whiting, and Green., 2011; Mohai, 2003; Sheppard, 1995 & Mohai, 2003).

Moreover, according to the 2017 Outdoor Recreation Participation Report, 48.8% of the U.S. population participated in at least one outdoor activity in 2016. This number increased from 48.4% in 2015. Fifty percent of white Americans engaged in some sort of outside activity, whereas only 33% of Black Americans did. Figure 1 presents demographic data over seven years of participation rates among different races.

Table 1 *Percentage of youth and young adults who participated in an outdoor activity between the years of 2009 and 2016.*



Youth and young adults are defined as being aged 6-24 years. Outdoor participation is mostly dominated by Caucasian people, followed by Hispanic. Adapted from the Outdoor Participation Report. (2017). Washington, DC: The Outdoor Foundation. Retrieved February 20, 2018, from [www.outdoorfoundation.org](http://www.outdoorfoundation.org).

The Outdoor Foundation (2017) interviewed 24,134 citizens using a nationwide sample of individuals and households. They asked a random assortment of questions, one example being “Why do people go outside?” The study listed the percentages of each response and divided them by race and ethnicity. The top three reasons African Americans go outside are as follows: to “get exercise,” “keep physically fit,” and “be with family and friends.” Responses such as “be close to nature” and “enjoy the sounds and smells of nature” were top response for White Americans but did not score with any of the other races and ethnicities. Issues with socio-economic status (SES) could also be seen in the report. For example, another reason this group did not go outside was because

outdoor recreation activities are too expensive. This reason was linked to another reason, namely “do not have the skills or abilities” for Black people.

Compounding this information is the fact that Mississippi has the highest percentage of African Americans (37.5%) than any other state (U.S. Census, 2017). This creates a novel opportunity to study this phenomenon. In Education, Hattiesburg is also a special case. Black students make up 90% of the students enrolled in Hattiesburg Public School, in comparison to the 49% that makes up Mississippi schools in general (<http://mdereports.mdek12.org/data/>).

Another way to think about the issue is to look at the motivations of white Americans. They had a higher number of reasons for interacting with the environment. While most (66%) people from this group went outside to exercise, other reasons were also mentioned, such as to “observe the scenic beauty” and to “enjoy the sounds of nature.” There is no meaningful way to quantify this data; however, it is useful for interpretive purposes. It is clear that different races find different reasons to go outdoors.

While much information can be found about nature as it relates to African Americans, it is not many monographs dedicated to the attitudes of children. Finney (2014) believes that the same adverse perceptions that the parents would have could have been spread to the child.

### Statement of Problem

This mixed-methods (MM) study addresses the attitudes of elementary-school-aged African American children to uncover what experiences or conditions have led to their difference in desire to interact with nature and if those attitudes could be treated using a four-week summer camp. A convergent-transformative MM design is used. This

type of design is a combination of the convergent and parallel design, which is used “to collect different but complementary data on the same topic” (Morse, 1991). It is advantageous for this study, as it brings together the strengths and weaknesses of quantitative (QUAN) and qualitative (QUAL) methodologies. The transformative aspect of the study goes beyond the theoretical framework and involves consideration of the worldview; it takes into account the importance of the topic at a societal level (Mertens, 2010).

### Research Questions

This dissertation is founded on the attitudes and accompanying fears that have plagued the African American community in relation to nature. The researcher seeks to explore ways to increase the comfort in and knowledge about nature in African American children. The researcher is of the opinion that a belief exists that many African Americans (AA) are not interested in nature or the environment, with no hard evidence that is not anecdotal. Studies are needed to uncover the true narrative surrounding African American children and the environment.

This study is designed to answer the following research questions:

1. What are some attitudes that south Mississippi African Americans have about nature and being outside?
2. How have the children’s attitudes about nature changed from the start of the program to the end?
3. How have the children’s career choices changed from the start of the program to the end?

## Purpose Statement

The purpose of this study is to afford children the opportunity to explore the environment in a supervised manner that reduces their stress response, decreasing any negative attitudes related to nature. A previous program titled *Helping Make Nature Natural for African American Children* was designed using the constructivist learning theory (CLT). This theory is rooted in active learning, which grants the student more agency in his instruction, thereby allowing for a more interactive process that fosters group work and cultural growth (Bruner, 2003).

The previous program took place in the summer of 2016, and it partnered AA children from the Hattiesburg community with African American undergraduate and graduate students from the University of Southern Mississippi (USM). The program is rooted in service learning, and it involved the use of storybooks, active learning, and an introduction to black scientists (Herron, Chesnut & Buford, in review).

## Definition of Terms

**Constructivist Learning Theory:** A theoretical framework, created by Jerome Bruner, that posits that people construct new knowledge based on both current and past knowledge.

**Critical race theory (CRT):** a framework to analyze educational research and patterns and can be used to analyze the role of race and racism in social disparities between dominant and marginalized raced groups (DeCuir & Dixson; Ladson-Billings & Ladson-Billings & Tate, 1995).

**Epistemology:** the study of the nature and scope of knowledge.

The “Global Learning and Observations to Benefit the Environment” program (GLOBE): funded by the NSF, NASA, and NOAA, with support from the U.S. Department of State.

Environmental Justice: The fair treatment and involvement of all people pertaining to development, implementation and enforcement of laws, regulations, and policies as it applies to the environment (<https://www.epa.gov/environmentaljustice>).

Nature Deficit Disorder: An idea, posited by Robert Louv, that children are spending less time outside and that a wide range of behavioral problems could stem from said lack of interaction with nature (Louv, 2008).

Pragmatism: a worldview that is associated with Mixed-methods research. The focus of this worldview is on the importance of the question being asked, not on the method to solve it. Pragmatism encourages the use of multiple methods to answer the researcher's question (Cresswell & Plano-Clark, 2011).

Social cognitive theory (SCT): consists of a structure to address both the development of competencies and action regulation (Bandura, 1986).

Socio-economic status: the social standing or class of an individual or group. It is measured as a combination of education, income, and occupation.

Social Learning Theory (SLT): a combination of cognitive learning theory and behavioral learning theory. Defines learning as a process that is based on one's response to environmental stimuli.

Self-efficacy: defined as "the belief in one's capabilities to achieve a goal or outcome." And was developed in Bandura's (1986) work.

Transformative design: an MM design created to be change-oriented and which seeks to advance social justice causes (Cresswell & Plano- Clark, 2011).

Worldview: a term used by Creswell and Plano (2011) to describe the MM assumptions defined by Guba and Lincoln (2005). Paradigm is a term that is often used synonymously with worldview.

### Summary

Outdoor participation grew by .4% in 2016, according to the Outdoor Recreation Participation Report (2017). This number now totals 48.8% or 144.4 million Americans. However, African American participants were still not going outside as much as White Americans (figure 1). The researcher believes that a rich amount of data is missing from the current literature that could possibly explore this lack of participation.

A wide range of publications have suggested that African Americans have an assortment of reasons for not wanting to go outside. Interacting with nature seems to be a negative activity in the eyes of most African Americans, and this will have a negative effect on their perceptions and use of the environment. Currently, what effects that this has on the children is unknown. However, the researcher believed that providing participating children with both a structured and constructive manner in which to interact with nature would acceptance and tolerance of the outdoors. It is important to ensure that African Americans are comfortable with nature, as it has been demonstrated that an aversion to nature can be detrimental to people (Larson et al., 2011; Sheppard, 1995 & Mohai, 2003).

The study was designed to assess attitudes and perceptions about nature among children aged 6-10 years old in the African American community. This study allowed children the opportunity to explore the environment in a structured manner. The program was based on the previous “Helping Make Nature Natural for African American Urban

Children” program. This four-week program was designed using a combination of social learning theory (SLT), critical race theory (CRT) and constructivist learning theory (CLT) as the theoretical framework.



## CHAPTER II REVIEW OF LITERATURE

### Identification of the Problem

African American's spend less time in nature than other races. On its own, this issue would fall firmly into the paradigm of social justice and, therefore, critical race theory (CRT). However, the ramifications of this issue are greater than what most people consider. The chief challenge that stems from African American children's reduced time in nature is a condition called nature deficit disorder (NDD). On the surface, this condition appears to be a simple issue; however, according to Louv, it is much bigger than most think. Children who do not want to be engaged in nature will not have a desire to interact with the environment, and Louv (2005) has suggested that this predicament could lead to shorter life spans.

The transformative portion of this study also crosses over into the theme of EJ. Environmental justice emerged in the 1980s and is a mix of a social movement and the distribution of environmental benefits (Schlosberg, 2007). The U.S. Environmental Protection Agency defines it as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (EPA, 2018). Furthermore, various papers have been published on EJ over the past few years (Chand et al., 2015; Cloutier et al., 2014; Duro, 2016; Juwana et al., 2016; Pinar et al., 2014 and Reisi et al., 2014).

Environmental discrimination is one issue that EJ attempts to address. Racism and discrimination have led to cases where the dominant group receives better treatment or better access to parks and recreational facilities in general (Taylor, 2011). Furthermore,

even the available land for minorities to use is usually smaller in size or worse in condition. For example, studies have demonstrated that across the US, environmental discrimination has caused an unfair distribution of waste disposal, manufacturing, energy production facilities, airports, and toxic waste dumps in poorer communities (Chavis et al., 1987; Lerner, 2005 & Skelton, 2011).

In a broader sense, environmental racism is a better term to capture the issue that the researcher is trying to address in this research. This term fits better, as it discusses the issues of the unfair treatment of the environment, specifically through the lenses of minority and low-income communities. It links racism with environmental actions, experiences, and outcomes, as well as the way in which this created a racial disharmony with nature. The three tenets of environmental racism are (1) prejudicial belief and behavior; (2) the personal and institutional power to enact policies and actions that reflect one's own prejudices; and (3) privilege, unfair advantages over others, and the ability to promote one's group over another (Taylor, 2000).

The issue can appear to be circular in nature. Some authors have argued that many sustainability programs are not designed to tackle the social justice issue (Agyeman, 2008 & McLaren and Agyeman, 2015). This is problematic as one cannot truly address the issue of EJ without tackling its adverse feeling and effects on the disenfranchised. Agyeman (2004, 2008, 2013 & 2015) has gone as far as to say that EJ is essentially "just sustainability." It is vital that the two are incorporated to ensure the preservation and respect of the environment. Urban sustainability is also important as the rural landscape shrinks and we all become increasingly connected. Polese and Stren (2010) have argued

that we cannot work towards this goal of urban sustainability without first tackling the circular problem of both EJ and environmental discrimination.

## Conceptual Review

### *Critical Race Theory*

Critical race theory (CRT) was developed in response to limitations in studies that dealt with discrimination against minorities. More emphasis needed to be placed on the African American condition, as the fight for equality has continued from slavery, persisted after its abolishment, continued into the “Jim Crow” era, and persists even today (Anderson, 1988). Critical race theory has also moved into the educational setting as it tackles issues such as school quality and resource partitioning (Crenshaw, 2011; Dixson & Rousseau, 2005; Ladson-Billings & Tate, 1995 and Tate, 1997). However, this does not describe its foundations. The theory was founded in response to critical legal studies. The founders of CRT believed that many of the reasons that have kept African Americans from making progress are instilled in the laws that were meant to “keep all men safe” (Crenshaw, Gotanda and Thomas et al., 1995). In education, authors such as Ladson-Billing and Tate (1995) have posited that educational policies are also a cause for concern because these policies contributed to inequitable outcomes for black and white Americans. These same issues can be seen in studies of environmental racism.

While CRT may have started with the writings of Ladson-Billing and Tate (1995), it is now a full-fledged subfield in both education and social sciences. It is also transformative in design and is utilized by researchers who want to highlight the issues of race in America. The principles of CRT are grounded in change (Bell, 1995). The theory is important to this study because all students were identified as African American. More

importantly, the researcher posits that students' adverse perceptions stem from their parents. The parents, more so than the children, would have been exposed to the issues of race and the practices that would have shaped their observations about nature. In turn, these observations would be transmitted culturally to their children.

This last point is vital to the understanding of the transfer of fear and aversion to nature. Previous findings have indicated that youth development (socio-emotional) requires parental support (Brown et al., 2002; Brody, Murry, Kim, and Brown., 2002). Vocational outcomes and endeavors are also deeply rooted in parental involvement (Diemer, 2007). Taken together, children need to see their parents interact with the environment to truly learn to appreciate it. However, in cases when parents are not willing or able, other adults can fulfill that role (Jekielek, 2002). Teachers and mentors, for example, provide an important source of social support. To this end, many programs have been created that provide either one-on-one or group therapy (Bauldry and Hartman, 2003). The effectiveness of these programs has been examined in many studies (Catalano Berglund, Ryan, Lonczak, and Hawkins, 2004; Dubois and Neville, 1998; Dubois, Holloway, Valentine and Cooper, 2002; Hirsch, Mickus, and Boerger, 2002 and Tierney and Grossman, 1995).

### *Social Cognitive Theory*

Social learning theory (SLT) is needed to truly understand how the transmission of fear and knowledge about the environment has spread throughout the black community. This theory focuses on how people can learn from observing one another. Special attention is paid to imitation and modeling behaviors. Social learning theory is

rooted in behaviorism; however, it pays more attention to the role of environmental stimuli and the consequences (Ormond & Ormond, 2010).

SLT eventually became Social Cognitive Theory (SCT). SCT consists of a structure to address both the development of competencies and action regulation. Knowledge serves as a foundation to create complex cognitive structures to guide behavior and understanding. This theory is sometimes considered to be the bridge between behaviorism and cognitivism (Bandura, 2011). SCT has a core set of constructs: reciprocal determinism, behavioral capability, observational learning, reinforcements, expectations, and self-efficacy. It also considers how all these constructs work together to influence behavior and well-being (Bandura, 2004).

Out of all the constituents of SCT, this study utilizes the principles of self-efficacy. Bandura (1994) has listed four main sources of self-efficacy and understanding the rationale behind these sources is imperative for a proper critique of this analysis. The first source mentioned is mastery of experiences. Mastery Experiences are valuable as they are equitable to success, whereas failure can hinder growth. This is because reaching success is challenging. Easy success can thus be seen as a detriment to the growth of a student. Students must also gain plenty of vicarious experiences which is the second source of self-efficacy. They need to see people who are similar to them in situations that they would deem worthy of remembering. If they can succeed, then arduous tasks seem less impossible, and this can persuade them to continue to face their own trials. This can overlap with the third source, namely social persuasion. Students need to be convinced that they can succeed. Social persuasion is also useful for helping people to overcome any self-doubt. The last source of self-efficacy is reducing the stress response. Negative

events are bound to occur, and students must understand that such events form a regular part of learning, so that they do not become demotivated by potential setbacks. Reducing the stress response should increase their positive mood. In addition to the four above-mentioned sources, mood is another significant factor in self-efficacy. People with higher levels of self-efficacy tend to be in a better mood.

This study was designed to improve self-efficacy with the outcome measurement in this study is grounded in self-efficacy. The treatments (storybooks and active learning activities) were used to create mastery experiences. They also helped the children to become aware of and comfortable in nature. Working with peers and a non-parent mentor should also count as a source of social persuasion. Mood and the associated emotional response had to be handled in a manner that does not create more adverse associations. The most important element is ensuring that the pace and the activities are utilized in a careful manner.

### *Constructivist Learning Theory*

The constructivist model of teaching is developed to cater to this theory of user-created knowledge. The pedagogy of constructivism is usually seen in comparison to the behaviorist model of teaching. The differences in the two teaching methods are all based on the role of and relationship between the teacher and student. In a constructivist learning environment, the student is seen as unique, as his perceptions ultimately dictate what he perceives as real. This can be contrasted to a behaviorist learning environment, which has students learning at a set pace. The individual differences between each student are not highlighted, and this makes learning more passive. Moreover, the teacher oversees learning, and the student oversees presenting what he or she has learned for

mastery. Constructive learning theory (CLT) offers this agency back to the student and is more active in its learning approach (Bruning, Schraw, Norby and Ronning, 2004 & Woolfolk 2007).

The interaction between teacher and student is also vital for this study. CLT is designed so that the teacher and the student learn from each other. The student would compare his version of truth with that of his teacher and his peers. In this way, the student is able to rearrange his truth based on an awareness of what is considered universally sound. This study was designed such that the social learning of constructivism is vital to the overall goal. It has been posited that social learning is a major method of transmitting the aversion to the outdoors. If this is true, then mediating the condition would also involve social learning (Bruning et al., 2004; Woolfolk, 2007 and Lam, 2011).

Taken together, this study was a combination of both learning theories. Social cognitive theory is to be used to assist with the creation of objective themes in the QUAL section and to ensure proper validity in the QUAN section. Behaviors are easier to identify, as SCT allows for a more structured rubric. It was also easier to draw trends from behaviors versus the subjective experiences of the students. Constructive learning theory was employed primarily in the QUAL section. Here, the researcher utilized semi-structured interviews to uncover the unique situations that have created the experiences of the children.

#### Theoretical Framework

Bandura (1977) has noted that behavior is learned from the environment through what is known as observational learning. This statement forms the basis of the theoretical underpinning of the researcher's methods. The behavior of children is learned from

contact with their environment: children will imitate and encode the behaviors of those around them. The process is expedited when the child perceives the source of the behavior to be similar to him or her in race. This process is called “identification,” and the term itself stems from Social Learning Theory (SLT) (McLeod, 2016).

SCT will help to evaluate the sociocultural conditions of African Americans and their relationships with nature. However, the life experience of the children alone will not garnish a complete analysis of the situation. To do this, one must also incorporate CRT. The theory examines the relationship between race and power to explain experiences and the effects thereof on POCs. Critical race theory is important because many of the issues that African American children have with nature and the environment will be transmitted from their parents, teachers, peers, and others who surround them. Vital information should be acquiesced from viewing the teachings of adults through the lens of CRT.

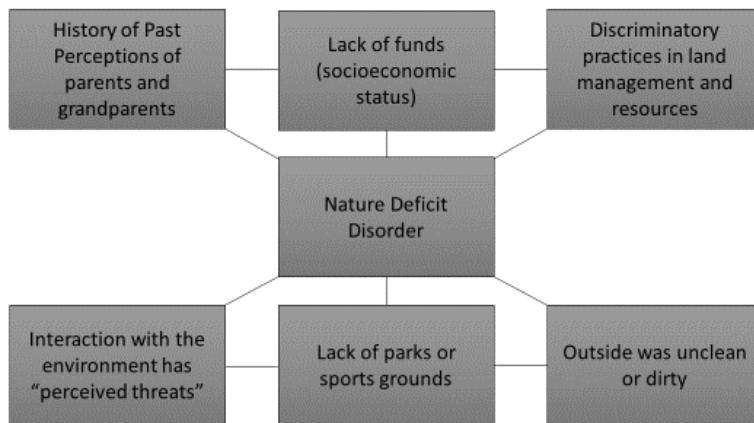


Figure 1. Factors Contributing to African American’s Attitudes Towards Nature  
*Mixed Method epistemology*



An mixed-method (MM) study must be constructed in such a way that it incorporates both a post-positivist and a constructivist mindset. This study was also transformative in design, meaning that the social ramifications of the study must also be considered when trying to develop a cohesive research methodology. It is the researchers hope that the following information, taken together, creates a complete understanding of the keystones of the study.

Paradigms are often mentioned in MMR, as they help to describe the position that is being taken in the research. They delimit the ontological and epistemological assumptions of the study. Furthermore, they can be simply defined as ways of looking at the world (Mertens, 2005). Paradigms are guided by the researcher's belief. For example, the typical MM researcher would hold the stance that all research is interpretive because even the quantitative data is selected by him or her, and the interpretation is also subject to his or her background and assumptions. This study is a synthesis of many paradigms, as the researcher believes that many views are needed to create a complete understanding of the phenomena under study. These paradigms are post-positivist (QUAN), constructivist (QUAL), interpretive (SCT), and CRT.

### *Summary*

The mixed-method study proposed by the researcher was designed using a concurrent transformative foundation and is designed to study a phenomenon both interpretively and empirically (Schwandt, 1994 & Cresswell , 2013). This study used this concurrent design, as it allows for both types of data to be collected at the same time. Data collection in this manner makes it more convenient to gather all necessary data.

The critical issue in this study is the interaction of CRT, NDD, and EJ. The researcher believes that each of these issues could have a synergistic effect on children's perceptions of nature. Critical race theory and EJ can explain why parents are not comfortable being in the environment. Historically and currently, African Americans have faced mistreatment when it comes to numerous issues—in particular, the lack of equal land equity (Delgado, 1994 & Bell and Ebisu 2012).

SLT is the precursor to the theory in which this study is grounded in, namely Social Cognitive Theory (SCT), which posits that learning is social and that a dynamic and reciprocal interaction exists between the person, environment, and behavior.

Furthermore, SCT focuses on the influence of socially transmitted attitudes. It also believes that past experiences can influence and reinforce behaviors (Bandura, 1989).

Using SLT as a foundation, the researcher believes that this fear could have spread to children in the form of avoidance (McLeoud 2016). This issue is compounded by the fact that, in reports, POCs have been seen to not have the same desires to interact with nature (The Outdoor Report 2011 & 2012). Nature deficit disorder, a condition posited by Louv (2016), depicts the future of AA children if this condition is not fixed. In his monograph, he goes into detail about the list of conditions (e.g. depression, obesity, failing grades, and Attention Deficient Disorder) and why this issue must be addressed.

The instruments in this study (storybooks and outdoor activities) were designed with CLT, particularly, transactional constructivism as a foundation. Transactional constructivism has all the same constituents of constructivism, such as being student-centered; however, it also places emphasis in the power of socially learned knowledge. It is not enough that the student interacts with nature; he also needs to see his peers do the

same to demonstrate that everyone is comfortable with the task. Social learning theory also ties in with the social transmission of traits, and this theory is built on the principle that observational learning is key to knowledge (Bandura, 1994).

Table 2 reframes the research question in a more reductionist manner. Here, the questions are listed along with the type of design (QUAN or QUAL) that were used to answer them. The analysis within the design methodology is also listed.

Table 2 *Tabulation of Research Design*

<b>Research Question</b>	<b>Treatments</b>	<b>Research Method</b>	<b>Instruments</b>
<b>What are some beliefs that south Mississippi African American children and parents have about nature and being outside?</b>		Quantitative and qualitative	Observations Parent questionnaire Children’s Comfort in Nature Pre-test Art analysis Semi-structured interviews
<b>How have the children’s beliefs about nature changed from the start of the program to the end?</b>	Storybooks Art activity sheets Nature walks Peer mentoring	Quantitative	Children’s Comfort in Nature pre- and post-tests
<b>How have the children’s career choices changed from the start of the program to the end?</b>	Exposure to minority representation in nature careers	Quantitative and qualitative	Children’s Career Aspirations pre- and post-tests Art analysis Semi-structured interviews

## CHAPTER III – METHODOLOGY

### Introduction

This study was implemented to study the behaviors of south Mississippi African American children as it pertained to nature. After the behaviors were discovered, this study next determined if a four-week summer program could change the perceptions of African American children in not only attitude but also career selection. According to research, African Americans have a negative outlook on nature and the researcher used this as a basis of comparison throughout the study, when applicable (Byrne et al., 2009; Byrne & Welch, 2009; Chesney, 2007; Finney, 2014; Kardashev et al., 2012; Mock, 2014 & Outdoor Participation, 2017). This chapter delimited the facets of the research methodology.

### Mixed Methods Design

A convergent transformative design was chosen (Creswell, 2013). This design involves concurrent collection of QUAL and QUAN data. The transformative aspect of the design commits it firmly to societal and political change. This study is grounded in CRT and SCT, both of which have societal underpinning.

Figure 2 depicts the basic design of a convergent-parallel mixed method design. This design is used when the researcher decided that both strands of the research (QUAN and QUAL) are equally important to the analysis. The purpose of this design is to develop a more complete understanding of a topic or to validate quantitative scales. QUAN and QUAL segments are collected roughly during the same phase of the experiment. Usually one phase is done before other as an embedded design is utilized when the research truly wants to mix the QUAN and QUAL procedures. It is during the analysis that the data is

corroborated. The overall interpretation is also mixed and is crafted in a manner that gives a complete understanding of the subject.

The mixed methods design mentioned below was designed to answer the following research questions:

1. What are the attitudes of south Mississippi African American children about nature and being outside?
2. How have the children's attitudes about nature changed from the start of the program to the end?
3. How have the children's career choices changed from the start of the program to the end?

#### Qualitative Analysis

In this study, the QUAN data consisted of the questionnaire depicted in appendices B, G, and F. The questionnaire featured in appendix G is an expanded version of what was presented in Herron, Chesnut & Buford. (in review), and it is designed to measure children's attitudes about and their level of comfort when engaging with nature. The questionnaire contained eight questions, each of which is scaled using the "smiley" Likert scale. The same test was given in a different order at the end to measure any changes in perceptions. Appendix B was designed to determine which type of jobs the children in the study prefer. The children marked their responses in appendix D, and the choices were tallied by the researcher and used to determine which job type (environmental or non-environmental) is more favorable to those children. This test was also administered twice to compare any changes in response from the start of the study. Appendix F also includes a Likert scale, which was designed to obtain information about

the parents' attitudes about nature. As stated, the researcher believed that the parents' views could have been transmitted to the children. To verify this claim, some information needed to be known about the parents' perceptions. The rest of the survey also featured questions that can be used for descriptive statistics.

All quantitative analyses was performed using SPSS v.25, and multiple statistical tests were performed to analyze each dataset. Research Question 1 was analyzed using a one-sample t-test. In this analysis, the average mean score of the campers was compared to a negative core of the assessment (33 for the parent questionnaire and 31 for the comfort in nature assessment). This allowed for the participants' attitudes toward nature to be quantified, as the analysis compares those attitudes to what would be a negative attitude to nature.

Research Question 2 was created to explore the change in campers' attitudes before and after the program. The best way to answer this was with a repeated measure analysis. In this case, was a dependent sample t-test. Research Question 3 was similar in design but measures a change, if any, in career selection. However, it was a binary choice and was unable to be answered using a parametric test; a McNemar's test was used instead.

### Quantitative Analysis

The participants were children participating in the program. A sample of convenience was utilized in this study because the students were selected based on their accessibility. Furthermore, as this study was only designed to evaluate the perceptions of African American children, age and race served as another factor for exclusion. Verbal interviews were recorded after consent—note taking runs the risk of offending some;

therefore, audio recording equipment was used and mentioned in the consent and assent forms (Shea, 1998). Interviews was transcribed using MAXQDA v.18, and the researcher coded them without the use of any programs.

The qualitative section was designed to improve triangulation. In the QUAL study, triangulation was vital to ensure that the obtained results are accurate. Second, the researcher must be cognizant of the age group of the children who was observed. The interview questions (appendices A and C) were semi-structured in design.

The interview questions were coded for themes related to self-efficacy. These themes included, but were not limited to, mastery experiences, vicarious experiences, and belief in general. Any recurring themes about nature, such as fears, or positive experiences were also be recorded. The semi-structured nature of the interviews allowed for the researcher to adjust the direction of the questions to better guide the children to the questions that are important to the study. Care was taken to prevent leading the children to provide responses that are not genuine (Sommers-Flanagan & Sommers-Flanagan, 2007).

Projective drawing was also utilized. It allowed the child to paint a picture directly from his or her sub-conscious. This technique is usually framed in a way that instructs the child to draw him or herself in and out of unique situations. The abstract nature of students at this age makes this technique an ideal way in which to demonstrate to the researcher information that could not be gleaned from an interview. Projective drawing also helps to build rapport with the student. Appendices D and E list the different artworks that was given to each student. These activity sheets were coded similarly to Herron, Chesnut, and Buford. (in review). Here, all artifacts related to nature were coded

to determine what features of nature were the most interesting to the participants. Both instruments together should be able to offer information on the children’s attitudes.

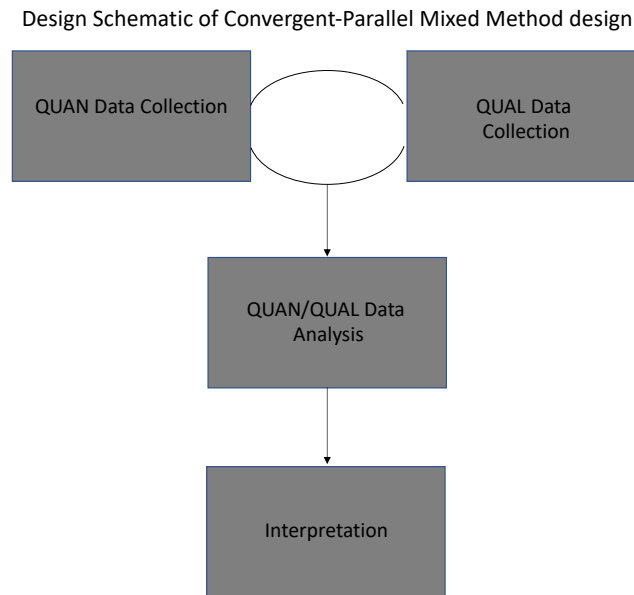


Figure 2. Design schematic of convergent-parallel design—also referred to as a convergent design.

### Participants

Participants were selected from the total population of African American children in Hattiesburg that are involved in the Osceola McCarty Youth Development Center. Only children aged 6 through 10 were selected. To reduce selection bias, the researcher used the support of Dr. Sherry Herron and the director of the Osceola McCarty Youth Development Center to help select participants.

Campers were instructed to take as much time as needed to complete the assignments.

Activity sheets were not treated as work in a classroom and the researcher did not want the students to develop such as attitude towards it. Instead, campers were gently pushed to finish all work, and were allowed to stop when they felt as if the activity was



completed. Either the undergraduate researcher or the researcher would inspect the artwork and would ask the camper to explain what they drew and how it made them feel when time permitted. Regardless of age, all activities were collected and stored in a folder with each camper's name on it.

### Instruments

The instruments used were revised from Herron et al. (In review). Using a modified version of these instruments that were already based on well-established programs such as GLOBE and other learning aids improved inferences of construct validity, and usability. Internal consistency was determined using Cronbach's Alpha. When necessary, items from the inventories were omitted or reverse coded. Two of the instruments used are Likert scales and were developed to collectively determine a single unidimensional concept (attitudes toward nature) (Babbie, 1999; McIver & Carmines, 1981). Although, subconstructs can be used and combined to make one scale, the researcher elected to have all questions measure the same construct (attitudes toward nature). Questions were modified from Herron, Chesnut and Buford (In review) for the children and modified from the Outdoor report (2017) for the parents. As the questions from the outdoor report were heavily modified and is for nonprofit educational purposes, the use of the questions falls under the fair use doctrine.

The first instrument mentioned in this study (appendix A) consisted of the interview questions that was used to answer research questions 1 and 3. The research questions were designed using a synthesis of the structure presented in Leeuw and Otter (1995), Markopoulos and Bekker (2002), and Morgan et al. (2002), as well as in *Interviewing Children and Adolescents* by James Morrison and Kathryn Flegel.

Although short in questions they are semi-structured. This leaves room for follow-up questions to learn more about any interesting answers.

The “Career Aspiration” pre- and post-tests are featured in appendix B. This instrument was developed by Dr. Herron and featured in Herron et al. (in review) (Figure 3B). The questionnaire was developed to gauge the children’s belief towards career selection. It has five questions in total and asked students to make a dichotomous choice about the career they would rather have. The choices were developed to be a graphical design of a non-environmental career and the other an environmental choice. Furthermore, visuals are used to make up for the lack of cognitive development that would naturally exist at the subjects’ age (Sommers-Flanagan & Sommers-Flanagan, 2007). Appendix D contains the questions that the children answered in relation to their career aspirations. It was developed in a minimalistic style to prevent confusion.

Appendix D also depicts the worksheets that were used for art therapy. Art helped to overcome some of the challenges that are presented when trying to ascertain complex thoughts from children (Salmon, 2006). Butler et al. (1995) also mention that drawing is a better way to help students recall events. Most of the worksheets were developed by GLOBE, whose worksheets have been created and field-tested using experts in childhood education and other related disciplines. Other worksheets were created by the researcher to address specific activity sheets. Appendix E also contains art activity sheets for the career aspirations objective (research question 3). These questions were developed using the guidance of Dr. Herron and Butler et al. (1995).

The parents or guardians received a questionnaire, which was included in the

registration form for their children. This questionnaire was developed using CRT and SLT as a framework, and it gathers information pertaining to CRT and the parents' SES. The data was used for comparison during the interpretive section of data analysis.

The pre- and post-tests to assess participant comfort with nature was a synthesis of the characters listed in Figure 3A and the researcher's own design. The instrument is visual in nature and tailored to African American children. Male and female figures were created in varying shades of color in a cartoonish manner. The figures were designed to display varying depictions of comfort or discomfort, similarly to a Likert scale.

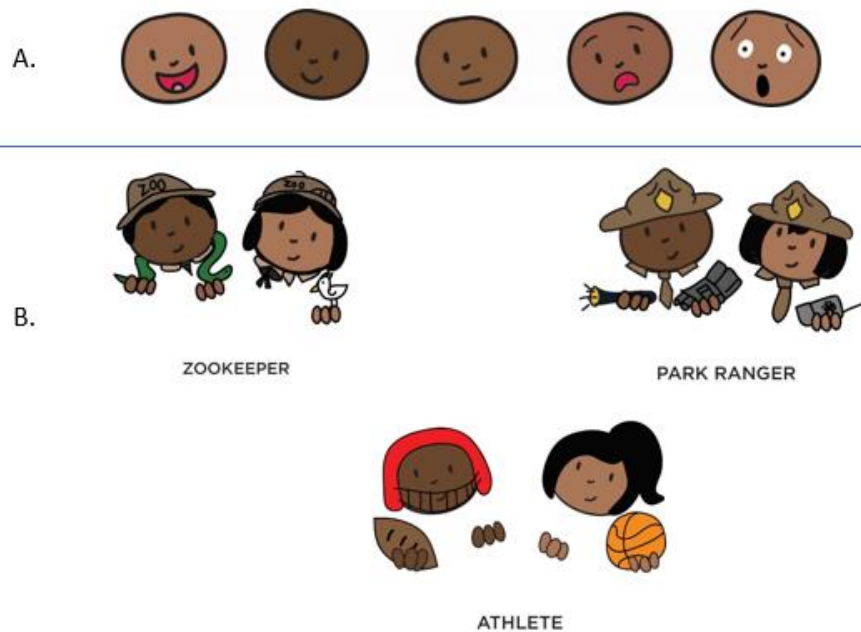


Figure 3. Examples of Previously Created Visual Aids.

Two research instruments were created to help gauge the perceptions of AA children. The first (Figure 3A) is a stylized Likert scale to determine comfort with nature. Faces range from happy to terrified, and they replace what is traditionally stated as strongly agree to strongly disagree. The authors in Herron et al. (in review) also developed questions to assess perceptions about nature and the environment. Figure 3B depicts choices from the career aspiration aspect of testing. These questions were developed to determine which professions the children could see themselves in when they grow older. This inventory had the faces dressed up in different attire to depict various professions. All images were created by Sara Beth Sappington, an undergraduate work-study student at the Center for Science and Mathematics Education (CSME).

Appendix G presents the revised questionnaire from the previous study adjusted for the current study. This instrument used “smileys” instead of numbers and was designed as a Likert scale. This questionnaire was issued before and after the study starts, for use as a repeated measure examination to determine any changes in career preferences. The questionnaire was designed to answer research question 1, which aims to assess the environmental comfort of the children in the study.

### *Treatments*

The treatments in this study ranged from storybooks to direct interactions with nature. A selection criterion was used to choose storybooks: these books were not required to feature an African American, but if they did, said character had to have been a main or supporting character. Picture books are the starting point for most children when it comes to reading. The images in these types of books can help connect the words with the story itself. During this time, children are also developing racial attitudes towards others along with their own cultural identity (Cole & Valentine, 2000).

The following storybooks were used:

- *Under One Rock: Bugs, Slugs, and Other Ughs* by Anthony D. Fredericks
- *Up in the Garden and Down in the Dirt* by Kate Messner
- Emily Morgan’s series *Next Time You See a Spiderweb*, .
- Cathryn Sill’s series *About Reptiles, .: A Guide for Children*
- The GLOBE storybook series featuring *The Mystery of the Missing Hummingbirds*, *All About Earth: Our World on Stage*, *The Scoop on Soils*, and *What in the World is Happening to Our Climate*

In addition to storybooks, GLOBE also provided the activities that were used throughout the four-week program. Along with these activities, the children also

learned how to perform safe scientific techniques, such as leaf preservation, that can be done in the field.

All activities were performed outdoors when possible; this enhanced the experience with nature. Ample time was granted for students to complete their activities and to reflect on nature. This type of learning is better at expanding the mind than surface learning and is important to both SLT and CLT (Chotitham et al., 2014).

Lastly, representation was also an issue in in this study. Children begin to notice race by the age of two. “By age three, children show signs of being influenced by societal norms and biases and may exhibit ‘prejudice’ towards others on the basis of gender, race, or disability” (Cole & Valentine, 2000). The development of emotional responses toward those of color, along with the labels of skin color, flourishes from the age of three through seven (Cole & Valentine, 2000). Children’s views of racial or ethnic identities depend on association and interaction with race during this period (Wilson, 2014). To that end, children were shown photographs of real minorities interacting with nature. Scientist cards were acquired from [naturalinquirer.org](http://naturalinquirer.org), and they were enlarged to 8.5” x 11” posters to increase visibility and laminated for discussion. Figure 4 displays an example of a scientist card. One male and one female were selected in this figure. At the start of each week, one scientist was highlighted, and the others were featured as time permits. Appendix I shows the research cards in the order in which they were presented throughout the program.



Figure 4. Examples of African American scientist in the environmental field. Cards were selected to demonstrate representation to the children. Cards were downloaded from <http://www.naturalinquirer.org/scientists-v-168.html>.

Due to the plasticity of the program, other adults were allowed to perform activities when deemed appropriate to the theme of the summer program. This occurred three times throughout the program. The first was the introduction of a leaf preservation activity by the undergraduate assistant. This was done during the first week of the program as it helped acclimate the campers to the exploration that was required for future activities. Here, campers were given the chance collect any leaves that they saw fit to be preserved. The undergraduate assistant pressed all leaves and

returned the finished product to the campers. The second and third incidences of new activities were introduced by another graduate student from USM. She introduced the students to the birds in the environment by creating a makeshift bird feeder. The feeder was created with peanut butter and bird seed, matted on a pine cone base. Ultimately, the pine cones were hung up around the youth development center for the campers to observe. The other activity was entitled “moss painting” and gave the students a chance to learn about the different ways we can use nature in unorthodox ways. In this case, moss was mixed with milk, and glue (thickening agent). The students could use this finished product to decorate the walls outside of the center.

### *Procedure*

Institutional Review Board approval at The University of Southern Mississippi was first given before any experimentation could begin. Permission from the camp director was given before approval as the summer program was designed to work with our without the instruments, being a continuation of a service project hosted by the Center for Science and Mathematics Education. Parental permission was acquired during the first week of program via hard copies of the consent forms being issued as the campers were dropped off at the summer camp. Minor assent from campers was gathered on a case by case basis after parental permission was given. Code names (favorite superheroes) were gathered throughout the program to be used to preserve confidentiality during interviews and inevitable online data collection process.

The program implemented in this study was designed using information and techniques from the North American Association for Environmental Education (NAAEE), the

NEEF, The National Wildlife Federation (NWF), Project Learning Tree (PLT), GLOBE, and Herron et al. (in review). These programs add a degree of usability to the nature program, as it uses verified instruments and tools to aid in the delivery of information. This study only featured campers 6 through 8 but the entire cohort consisted of students ranged from 4 to 18. Campers would meet in the main fellowship hall after breakfast. Here, the campers learned the word of the day and a brief speech about manners and conduct was given. Campers were released to the researcher, his undergraduate assistant, and AmeriCorps volunteers around 8:25. The researcher used the walk to the classroom every morning as an opportunity to explore nature. Campers were encouraged to interact with any biotic factors as they continued to walk to the classroom.

Upon entry into the classroom, the campers were required to sit in their seats for the morning announcements. Here, they were briefed on the activities that would be held throughout the morning. This time was also used to answer questions about anything that they had explored and prime the campers for the new vicarious experiences. At least once a week, the students were introduced to a new environmental career. Said careers were highlighted using cards downloaded and printed from the [naturalinquirer.org](http://naturalinquirer.org). The cards also served as a source of minority representation.

If the grounds were not overly saturated with water, the campers would then line up and be ushered to a tarp in the field. This was done to foster a sense of connection to the environment. Campers were read one of the numerous storybooks supplied by USM's Center for Science and Mathematics Education. Only half of the storybook would be read each day to save time and prevent restlessness.



When half of the storybook was completed or roughly at the thirty-minute mark, the campers were issued the following items: clipboard, activity, and writing utensil. The activities were developed by the organization that created the storybooks in the case of GLOBE. Other activities were developed by the researcher and inspected by the committee. Both examples serve as a source of face validity to ensure that handouts were adequate to interpret the narrative that each camper was developing as he or she explored nature.

The group activity sessions lasted until 9:20 am. At this point each camper was instructed to go back into the classroom to clean themselves up. Water was also given at this point. If time remained, the researcher would ask the campers to share what was done today and how it made them feel. Fears and discoveries were explored as a group to provide a source of vicarious experiences. If one camper relayed that he or she was fearful of a biotic or abiotic factor in nature, the researcher would ask another camper to mention how they felt about source of discomfort. This sharing of experience was in hopes to expose each other mastery experiences and to provide a source of social persuasion. This program four weeks in length, taking place throughout the month of June. The curriculum for this program was divided into four one-week units. Each unit incorporated hands-on environmental activities in increasing amounts to gradually raise the level of comfort with nature. The pre-test was given at the start of the first week, and the post test was issued at the end of the fourth week. Time must be carefully considered in this program. Table 3 features a more condensed version of the activities that occurred throughout the summer program. The first and last weeks are highlighted below, as they feature important information about the structure of the program and data collection.

### *Week 1*

The first week was dedicated to discovering children's preconceptions of nature. It began with the pre-tests that are based on Herron et al. (in review) to ensure construct validity.

The assessments were completed in less than 20 minutes apiece (~40 minutes in total) to complete, and they were analyzed at the end of the study.

The rest of the week was active learning-orientated but was designed to ease the students into interacting with nature in a controlled manner. This week also commenced the use of nature walks as enrichment. Instead of trying to fill every minute with a planned activity, the students went outside to learn about nature in a controlled manner. They also were able to show the researcher which trees and plants they find interesting to start their plant collections. In addition, this week also featured the start of the art activity sheets.

### *Week 4*

This was the final week of the program. During this time, GLOBE storybooks and activities were used, but only at the beginning of the week. The post-tests were issued during the middle of the week. This allowed the researcher time to prepare memory books for the students. These memory books featured a collection of all the work that the students did throughout the program. It was during this week that the program was abruptly ended. Due to this, all ending procedures were accelerated to ensure some data collection for analysis. Post-test were given in two different time points, once during a planned meeting at the park, and once more digitally using Google Forms. As, privacy cannot be determined using a non-research-based platform, the campers code-names were used in the place of their real names. Any other personally identifiable information was also excluded.

Table 3 *Condensed Timeline*

<b>Week</b>	<b>Day</b>	<b>Featured Activities</b>	<b>Highlighted Person of Color</b>
1	Monday	Pre-test, Introduction	Erika Cohen, Physical Scientist
	Tuesday	Pre-test, Under One Rock: Bugs, Slugs, and Other Ughs by Anthony D. Fredericks, Herbarium activity.	
	Wednesday		
	Thursday	Next Time you see a Spiderweb by Emily Morgan Part I, Art Activity sheets	
	Friday	Next Time you see a Spiderweb by Emily Morgan Part II, Art Activity sheets	
2	Monday	About Reptiles: A guide for Children by Cathryn Sill Part I, Reptile Lesson Plan	Dr. Tim Baldwin, Herpetologist
	Tuesday	About Reptiles: A guide for Children by Cathryn Sill Part II, Art Activity sheets & Poster	
	Wednesday	The Scoop on Soils Part I, Coloring Page A and B	
	Thursday	The Scoop on Soils Part II, Art Activity sheets: Getting to know Soil	
	Friday	Insect Display	

Table 3 (Continued)

3	Monday	All About Earth: Our World on Stage Part I, Coloring Page A and B Art Activity sheets: Terrarium	Dr. Dexter Strother, Forest/Soil Ecologist
	Tuesday	All About Earth: Our World on Stage Part II, Art Activity sheets: We're All connected	
	Wednesday	About Birds by Cathryn Sill Part I, Art Activity sheets,	
	Thursday	The Mystery of the Missing Hummingbirds, Part I, Art Activity sheets	
	Friday	The Mystery of the Missing Hummingbirds, Part II, Art Activity sheets	
4	Monday	What in the World is Happening to Our Climate, Moss Paintings	Dr. Viniece Jennings, Biological Scientist
	Tuesday	Big Picture View, Coloring Page A & B	
	Wednesday	What in the World is Happening to Our Climate II, Zoomed in View	
	Thursday	We're All Part of the Solution, Coloring Page A&B	
	Friday	Field Trip	

Table 3: Timeline of activities for the "Helping Make Nature Natural for Urban Children" program that took place started June 4, 2018. The program featured numerous activities from GLOBE, its partners, Project Learning Tree, and various CLT lesson plans to increase both comfort in nature and show representation in environment. Showing minority representation was done in hopes to increase the childrens' awareness of African Americans that work in the environment. Although, scheduled to be six weeks, the program was abrupt cut due to unforeseen circumstances during the last week.

## Data Analysis

### Research Question 1

What are some attitudes that south Mississippi African Americans have about nature and being outside?

This research question was answered using a combination of QUAN and QUAL data collection and analysis. The parent questionnaire was used as a means of comparison, and it featured questions about SES and comfort with nature. These questions were analyzed descriptively to gather baseline data about the families to which the students belong. Seventeen questions on the questionnaire were Likert scale in nature. The aggregate mean score of this assessment was used in a one-sample t-test to compare the parents' attitudes to nature to a score that would indicate a negative outlook on nature. The children's Comfort in Nature pre-test of environmental comfort was vital to answering this research question and were analyzed with a one-sample t-test to observe how the children's attitudes differ from a score that would indicate a negative outlook on nature. The researcher analyzed students' responses to the interview questions to determine whether any themes can be gathered by coding for self-efficacy and feelings about nature in general using a more interpretive lens. Any observations that are gathered throughout the program were featured and expanded in this section. The art activity sheets were also analyzed. While they cannot be measured in a before-and-after format, because of their inclusion throughout the program, they were analyzed for themes.

### *Research Question 2*

How have the children's attitudes about nature changed from the start of the program to the end?

To answer this question, the researcher analyzed the pre- and post-test questions from the summer program. The questions were analyzed using a dependent sample t-test. These questions originated from the “Comfort with Nature” questionnaire, and they were developed using a modified Likert scale.

### *Research Question 3*

How have the children’s career choices changed from the start of the program to the end?

As with the second research question, the third question was also answered using a dependent sample t-test. This section was dedicated to determining whether exposure to the environment and scientists of color could bring about an overall change in attitudes about career aspirations. These questions were not set up in the format of a Likert scale; instead, the children were presented with two career choices (dichotomous) and marked their preference.

The QUAL segment consisted of an interview towards the end of the program. The questions therein were used to aid in the overall interpretation of the analysis when the data was combined in Chapter IV.

### *Synthesis of Data*

The purpose of an MM design is to combine both QUAN and QUAL data to create a more substantial understanding of the research questions. The concurrent design in particular is developed to keep this information separate until it is time to analyze the data for the purpose of drawing conclusions. The QUAN data was able to uncover any trends that could be considered generalizable from my study. However, it does not explain the “why.” To answer this question, the QUAL data is required. The QUAL data provided an individual view of each child’s psyche. This view was important to observe

in order to give meaning to the generalizable results that were highlighted in the QUAN section. Together, the two types of data complemented each other. The QUAN data validated the problem that is proposed in this study, and the QUAL data gave examples of the affected the children's attitudes about nature. Moreover, the QUAN segment would offer information such as how positive or negative the subjects feelings are about nature, and the QUAL component would illustrate, via trends, how common the perceptions are. This researcher believes that neither part on its own was able to properly express the complexity of the problem that African American children are facing.

#### *Missing Data*

The treatment of missing data is important in a QUAN study. If handled improperly, the study runs the risk of resulting inaccurate inferences (Allison, 2009). In the parental questionnaire, cases of item non-response occurred due to the sensitivity of the questions. In those cases, they questions were overlooked they were only analyzed using descriptive manner.

The children's Comfort in Nature inventory also had cases of missing data. This data was determined to be missing at random (MCAR). Missing data was replaced using the item mean imputation method. Using this method the missing value on a certain variable is replaced by the mean of the available cases. This method comes with the cost of lowered variability between items and can decrease the coefficient

## CHAPTER IV – RESULTS

### Introduction

The purpose of this study was to uncover the attitudes that African American children have toward nature. Furthermore, this study tested the effectiveness of a summer program titled “*Helping Make Nature Natural for African American Urban Children*” in alleviating the fears and increasing awareness of the campers aged 6 – 8. This program was divided into two components, one to test the implementation of non-parental mentoring and active learning and the other to introduce minority representation to environmental careers. Divided into three research questions, this chapter presented the statistical results from the quasi-experimental, mixed methods design.

Given the nature of the convergent-parallel design, the results were separated by research question and again by the type of method used for each section. The analyses featured below were all treated independently of one another, and any trends were delimited in the discussion. All tests for assumptions were performed by the author and should be considered within tolerance, unless stated otherwise. In the cases where an assumption was violated, the solution is listed before the final analysis is concluded.

#### Research Question 1

What are the attitudes south Mississippi African American children have about nature and being outside?

#### *QUAN*

Parental questionnaires were issued to the parents multiple times throughout the program. Twenty-three questions were featured in total. Six of them were multiple choice, taken from various other educational surveys to gather general information about



the parents. The remaining 17 questions included in the Likert scale were adapted from the Outdoor Participation Report (2017). Nine out of 23 parents agreed to take the survey. To encourage honesty, names were not required on the form itself.

Table 4 list three of the six questions featured on the survey converted into frequencies. All nine parents answered the three questions. There were equal numbers of parents with high school diplomas and two-year degrees (4), and only one parent had completed a four-year degree. Most of the parents also indicated that they go outside either for work or recreation several times a week (7) Lastly, there were equal numbers of parents whose fell into the following categories: households that earned under 20,000 and those that earned 20,000-39,000 dollars.

Table 4 *Frequency Data of Parent Questionnaire Questions 1 - 3*

Highest Degree Earned		n
High School/GED		4
2-Year College Degree		4
4-Year College Degree		1
<b>Total</b>		<b>9</b>

Combined Income		n
Under \$20,000		3
\$20,000 to \$39,999		3
\$40,000 to \$59,999		1
<b>Total</b>		<b>7</b>

Table 4 (Continued)

Interaction with Nature	n
None	3
Once a week	3
Several times a week	1
<b>Total</b>	<b>7</b>
Missing	2
<b>Total</b>	<b>9</b>

Table 4: Descriptive statistics of questions 1-3 from the parent questionnaire. All data is self-reported and thus subject to issue of self-report bias and misunderstanding. All parents (n = 9) reported having completed a high school education, with four continuing to acquire an Associate's degree and one obtaining a Bachelor's degree. Six parents reported earning under \$40,000 a year, while one parent reported earning \$40,000-59,000, and two chose not to answer. All parents reported interacting with nature at least once a week. The majority of parents (77.8%) reported spending several days a week outside. Descriptive statistics were tabulated with SPSS v. 25.

The next series of questions continued gathering demographic data on the parents using the same inventory. Thirty-three percent of the parents in this study chiefly interact with nature to exercise. Another 33% selected the "other" option, which, given the limitations of the question, leads the researcher to assume that this interaction is neither for exercise nor for relaxation. Finally, over half of the parents indicated that they interact with nature with their children several times a week (55.6%). Only one parent indicated that he or she had no interaction with his or her child in nature.

Table 5 *Frequency Data of Parent Questionnaire Questions 4 - 6*

Primary purpose of going outside?		n
Exercising		3
Relaxing		2
Other		3
Multiple Entries		1
Total		9
How often does your child play outside?		n
Several times a week		9
Do you interact with your child in nature?		n
None		1
Once a week		3
Several times a week		5
Multiple Entries		1
Total		9

Table 5: Descriptive statistics of questions 4-6 of the parent questionnaire. All data is self-reported and thus subject to the issues of self-report bias and misunderstanding. Parents (n = 9) reported various reasons for interacting with nature. Equal numbers of parents, at three per category, reported exercising or performing “other” activities outdoors. One parent mentioned using nature for multiple reasons, and only two reported using nature for relaxation purposes. All parents reported that their children were allowed to go outside several times throughout the week, and 88.9% of them would allot time to interact with their child/children. One parent reported that he or she did not interact with his or her child outside. Descriptive statistics were tabulated with SPSS v. 25.

The Likert-scale questions were analyzed using SPSS, and Cronbach’s alpha was used to measure the internal consistency of the scale. Cronbach’s alpha indicated that questions did not reach the minimum level proposed by Nunnaly (1978) of  $\alpha = .7$ . Instead, the reported value was  $\alpha = .292$ . Most items appeared to be worthy of retention except for questions 13 and 14. Upon deletion, alpha rose to  $\alpha = .710$ . Subscales from the Likert scale were treated as a continuous variable and combined to create an aggregate score. The one-sample t-test was conducted to determine whether a

statistically significant difference existed between the scored attitudes of the parents who completed the questionnaire measuring comfort and interaction with nature, compared to what would be considered a negative outlook (score = 31). The mean questionnaire scores ( $M = 63.11$ ,  $SD = 5.46$ ) were higher than what would be considered a negative outlook on nature. Furthermore, the aforementioned questionnaire scores had a highly significant difference of 30.11, 95% CI [25.91 to 34.31], when compared to the targeted questionnaire score of  $t(8) = 16.53$ ,  $p = < 0.001$ . Table 6 depicts the SPSS output of this analysis.

Table 6 *One-Sample T-Test of Parent Questionnaire*

One-Sample T-test	Test value = 31
t	16.53
df	8
Sig. (2-tailed)	<0.001
Mean Difference	30.11
95% Confidence Interval of the Difference	
Lower	25.91
Upper	34.31

Table 6: One-sample t-test comparing the Likert scale featured in the parent questionnaire to an average (test) value (45). The selected parents were previously the guardians of 22 campers that were part of the 2018 “*Helping Make Nature Natural for African American Urban Children*” program. Nine parents volunteered to take the survey. The results revealed a highly significant difference ( $p = < 0.001$ ) from a score indicating a negative value. A one-sample t-test was performed using SPSS v. 25.

The children’s Comfort in Nature inventory was analyzed using SPSS v.25 in a similar manner, and Cronbach’s alpha was used to measure the internal consistency of the scale. Upon first analysis, a negative value of  $\alpha = -.025$  was reported. According to Nichols (1999), an alpha score can be negative when the average covariance among items is negative. This can be because of three common issues (coding errors, small sample or number of items, or lack of positive covariances). To increase the coefficient, multiple questions (2, 3, 5, 9 and 11) were determined to require reverse coding. After the

alterations to the data were made, the final score was calculated to be  $\alpha = .720$ . A one-sample t-test was conducted to determine whether a statistically significant difference existed between the scored attitudes of the children using the Comfort in Nature questionnaire, compared to a score that would from a camper that would be considered having a negative attitude (average score = 33). The results of analysis can be seen in Table 7. All values were within tolerance, and all other assumptions were met. The mean children’s Comfort in Nature questionnaire scores ( $M = 31.5$ ,  $SD = 7$ ) were lower than what would be considered a negative outlook on nature. Moreover, the questionnaire scores were not significant, with a mean difference in value of -1.15, 95% CI [-5.50 to 3.21], when compared to the targeted questionnaire score of  $t(16) = -.560$ ,  $p = .583$ . Table 7 depicts the SPSS output of this analysis.

Table 7 *One-sample t-test comparing comfort in nature scores to an negative (test) value (33).*

One-Sample T-test	Test value = 33
t	-.560
df	16
Sig. (2-tailed)	.583
Mean Difference	-1.15
95% Confidence Interval of the Difference	
Lower	-5.51
Upper	3.21

Table 7: One-sample t-test comparing comfort in nature scores to an negative (test) value (33). Twenty-two campers were part of the 2018 “*Helping Make Nature Natural for African American Urban Children*” program. Out of the total numbers of campers, 17 were eligible to be part of this study and were analyzed. The results displayed no difference ( $p = .583$ ) from a score indicating a negative attitude. A one-sample t-test was performed using SPSS v. 25.

### *QUAL*

As a consequence of unforeseen circumstances during data collection, the total number of interviews had to be reduced to two. The following transcripts add a more

personal view to the QUAN data that was collected. Transcription was created using the Mergenthaler and Stinson (1992) standards as a guide. These transcription standards allow for the inclusion of verbal, paraverbal, and nonverbal utterances. To maintain anonymity, each child's favorite superhero was used in place of his or her name.

Table 8 *Transcript of Interview with Spiderman*

Subject ID: Spiderman; SESSION NO: 1; DATE: 2 July, 2018; INTERVIEWER: Kendrick Buford)  
K = Researcher  
S = Participant  
Ka = Undergraduate Assistant

K: So...tell me your first and last name.

S: (Answered)

K: So, tell me about playing outside. Tell me some things that you notice.

S: The grass is green.

K: The grass is green? Anything else?

S: The trees are brown and green.

K: So, you pay attention to the plants that are outside?

S: Yes

K: Ok. So, what do you like to do when you are outside?

S: Play. I like to play with all my friends.

(Incomprehensible)

K: Ok. So, you like to play with your friends. Do your parents let you go outside and play all the time?

S: Sometimes.

K: What are their rules about playing outside?

S: Make sure no one picks on you. Be very careful. Even when playing tag, make sure no one puts their hands on you. Don't let your hands touch the concrete.

K: Those are some responsible rules. Do you make sure to follow them?

S: I do.

K: What else do you like to do outside that is fun. What other games do you play?

S: Tag.

K: Ok.

S: Freeze tag.

K: Freeze tag? I like freeze tag. Where do you go outside to play these games?

S: At school. At home. At my Mom's and Dad's house.

K: Do you have a park nearby?

S: Huh?

Table 8 (Continued)

K: Do you have a park to go to?

S: Yes.

K: Do you enjoy going there?

S: Mmmh hmm.

K: You have told me of some fun things to do outside. Tell me some not-so-fun things to do when you are outdoors?

S: (unintelligible)

Ka: Do you have to do yard work?

S: No.

Ka: That's good.

K: You don't have to do yard work? Ok, you only get to do the fun things outside. So tell me about the animals that you like to watch or play with. Are there any that you like to try and catch?

S: I saw a bird, but it was sick. It fell on the concrete.

K: What did you do with the bird?

S: We didn't touch it. It came to us, but we didn't move.

K: I'm glad you tried to take care of it.

S: Me and Dad saw the bird. We saw the bird. He saw it first. Then I saw it. Then we tried to shoo it away, but it only ran to the other concrete.

K: So, tell me about the animals that you don't like to play with outside.

S: Snakes, spiders, and lions.

Ka: Me too.

K: Ok. Do your parents mind if you play with the animals outside?

S: One day I tried to catch a cricket.

K: What happened?

S: It died.

K: Did your parents mind that you tried to catch a cricket?

S: No.

K: What about a lizard?

S: I don't know.

K: Ok, that might not be something that you would ask your parents.

S: I know one day I saw a lizard outside. It was black and blue. Its tail was blue. It kept trying to bite something. I found it under a brick.

K: You went exploring; that sounds fun.

S: Yea.

K: Where did you see this lizard?

S: Yesterday when we were off?

K: Are there any plants that you like?

S: Grass, bushes, and trees.

K: What do you like about them?

S: That they grow and can make us some food.

K: I like food too. Are there any plants you don't like?

Table 8 (Continued)

S: I don't like the ones that make you sick. I also don't like the ones that are dead. I don't like to touch them.

K: So, your parents don't make you do chores. Well, do you get to help plant a garden or cut the grass?

S: I only do chores inside.

K: So, today for your artwork, we asked you to tell us one thing that you would do to help the environment. What was that one thing?

S: \*thinking sound

K: I helped you, come on.

S: Was it outdoors?

Ka: Yes, it was outdoors. What did we do outdoors?

S: We digged ...with shovels.

Ka: And we what?

Table 8: Transcription (1 of 2) of a semi-structured interview. Interviews were performed during the fourth week of the summer program. Students were interviewed in the classroom after the activity of the day was performed. The researcher and assistant sat at 90-degree angles, allowing for indirect contact with the participant to alleviate tension. Questions were asked in a casual manner, allowing for the campers to ask their questions when desired. Interviews were transcribed using MAXQDA v.18.

Interview questions were created using Markopoulos and Bekker (2002) for a conversational tone and flow. Moreover, Morgan et al. (2002) was used for word choice and as a guide to ensure that the questions asked would be valid for interpreting a possible stressor in their day-to-day life. Herron et al. (In review) was used as a philosophical underpinning in the formation of questions related to an aversion to nature. Table 8 serves as the verbatim transcript for the subject who was renamed Spiderman. This subject was one of the few to remain in the program until it was cancelled. He was also a member of last year's cohort. The interview was 8 minutes and 46 seconds in length. The subject appeared to enjoy going outside to play and using the environment as a source of exercise. One vicarious moment that stood out to him was his interaction with a bird. Here, he exhibited a lack of fear to be around the creature in question. Using the approved questions, the researcher was unable to glean any insight into the social



persuasion that could have been brought about by the parents. The ramifications of this was elaborated in the discussion session.

Using Maxqda v.2018, a coding schema was developed using the constituents of self-efficacy. Table 9 depicts a summary table of themes discovered in the participants’ transcript. For the sake of validity, the undergraduate who helped with the program was instructed to also code for the same themes. “Vicarious experiences” was highlighted most frequently by both researchers, totaling 20.58%. This is in agreement with the design of the questions, as those experiences were what the researcher was trying to gather. A high percentage (16.17%) of negative feelings about nature were also observed in this interview. It appeared that the subject would go outside but faced obstacles that could be considered detrimental to his outlook on nature. These experiences mostly coincided with times when cases of social persuasion could be observed. Here, the parents were the largest source of persuasion, as it applied to the rules that had to be followed when outside.

Table 9 *Table of Coding for Spiderman*

Code	Coded segments	% Coded segments
Negative Feelings about Nature	5.5	16.17
Self-Efficacy: Mastery Experiences	7	20.58
Self-Efficacy: Vicarious Experiences	7	20.58
Self-Efficacy: Social Persuasion	6.5	19.12
Animals	3.5	10.29
Plants	3	8.82
Self-Efficacy: Reducing the Stress Response	2	5.88
Positive Feelings about Nature	1	2.94

Table 9: Coding table of themes related to the self-efficacy, biotic factors, and emotional responses (positive or negative) of a selected camper (Spiderman). Coded segments were converted to a frequency for easier analysis. This participant encountered equal numbers of mastery experiences and vicarious experiences (20.58%), followed by social persuasion (19.12%). Overall, this camper’s narrative

## Table 9 (Continued)

could be seen as negative (16.17%), but not because of any particular fears of nature. Instead, this camper faced concerns about animal sickness and playground interactions. Interviews were coded using MAXQDA v.18.

The next subject was female with the ID of Wonder Woman. Her interview was slightly longer at 9 minutes and 30 seconds. The information gathered from her was different than Spiderman's as she had more obligations to be outside (pets). Here, her two dogs allowed her an opportunity to spend more time in nature, directly interacting with an animal.

## Table 10 *Transcript of Interview with Wonder Woman*

(Subject ID: Wonder Woman; SESSION NO: 2; DATE: 3 July, 2018; INTERVIEWER:

Kendrick Buford)

K: What's your name?

WW: Answered.

K: So question number 1. Tell me about playing outside. Tell me what you notice about playing outside.

WW: It's wet.

K: It's wet? Ok. Do you see any animals when you are out there?

WW: Birds.

K: No squirrels? What about dogs and cats?

WW: (unintelligible)

K: So, you see some dogs and cats. It's also wet. Makes sense. What do you like to do when you are outside?

WW: Play with my puppy.

K: What is your puppy's name again?

WW: Teddy.

Ka: That's a cute name.

K: It is precious. Is that the only thing that you like to do outside. No games?

WW: Golf.

K: I've never played golf before. Do your parents allow you to play outside when you want to? What rules do they have about playing outside?

WW: No rules.

K: Where do you go outside?

WW: My backyard.

K: Is it big enough for Teddy and you to play?

WW: U huh.

Table 10 (Continued)

K: So, I know you like to play with Teddy. What are some things that you don't like to do outside?

WW: (unintelligible)

Ka: Did you say mow?

WW: Mow the yard.

K: You don't like to mow the yard? Why not?

WW: It's tiring.

Ka: It's tiring.

K: Do they make you use the push mower?

WW: Un huh.

K: When you get older, they will let you use the riding mower.

WW: My brother is only 11 and he gets to use the riding mower.

K: Oh. He is mature for his age then. So, tell me about the animals that you like to watch or play with. I know you mentioned the birds. Do you try to play with the birds?

WW: I tried to play with a bird, but he pecked me.

K: I hope that it didn't hurt too bad. He didn't mean to harm you. He was only scared because you are bigger than him.

WW: Ok.

K: Are there any animals that you don't like to play with outside?

WW: My other dog.

Ka: \*laughs

K: What's his name?

WW: Buster.

K: Why don't you like Buster?

WW: (unintelligible)

K: But you are fine with the lizards and snakes and frogs?

WW: Yes.

K: There's nothing wrong with that. I don't mind looking at them but I don't want them to surprise me. I don't like surprises.

WW: What about roaches? They fall from the sky?

K: Who ...What falls from the sky

WW: Roaches.

K: They will fall and that can be scary. Do your parents let you play with lizards and things other than Buster?

WW: Preston steps on the lizards.

K: Why? Do you tell him not to step on them?

WW: We have a whole bunch in the back yard.

K: Do you like plants?

WW: Yes.

K: What color?

WW: Roses.

K: You have a rose bush? I, or rather my mother, had one when I was a child too.

WW: We have two, but one was there when we moved.

Table 10 (Continued)

K: Are there any that you don't like?

N: The ones in the grass.

K: Why not?

WW: They make the bees come.

K: Do you like bees?

WW: No.

K: Why not?

WW: They try to sting me.

K: That makes sense. Do your parents like for you to help them outside?

WW: Nope.

K: Why not?

WW: (unintelligible)

K: Tell me about your art today. What color did you paint your footprint?

WW: Purple and blue.

K: Why did you choose those colors?

WW: They are my favorite colors.

K: Is there anything in nature that is that color?

W: Yes.

K: Like what?

WW: The sky.

K: Ok. I can agree with that. So, what is one thing that you want to do to help the environment?

WW: Clean.

K: I think we should all pick up trash wherever we see it.

WW: My mom cleans houses.

K: Does she? Do you like to clean?

WW: Yes.

K: I don't like to clean.

Ka: (unintelligible)

WW: I cleaned my puppy when I got him Friday.

K: Did he like it?

WW: NO.

K: That sounds neat. Have you been practicing your art?

WW: Yes.

K: I can't wait to see more of it.

K: Do you have any questions for me?

WW: Do you like outside all the times?

K: I try to go out at least three times a week when I am not working. But I get to go outside everyday with you guys and that's great. I like to go to the park, sit on the benches, BBQ.

WW: My Dad BBQs.

K: Did he BBQ for the Fourth of July?

WW: Yea.

Table 10 (Continued)

K: Was it yummy?

WW: Yes. We also went to the beach.

K: That sounds fun. Where was it?

WW: Pensacola.

K: Did you drive?

WW: \*laughs. No, but it was fun. On some days it was cold though.

K: And you had fun even when it was cold?

WW: Yea. I also got to visit my old room. It was made of a couch.

K: Ok. I think we call those futons. This was fun “omit.” You can go back and play.

Ka: Thank you.

Table 10: Transcription (2 of 2) of a semi-structured interview. The interviews were performed during the fourth week of the summer program. Students were interviewed in the classroom after the activity of the day was performed. The researcher and assistant sat at 90-degree angles, allowing for indirect contact with the participant to alleviate tension. Questions were asked in a casual manner, allowing for the campers to ask their questions when desired. Interviews were transcribed using MAXQDA v.18.

Table 11 *Table of Coding for Wonder Woman*

Code	Coded segments	% Coded segments
Negative Feelings about Nature	10	31.74
Self-Efficacy: Mastery Experiences	2	6.67
Self-Efficacy: Vicarious Experiences	9	26.98
Self-Efficacy: Social Persuasion	2	6.67
Animals	5	15.87
Plants	1	3.23
Self-Efficacy: Reducing the Stress Response	0	0.00
Positive Feelings of Nature	2	6.67

Table 11: Coding table of themes related to self-efficacy, biotic factors, and emotional responses (positive or negative) a selected camper (Wonder-Woman). Coded segments were converted to a frequency for easier analysis. This participant encountered a high amount of vicarious experiences (26.98%). Mastery experiences and social persuasion were equally low (6.67%). This camper's narrative could be seen as highly negative (31.74%). In this case it would appear that it is SES plays a big role in this campers negative feelings. Interviews were coded using MAXQDA v.18

This participant had more cases of adverse feelings (31.74% vs. 16.17%) about nature. This was seen with her issues with both the pests in and out the home and one of her pets. The interview was able to uncover similar trends of vicarious experiences. Positive or negative, the participant had some vivid memories about nature. These memories appear to be related to her time spent with her own personal animals. In both

above-mentioned cases, the subjects do not appear to have many positive experiences with nature.

Finally, the campers' artworks were analyzed. Roughly 346 drawings were created by the campers. Artifacts were coded by the actual name of the artifact versus themes for self-efficacy. The most frequently noticed objects drawn from nature were as follows: insects (16.27%), people (13.40%), pets/mammals (12.92%), and birds (12.93%). It is no surprise that insects and birds featured prominently in the artwork, as there were storybooks coupled with the children's activities related to these topics. However, it appears that pets, similarly to mammals, were more likely added to the campers' artworks of their own volition, without interference from the summer camp.

Table 12 *Coding tabulation of analysis of artwork from the summer program.*

<i>Artifact</i>	Count	Frequency (%)
<b><i>Birds</i></b>	27	12.93
<i>Buildings</i>	9	4.31
<b><i>Butterflies</i></b>	12	5.74
<i>Clouds</i>	7	3.35
<b><i>Insects</i></b>	34	16.27
<i>People</i>	28	13.4
<b><i>Pets/mammals</i></b>	27	12.92
<i>Plants</i>	18	8.61
<b><i>Playground equipment</i></b>	5	2.39
<i>Rain</i>	2	0.97
<b><i>Rocks</i></b>	13	6.22
<i>Sun</i>	16	7.66
<b><i>Swimming / outdoor activities</i></b>	11	5.26
<b>Total</b>	209	

Table 12: Coding tabulation of analysis of artwork from the summer program. Twenty-two students were assigned activities periodically to prime them to think more about the individual parts of the environment. Bolded artifacts are the objects that were represented the most in the children's drawings and accounted for over 50% of the total artifacts. Microsoft Excel v. 2018 was used to create and tally the frequencies.

## Research Question 2

How have the children’s attitudes about nature changed from the start of the program to the end?

*QUAN*

A paired-samples t-test was conducted to compare the attitudes about nature before and after the introduction of the “Helping Make Nature Natural for African American Urban Children” program. Only the students who completed both the pre- and post-tests were eligible to be analyzed in this section. Given the abrupt end of the program, only seven students were able to be analyzed. All assumptions of a dependent sample t-test were met.

The results demonstrate that participants had a higher score on the post-test (mean = 44, SD = 13.51) than they did on the pre-test (mean = 30.60, SD = 5.27). A dependent-measures t-test found this difference to be significant:  $t(4) = -5.06$ ,  $p = .01$ . Taken together, this suggests that the “Helping Make Nature Natural for African American Urban Children” program had an effect on the children’s perceptions of nature.

Table 13 *Dependent Sample T-test*

		t	df	Sig. (2-tailed)
	Pretest vs. Posttest	-5.06	4	.01

Table 13: Dependent sample t-test comparing comfort-in-nature scores before and after the summer program. Twenty-two campers were part of the 2018 “*Helping Make Nature Natural for African American Urban Children*” program. Out of the total number of campers, only 17 were eligible to be part of this study. Given the abrupt end of the program, four students completed the post-test. A dependent-measures t-test found this difference to be significant:  $t(4) = -5.06$ ,  $p = .01$  Data was analyzed using SPSS v.25.

## Research Question 3

How have the children’s career choices changed from the start of the program to the end?

*QUAN*

The children’s Career Aspirations Survey consists of six questions, which were adapted from Herron et al. (in review), and the original version was used by in the 2017 program. Similarly, to the children’s Comfort in Nature assessment, reliability testing was performed before a proper statistical analysis was done. Although Cronbach’s alpha can be utilized, the researcher decided to use the Kuder-Richardson 20 (KR-20), as it is designed to measure internal reliability for a dichotomous choice. SPSS performed this analysis in the same manner and reported a coefficient value of .666, signifying reasonable reliability.

Upon completion of the program, four participants were eligible to determine the effectiveness of the program on career selection. An exact McNemar’s test determined that there was not a statistically significant difference in the change of nature vs. non-nature careers:  $p = .500$ . Table 14 depicts the pertinent output from the analysis. Before the program, all four of the eligible students were more interested in nature-related jobs than in jobs unrelated to nature. Upon completion, only 50% were still interested in pursuing a career in nature.

Table 14 *McNemar’s Test of Career Aspirations*

	N	Before and After summer camp
	Exact Sig/ (2-tailed)	.500 <sup>b</sup>

Table 14: McNemar’s test to determine whether a statistically significant change occurred between the dichotomous trait (career aspirations) over two time points (the start and end of the program). Four campers were eligible for analysis. Upon completion, it was determined that no statistical difference existed between the campers’ outlook before and after the program concluded ( $p = .500$ ). Data was analyzed using SPSS v.25.

### *QUAL*

Questions about career aspirations and social persuasion by the parents, if any, were also transcribed from the same audio that featured questions about participants’



comfort in nature. This section is smaller in quantity as a result of a reduced number of questions. Although interested in the effect that introducing nature in a positive light could have on the campers, it is difficult to truly say that any change made now will remain until they are old enough to start a career. The transcripts below are short in duration. This set of transcriptions also did not focus on self-efficacy as much, as the researcher desired to determine whether the campers were actively thinking about something as far off as a career. It appears that the participants already have an idea of what they would like to do as a career (e.g., race car driver and artist). However, there is a chance that the children do not quite understand what a career truly means.

Table 15 *Career Aspiration Transcript for Spiderman*

(Subject ID: Spiderman, SESSION NO: 2 DATE: 2 June. 2018, INTERVIEWER; Kendrick Buford)

K = Researcher

S = Participant

Ka = Undergraduate Assistant

K: Ok, Three more questions.

S: Ok

K: Think about the grownups in your life like your mother. What do they think about going outside.

S: My mom don't like to play and hide. She gets hot and wants to go inside

K: What about your father?

S: He will like to turn the air on. My mom likes cold. He will go outside when it is hot in the house.

K: What does he do out there

S: Some days he just stands there. Other times he comes out and comes back in. He checks on us. Sometimes he just watches the sky.

K: What do you want to be when you grow up

S: A race car driver

K: That sounds fun? What do your parents want you to be when you grow up?

S: I don't know. I didn't ask

K: It's good that they are letting you make your own decisions. Do you have any questions for me

S: What do you like to do outside

K: I like to BBQ because I like to eat Jaden.

## Table 15 (Continued)

**Ka: Me too**

Table 15: Transcription (1 of 2) of a semi-structured interview illustrating the camper's views about nature o in relation to careers and occupation-related factors. Interviews were performed during the fourth week of the summer program, and students were interviewed in the classroom after the activity of the day was performed. The researcher and assistant sat at 90-degree angles, allowing for indirect contact with the participant to alleviate tension. Questions were asked in a casual manner, allowing for the campers to ask their questions when desired. Interviews were transcribed using MAXQDA v.18.

## Table 16 *Career Aspiration Transcript for Wonder Woman*

Subject ID: Wonder Woman, SESSION NO: 2 DATE: 2 June. 2018, INTERVIEWER; Kendrick Buford)

K = Researcher

S = Participant

Ka = Undergraduate Assistant

K: Think about your parents. Do you like with your mother and father

WW: Yes

K: What do they like to do when they are outside?

WW: My dad mows the yard. My mom comes outside to watch

K: \*chuckles. Do they play outside

WW: No

K: What about at your church or school. Do those adults come out to play?

WW: Sometimes

K: What do they come out to play

WW: Board games

K: What do you want to be when you grow up

WW: Artist

K: What do your parents want you to be

WW: My dad wants me to learn how to fix computers and my mom wants to me clean houses?.

Table 16: Transcription (2 of 2) of a semi-structured interview illustrating the camper's views about nature in association with careers and occupation-related factors. Interviews were performed during the fourth week of the summer program, and students were interviewed in the classroom after the activity of the day was performed. The researcher and assistant sat at 90-degree angles, allowing for indirect contact with the participant to alleviate tension. Questions were asked in a casual manner, allowing for the campers to ask their questions when desired. Interviews were transcribed using MAXQDA v.18.

## Summary

This chapter described the prominent discoveries uncovered by reducing the stress and aversion and introducing minority representation on campers in the *Helping Make Nature Natural for African American Urban Children* aged 6 – 8. These effectiveness of program was measured in change in campers perceptions and were analyzed via one-

sample t-test (parent questionnaire and children's Comfort in Nature inventory), dependent sample t-test (children's Comfort in Nature inventory before and after program conclusion) and McNemar's Test (children's Career Aspirations). A significant difference was found in parents' attitudes as they differed from a negative outlook towards nature. This data was complemented by the analysis of descriptive statistics. Here parents depict a remarkable comfort in nature, and ample time spent with their child. Spending time with their child in nature should serve as a positive source, increasing the children's views on nature. However, No significance was found in the children's attitudes when compared to a negative outlook towards nature. Interviews showed that children faced difficulties outside and either an abundance of rules or chores. *The Helping Make Nature Natural for African American Urban Children* program was proven to be effective in increasing campers' comfort in nature by illustrating significant improvement from start of program to conclusion. The camper's artwork showed that the biotic factors mentioned in the storybook persisted in the children's psyche. Lastly, the program was not effective in increasing the campers' desire to select an occupation that would be classified as nature-oriented. Interviews showed a mixed response towards parental influence on career selection.

## CHAPTER V - DISCUSSION

### Introduction

The synthesis of the quantitative (QUAN) and qualitative (QUAL) findings are presented in the following sections. The findings were compared to the existing literature to determine whether this researcher's findings support or challenge the current paradigms in place. The convergent-parallel design was chosen as the best way in which to analyze the data and draw conclusions about the participants featured in *Helping Make Nature Natural for African American Urban Children* program at the Osceola McCarty Youth Development center. The mixed-methods (MM) design better encapsulated the research questions while depicting a more complete picture of the issues at hand. The convergent-parallel design can also be used for validation purposes, as it collects different (QUAN vs. QUAL) but complementary data.

In this study, each type of data had equal priority. The instruments given throughout the program were spaced out in a manner that would not have caused either subset to be seen as more important than the other. As suggested by Creswell and Plano-Clark (2011), the QUAN assessments were kept separate from the QUAL in both the program and the analysis. The QUAN data was collected first via a pre-test and the parental questionnaire. A QUAL coding analysis was developed for the artworks and semi-structured interviews. The images served as powerful tools to uncover the attitudes and attitudes of a person or group (Barich et al., 1991) and made up for the lack interviews. Furthermore, coding in general is powerful in uncovering themes and stories within a person's narrative (Glaser et al., 1999). Together, the artworks should provide a

useful peek into the psyche of the campers, completing the story that interviews alone would not have been able to gather.

For the sake of clarity, each research question had its own subheading, and the individual analyses (QUAN and QUAL) was nested within those subheadings. However, a “synthesis” sections conceptualizes the overall picture. This section draws heavily on the complementary nature of the design. The implications section served as a callback to the social justice issues that proved to be the starting point of the research, and they should link the conclusions with the population at large. Finally, the section titled “Future Research” itemized potential research directions that could follow the foundation that has been set by this research.

#### Research Question 1

##### *QUAN*

###### *Socio-economic status*

African Americans have many reasons for not wanting to interact with nature (Mohai, 2003 & Sheppard, 1995 & Mohai, 2003), with reports as recent as 2017 indicating that this is not a condition African Americans face alone. However, they suffer from it at a higher rate. If this information is true, then a state in which 37.5% of the population is labelled as African American (U.S Census, 2017) would be an ideal place to study the factors that contribute to the fear and aversion that plagues the African American community in relation to nature and the environment. The first research question created by the researcher asks, “What are some attitudes that south Mississippi African American children have about nature and being outside?”. This question is vital because it is a starting point for the rest of the study. The baseline behaviors of south

Mississippi African Americans was needed to truly understand any growth or changes that could be made throughout the program.

According to the Pew Research Center, only 23% of African American adults who are 25 years or older are likely to have a bachelor's degree. This is 13% lower than the next highest demography. This information can be coupled with the fact that 88% of African Americans have a high school diploma. In this sample, Table 4 illustrates that all participants who elected to answer the questionnaire held a degree, with the four-year degree being the smallest in percent (11.1%). The U.S. Census Bureau (2017) found that 87.4% of people in Hattiesburg had a high school diploma, and 31.3% held a bachelor's degree or higher. While this repository would serve as the most complete database for SES statistics, it was unable to separate the individual data points by race.

African Americans lag in household income in 2017—trailing behind by \$27,887. This figure is dependent on education, as the average household income of an African American with at least a bachelor's degree was \$82,000. This figure still falls short of the White American household with the same conditions. Here, it appears that the average income is \$106,600. Over half of the parents in this study indicated that they make under \$40,000. However, the questionnaire only went up to \$60,000 and could have thus excluded some of the higher-earning households. This could be a plausible explanation for the two parents who completed the survey but decided to leave this question blank.

#### *Outdoor Participation*

All of the parents reported that they interacted with nature to some degree, with 77.8% reporting to have been in nature several times a week. This figure, when compared to the Outdoor Foundation (OF) (2017) report, is much higher than the national average.

However, only 5% of the total 24,134 participants were located in the “East South-Central region,” and this would have been the area that would contain Mississippians. It is possible that the population parameters used by the Outdoor Foundation would not truly express the opinions of my sample making my criteria more exact for the purpose of this study and future iterations of it.

Parents were least likely to go outside for relaxing, which was selected only 22% of the time. This finding agrees with the literature, as responses that would imply relaxation scored lower on the response questionnaire reported by the OF (2017). Further readings on the social justice issues related to this topic would also strengthen this argument. For most African Americans, nature would be a discomfort, and it is difficult to rationalize it as being a place of comfort (Mohai, 2003 ; Sheppard, 1995 & Mohai, 2003). However, this aversion does not stop African Americans from enjoying nature for exercise or other activities, with both options being selected equally (33%).

All parents reported that their children were allowed to play outside several times a week. As it is known that fear can be transmitted from parent to child, it is important for the child to see that the parent were willing to allow for interaction in the environment. This direct contact with nature is required to provide a plethora of positive benefits (e.g., positive attitudes, environmental ethics, and awareness) (Haase, 2003; Lock, 1998; & Yore and Boye, 1997). However, only 55.6% percent of parents reported interacting with their children in nature several days of the week. One third of them attempted to interact with their children outdoors at least once, while one parent reported having no outside interaction with his or her child. That last point could prove to be problematic in the development of children’s attitudes toward nature, as socio-emotional support ties

together the transmission of both fear and acceptance to children (Brown et al., 2002; Brody et al., 2006).

#### *Parental Comfort in Nature*

The next section featured on the questionnaire was the Likert scale survey. A one-sample t-test would provide the best details about the phenomena in question, as what was truly being asked was, how comfortable are parents in nature when compared to a negative score?. The use of a five-point Likert test allowed for the determination of a negative outlook on nature being set to an average score of 31. The parents of the campers reported significantly higher-than-average test scores ( $p = < 0.001$ ), which are in agreement with what was reported in the descriptive statistics. Parents would logically spend more time outside if they felt more positive about nature.

This information provides an outlook that, at a glance, could be seen to be different than what is commonly reported, as it appears that the campers' parents were comfortable in nature when performing the activities that they selected (exercise and other). This new information does not provide support to the notion that the parents do not have an aversion to nature, but instead indicates that they are capable of still utilizing nature when necessary to suit their desires. However, the parents were not the focal point of this study. The researcher wanted to know what views could have been transferred to the campers, as a parent would be the first source from whom those children would receive information about the environment (Diemer, 2007).

#### *Children's Comfort in Nature*

Analyzing the children provided both a unique perspective and a novel problem. Following Piaget's levels of cognitive development, the instruments to test the research



questions were able to be developed properly. In this case, the children have only just gained the ability to apply logic to concrete situations; abstract thinking is possible, but mastery of the concept is unexpected. This aligns with Gelman and Baillargeon (1983) and Marsh (1986), as both studies reported that children between the ages of 7 and 12 faced difficulty answering questions on a five-point scale or negatively worded items. Children are also not capable of reliably answering questions about theoretical constructs such as emotions or matters of the self (Chambers & Johnston, 2002). To combat this, a graphically based assessment was used, along with asking questions that involve tactile stimulation. The premise was to remove any abstract nature from the questions and make the questions concrete, thus aligning with the level of cognitive development.

Another one-sample t-test was performed with the same premise as above. This analysis would show me how close to a negative attitude were the campers' attitudes about nature. In this case, the campers did not display a significant difference in the means of scores ( $p = .583$ ), leading to a promising start to the investigation. It is important to note that the children appear to have a less favorable attitude towards nature than their parents.

## *QUAL*

### *Semi-structured Interviews*

No QUAN analysis on its own is able to truly capture the emotional response of a participant. Closed-ended questions can lead to limited outcomes, preventing a true explanation. The limitations of the responses can also prevent the true narrative from being told. Also, children are more prone to giving responses on the ends of a scale, which in some cases, could provide false findings (Chambers & Craig, 1998 & Chambers

& Johnstone, 2002 1997). The interview questions were created to circumvent the limitations of QUAN data in children and contribute to the narrative. Interviews with two students were completed before the abrupt end of the program. The first subject, “Spiderman,” was one of the more active participants in the program. He was at the forefront of every activity and demonstrated a real desire to absorb any and all information. His desire for validation made him a great candidate for mediation (Lam, 2011). Similarly, to all the campers, he had a natural aversion to insects; however, this stemmed from misinformation and social persuasion/learning. The program quickly rectified this condition, and he became an avid insect collector midway through the program. The *Helping Make Nature Natural for African American Urban Children* was designed to prime the students via vicarious experiences. Afterwards, it was expected that the students would feel comfortable enough to complete the objective of direct interaction. The social persuasion aspect of self-efficacy could be seen as a bridge. Students were more comfortable with their surroundings as their peers became more comfortable.

However, the questions were not only geared towards measuring what was occurring in the program. As with the questionnaire, the purpose was to examine the factors at children’s home and in their community too. Regardless of the treatment being implemented in the program, the campers’ home life also needed to be able to complement the change that was desired. If not, the adverse reactions to the environment could undo any progress made (Bandura, 1977 & McLeod, 2016). Spiderman reported that his parents allow him to play “sometimes.” He noted that he is able to go outside to places where play is allowed (school, home, and a local park.). His parents have rules

about playing outside, but when pressed, it was revealed that these regulations relate to people and not to the creatures or places in the environment.

The researcher also found it important to include in the coding table any time an incident of positive or negative feelings about nature occurred. These feelings contributed to helping the researcher understand the direction in which the belief skews. Furthermore, young children have difficulty verbalizing their perceptions when asked about them directly, and the coding may more accurately reflect the feelings or emotional states where they are apparent to the interviewee. The transcript features the subject mentioning his encounter with a bird. It would appear that in this case, the subject was still unwilling to interact with animals; however, it cannot be ruled out that the health of the creature was not a factor in this choice. Disapproval from the parent could also play a role in the decision to avoid the bird, as it was mentioned that his parents were accepting of him catching smaller creatures (crickets). Spiderman did not exhibit a noticeable fear response when discussing the lizard that was found while playing. and he also appeared to be comfortable in the exploration and observation of the creature. This same lack of fear can be seen in his observations of the flora. Sickness was again a factor in deciding whether the artifact was safe. In this case, he objected to interacting with plants that could cause sickness or appeared to be dying. Could this fear of sickness and death be natural or taught to the child via the parent and other non-parental mentors.

Wonder Woman and Spiderman shared some overlapping experiences related to nature; however, her narrative felt more complex, with this subject paying more attention to the events that transpired in her environment. On its own, pet ownership relays a plethora of positive effects (e.g., increased physical activity, more time outside, and

improved mental health) on children, but in this case, the largest benefit was the increased time spent in nature (Roberts et al., 2017). Her pet created more situations in which she needed to be outside, and this granted her more of an opportunity to explore.

Birds were another common group of creatures that the children noticed. As birds made up a key topic in the summer program, this could be a source of priming. This information could be used in future iterations of the program—highlighting a certain object directly causes the children to pay more attention to it. Wonder Woman was also cautious of any bees in the area. This was expected because throughout the program, she faced troubles overcoming her fear of them. Time was spent trying to desensitize the camper to the fear response; time is a significant factor in the success of the program (Davison and Wilson, 1973).

This camper appeared to pay more attention to the flora in her surroundings. She knew that she had a rose bush, and even her artwork showed more attention to detail as it pertained to flora vs. fauna. In her own way, she understood the connections between bees and flowers—chiefly their role as pollinators. In addition, she also paid attention to the atmosphere. At one point, she mentioned that her favorite colors could also be seen in the sky. Attentiveness is a vital component in social learning, and in this case, it demonstrates that attention was paid to the lessons, as each artifact that Wonder Woman noticed corresponded to an activity that was utilized in the program.

The questions were created to single out cases of vicarious experiences, and it appears that roughly 20% of the code would fall into that category. Mastery experiences were represented roughly the same amount of time, followed by social persuasion. Stress response was noted to make up the smallest percentage of coded themes, most likely

stemming from the lack of questions about it. However, the students were not expected to be in a position to understand how to reduce the stress response, especially if nature is truly an adverse object.

### *Art Activities*

Eighteen art activities were given to the 22 campers throughout the summer, making this analysis one of the most comprehensive. Artifacts were coded to explore the children's attitudes, with the hope that art-related activities would provide a less stressful, more insightful view of nature from their eyes. Coding was a collaborative effort between the researcher and the undergraduate work-study student. Both parties invested multiple hours with the children to build trust. Moreover, reflective journal entries were used to accompany the coding to assist with selecting the proper overarching themes (Erickson & Stull, 1998, & Guest & MacQueen, 2008). As a cautionary note, not all campers completed all activities, and not all campers stayed to the end of the program.

The artifacts that appeared the most in the campers' documents coincided with the lessons that were administered during the program. There was also a spike in artifacts related to the activities shortly after the completion of the storybook, and a heightened sense of awareness could be seen in the following days. Campers noticed insects the most in areas around the youth development center. Insects were featured during the first week of lessons and appeared to be the creatures that brought the children the most discomfort. In order to bring comfort to the children, the program focused on insects in multiple manners. Explorations allowed for the children to uncover and study the behaviors of insects in their natural habitat, along with teaching them core skills, such as patience. Preserved specimens were also handed to the campers to observe. This gave them a

chance to pay close attention to the morphology of the insects without the fear of one flying away or biting them. Both of these activities were able to take the children from fear to appreciation of the “creepy crawlies” beneath their feet. The final exercise to cement this change involved the creation of a terrarium. Students were given agency over the activity and collected their own specimens, providing a valuable source of mastery over the experience.

People were the next key artifact highlighted in the children’s artworks. In most cases, campers would draw themselves alongside whatever part of the environment was being explored at the time. The researcher took this as a display of comfort, with the smiling faces in the artworks confirming with this finding. The depiction of birds was the next most important artifact. This information is surprising, as only three days were dedicated to birds. This can be contrasted with the week that was spent, in total, on insects. Nonetheless, the children took an immediate interest in birds and the desire to catch them. To this end, we created feeders to enhance our observations.

The feeders provided a highly positive source of interaction with nature. This afforded the children an opportunity not only to interact with nature, but also to feed an animal and derive new attitudes based on the reactions of the other campers and the counselors (Bruning et al., 2004; Woolfolk, 2007 and Lam, 2011).

### *Synthesis*

Parents reported having a positive outlook on and spending ample time in nature. This information would have been spread to the children via observations of nature as well as reflected in their comfort-in-nature scores and artworks (Brown et al., 2002; Brody et al., 2006). It is difficult to assess positive or negative connotations behind much

of the abiotic factors in the artworks. However, the expressions of the people can be seen as mostly positive, with a similar trend when the campers anthropomorphized the creatures in their drawings. This mostly positive display agrees with the values reported in the t-test, as a neutral score would depict comfort, but not an overly positive outlook. It would ultimately be up to the individual performing the coding to determine the direction, if any, of the belief. A safe response would be that the children did not appear to be terrified of nature. Instead, a curiosity about nature was discovered within each camper that could be strengthened by continued interaction between the environment and the child's peers. Children as young as four can borrow images from their surroundings or culture to adopt in their artworks (Wilson & Wilson, 1982). The question, however, is whether they are simply mimicking what they see, or whether what they see is actually being used to construct new schemas. This question is better answered by the second research question.

As mentioned in Brown et al. (2002) and Brody et al. (2006), it would be best if the parents are more likely to interact with nature. The parents in this study reported both comfort and more than minimum exposure to the environment. The level of interaction, or the activities done, is outside the scope of the research; however, whatever is being done appears to be creating the optimal environment needed to both reduce the students' stress and increase comfort. The parents did appear to be more comfortable in nature than their children. This is contradictory to what was expected based on the literature—it was expected that parents would hold a more negative view about nature because of race and discrimination (Ebisu, 2012). While race cannot be ruled out of the equation, it did not

play as large a role for these parents as the literature would have suggested for African American parents in general.

Nature deficit disorder was also suggested to be an effect of the combination of both the parents' and children's lack of desire to be in nature. Again, the parents' scores dismiss this by being significantly higher than a negative value. If the parents were the children's only source of exposure, then it would be easy to state that the parents passed their positive outlooks to their children. However, this does not take into account other sources, such as peers and non-adult mentors. If one was to take into account the artworks, the children drew both pets and other humans. Some were of similar heights; however, in some cases, adults were seen alongside them. Being that people account for 13.4% of all artifacts, parental representation in the artworks could be the detail needed to support the premise that parents were a larger influence on environmental perceptions than any of the other sources.

## Research Question 2

### *QUAN*

#### *Dependent Samples T-test*

It was known from the first research question that children have positive feelings about nature, and the program was developed to improve their outlook, with the second research question being developed to test program effectiveness. Students were subjected to a shortened program because of real-world issues and decreasing the program length from 6 weeks to 4 weeks could have reduced the amount of growth that the students could have undergone. However, when analyzed, a significant difference was observed in mean scores between the camps at the start and the end of the program. An increase in



scores was expected, as the program was founded in transactional constructivism, which has been proven to increase absorption of knowledge and hold the student's attention (Bandura, 1994 & Biesta & Burbules, 2003).

The repeated measures t-test revealed that the campers experienced a growth in positive feelings about nature. This information on its own demonstrates the effectiveness of treating issues of CRT with non-parent support (Park et al., 2015; Novelle and Gonyea 2016 & Park et al., 2017), as well as the effectiveness of transactional constructivism coupled with social learning theory (Chotitham et al., 2014), while showing that SES is still a factor, along with the improper allocation of resources (Crenshaw, 2011; Dixson & Rousseau, 2005; Ladson-Billings & Tate, 1995 and Tate, 1997), but it does not affect the children, or at least the campers in Hattiesburg, Mississippi, as much as would be expected if we were to explore national datasets ( The Outdoor Report, 2011, 2012). However, this on its own is still simply a generalizable conclusion. To observe the extent of the change, attention must be paid to the campers. Here, we noticed signs of fear, which was expected in the national survey (The Outdoor Report, 2011, 2012) and discussed by various researchers studying both CRT and social justice issues (Crenshaw, 2011; Dixson & Rousseau, 2005; Ladson-Billings & Tate, 1995 and Tate, 1997). The researcher cannot completely rule out the stance that environmental racism was not a factor; however, it can be treated. As reported in numerous other studies (Park et al., 2015 Novelle & Gonyea 2016; Park et al., 2017), a program can be developed to promote change. This change could also be seen both directly (in the artwork) or indirectly (in reflections), thereby creating an ideal cyclic pattern where the students' growth can be verified by comparing it to the ruminations of the counselor. In this case, the students can

clearly demonstrate that they are thinking about the writing activity sheets in order to complete the assignments. Alone, this information is only indicative of surface learning. However, it begins to stand out when combined with the GLOBE program's use of hands-on learning to foster tactile learning to better hold their attention and take the chore out of learning. Finally, further evidence is gained, and the argument is strengthened by the confirmations of the adults in charge. Both parties provided complementary information, and the researcher would even go as far to say that growth was exhibited by both child and adult.

Although small in sample size for analysis this change in perception was seen throughout the program. Reflections were kept by both counselors from the Center for Science and Mathematics Education with the purpose of being used as an aid to track the changes in the campers. These entries were not coded for themes but were read throughout the data analysis as a way in which to organize the campers' perceptions and to help understand the change that was seen in the dependent samples t-test.

The most prominent change in perceptions could be seen at the halfway point of the program. At the start of the program, the campers were timid in relation to both the assignments and the people in charge. Thereafter, a desensitization period occurred, and trust was seen to grow between both parties. The end of the second week marked the turning point in interactions with the campers. Here, the campers were more inclined to touch or explore without much hesitation. The fear response was reduced and could be interpreted as a reduction of the stress response. One example of this could be seen with Spiderman. He was unwilling to directly touch anything at the start of the program, instead opting to use tools to assist him. One day, during the third week, he was seen

directly interacting with an earthworm. He wanted to include it in the class's terrarium. This was one of many eye-opening experiences. It appeared that in most cases, the children only needed validation to interact with nature.

### Research Question 3

#### *QUAN*

This research question proved to be easier to analyze, but more problematic to interpret. The instrument was developed to be a simple, binary choice for the camper. He or she simply needed to decide between two careers, both of which were explained in easy-to-digest pieces and coupled with a picture. A non-parametric test was needed to analyze this data, and McNemar's test was chosen because of its ability to be used on paired nominal data. It would be the best way in which to determine whether the minority representation aspect of the program had an effect on career selection. As reported in the results section, the difference was determined to be insignificant. However, this could easily be seen in the raw data. More children were inclined to want work in the environment before the program ended, whereas upon conclusion, it appeared that more would rather work in an area unrelated to nature. The researcher found this to be puzzling, as the campers appeared to be more comfortable in nature at the end of the program.

An argument also arised and ample discussion could be had regarding the age of the campers. Career selection can be seen as an overlap of both self-efficacy and self-concept. Self-concept, defined by Baumeister (1999), is an individual's belief about him- or herself, with self-concept being a connecting piece. Literature pertaining to self-concept would list developmental or age-related factors as a chief influence. Simply put,

the campers most likely made their desired career choice based on any number of extraneous factors that would be difficult to delimit in this study. This could be supported by the literature, as children's career development seems to be based on what the children think they know about the world (Hartung et al., 2005).

### *QUAL*

Semi-structured interview questions were utilized to answer the third research question. To conserve time, those questions about career aspirations were asked at the end of the interview. This was done to save time and allow the students more time to interact with their surroundings. The questions also attempted to determine what factors played a role in the campers' career selection. This section was much shorter in length, allowing for both sets of responses to be connected seamlessly.

A mixed response was given when asked about the parents' input on career selection. In Spiderman's case, he mentioned that he has never asked his parents about his future career, nor did he mention anything about them volunteering any suggestions. It is difficult to determine whether this finding is beneficial to the camper, as it has been demonstrated that parents are important influences on children's career aspirations (Schultheiss, 2007). Wonder Woman's parents were more invested in their daughter's career choices. Her father was interested in having her learn about technology, and her mother wanted her to clean houses.

When directly asked, neither child chose a career related to nature. Instead, one wanted to be a race car driver and the other an artist. The choice of artist was featured on the career aspiration inventory, and it cannot be ruled out that this decision did not stem from being influenced by the question. However, it was a single case and should not

prove to be a confounding variable. A profession as a race car driver did not come up in the summer program, and it can be said with certainty that this career choice was not influenced by the summer camp.

### *Synthesis*

People learn through interactions with their environment (Super 1990). Specifically, when discussing career selection, there are many sources of learning through the environment, such as family, school, society, peer groups, community, and the labor market (Lent et al., 1994; Lent et al., 1996; Mitchell & Krumboltz, 1996, Patton and McMahon, 1999; Roe, 1956; Roe & Lunneborg, 1990; Vondracek et al., 1986 & Young et al., 1996). The campers would have already been exposed to these influences well before the program had even begun, and this would have been evident in the scores on the pre-test for career aspiration. Here, most considered environmental jobs to be more favorable than non-environmental ones. It was the hope that the program could increase this desire by offering students a point of exposure and minority representation. Program exposure has been discussed at length, but the issue of representation was not a paramount issue until this research question. African Americans have historically faced much hardship when it comes to exposure to environmental hazard, a disproportionate amount of negative impacts from environmental processes, and a disproportionate amount of negative impacts from environmental policies (Taylor, 2000). As career development is dynamic, it was important to determine what outcomes the campers selected (Watson & McMahon, 2005). Quantitatively, the program did not do much to alter the outcomes of career selection. Alone, this information provides some answers but does not truly delve into the views of the campers. Qualitatively, at the time, the campers'

minds appear to have been made up about their future. Parental involvement can be observed in one case, and here it appears that different outcomes are desired from both parent to parent and child to parent.

Similarly to teaching science or arithmetic, career selection can be mediated through the process of education (Gottfredson, 1981,1996 & Super, 1990).Social identity plays an important role in career selection (Gibbs a&nd Griffin, 2013). Both personal and cultural values are factors in social identity, and they ultimately tie into career selection. Although race was not shown be a key factor in some studies, it does seem to have an effect on a broader scale (Berryman, 1988; Mason, 2007; & Park et al., 2015). To this end, minority scientists were featured once a week, at minimum, and their achievements were broken down and explained to the campers. It currently appears that more work needs to be done to improve this facet of the program, as scores actually decreased by the end. The information gathered from the students about their social influences form an ideal start to developing something more robust. At the time, the questions in their current form would not truly help to develop a narrative of all important familial or peer persuasions that could alter perceptions of career selection.

### Implications

This study's findings contain several important implications for researchers, educators, and the community at large. This research sheds light on the attitudes of children and adults in south Mississippi, an area that sorely lacks information. Here, the findings illustrate the narrative and views of elementary school-aged children. These views appear to be different than what would have been expected based on the data posted from national inventories. This indicates that our children's attitudes can be swept

up in large sampled data analyses, thus leaving them voiceless. More research should be done before it can be said with certainty that what was discovered here was not an anomaly because of the small size of the camp and the abrupt end to the program.

In the case of this research, it would appear that the parents' high affinity for nature was transferred to the students. The lack of fear is abnormal, according to other researchers; however, the mechanism behind the social learning aspect would be the same. If fear can be transmitted, then so can comfort (Brown et al., 2002; Brody et al., 2006 & Diemer, 2007). Being rooted in comfort, versus aversion, could be a factor that plays heavily into the effectiveness of the program. Future renditions of this program should continue to focus on parental influence for the sake of eliminating confounding variables, and they should aim for community betterment.

The program itself appears to work in alleviating tensions related to discomfort in nature. Pre-test scores were already elevated, possibly stemming from parental interaction; however, non-parental interaction via the camp leaders also played a vital role in assisting with the creation of mastery experiences. This is confirmed by the increased scores.

Even though it is too soon to draw a conclusion about career aspirations, it does appear that children from the ages of 6-10 are thinking about topics related to occupation. If so, then it would be important to ensure that they are at ease with nature to prevent any fears from prohibiting career selection. This issue is doubly important in the STEM fields, as representation is a hotbed of research and findings. However, because of lowered focus on the topic and insignificant findings in this case, it is difficult to determine how much work is needed for these campers in this regard.

## Limitations

This section contains the issues that could have had an influence on this research. As this study determined the factors that impede African American children's desire to interact with nature, it must first be accepted that a problem exists in this area. Anecdotal evidence agrees with this assumption. *Black Faces, White Spaces: Reimagining African American relationships to the Great Outdoors* (2014) also provided much evidence to explain the issue. This monograph details the effects of slavery and Jim Crow on African American perceptions of nature and the environment.

The students were not going to be selected based on any factors that could result in an intentional bias in the research. For example, interest in nature was not a qualifying factor for this study. Other factors that are representative of inclusion were also be controlled to an appropriate degree.

The researcher employed a sample of convenience, and the participants were a subset of the children attending one summer program for African American children aged 6 - 10 in Hattiesburg Ms.

In addition to being a sample of convenience, another limitation to the student would be the locale-based perceptions and views of the participants. Campers in this study would have all come from roughly the same area and could be considered a mix of rural and suburban. The views that are shared by the campers in this area may not be equivalent to similarly aged children in other parts of Mississippi or even the United States. This limits the generalizability of the student until similar procedures are performed in other areas.



Time was another factor in the study. The summer program only lasted through the month of June. The researcher attempted to offset the limited time by collecting a sufficient amount of data that should be considered rich and valid. Careful attention was placed on testing for validity and reliability to ensure that this requirement is met.

Increasing awareness of minority representation could be limited by amount time spent on introducing the campers to African American scientists. The African American Scientist cards were utilized at the beginning of the session only once a week in most cases and twice when time permitted. Children have been shown to emulate career choices closely related to their parents (Holland, 1962 & Werts & Watley, 1972). This phenomenon is strengthened in cases in which parents appear to enjoy their career (Trice & Tillapaugh, 1991). The researcher and his aids would serve non-parental mentors along with the cards themselves, making it important to focus more on the careers in the future. It would also benefit the study integrate the careers of African American scientist to create a bond of sorts with the information being presented.

The QUAL subset had limitations that only affected this portion of the study. Research of this nature is easily influenced by the biases and perceptions of the researcher. Careful steps were taken to ensure that the researcher's idiosyncrasies were not used to confound the findings of the study. However, this study was meant to be transformative in nature. It is the belief of the researcher that being an African American male made it easier to both acquire and understand information pertaining to the research question.

The QUAN subset was limited by the small sample size. The determination of the sample is critical for any statistical analysis. Although each type of statistical test would

have its own assumptions, including those regarding sample size, it is still in the best interest of any study to have ample participants. Sample was based on the research question of interest but must consider real-world variables such as funding and subject availability.

While useful for the unique perspective, the effect of age on the cognitive ability of children could not be overlooked. Children from the ages of 6 to 8 fall between two distinct stages of cognitive development. Under Piaget's stages of cognitive development, these students could have been in either the preoperational or the concrete operational stage of development. Table 1 provides information about each operational stage and indicates that any assessments used must be developed in a manner that does not confuse children. Children in the preoperational and concrete operational stages may not be able to understand questions that are overly theoretical or abstract.

Cronbach's Alpha was used to test for internal consistency. Corrections to instruments were made when needed to maintain a proper correlation between items. Threats to construct validity were assessed and corrected with assistance from committee members to ensure that the questions were properly constructed (operationalization). The previous study performed by Herron et al. (In review) considered this issue. In their study, the researchers created a modified Likert scale using pictures instead of numbers and words. This allowed children to create a better cognitive bridge between the questions being posed and the responses that were to be collected and improved both content and face validity. The present study used the same graphics to strengthen the accuracy of the findings.

Let's think about where you like to play – either by yourself or with friends. If you like to play or sit, swing, or sing outside, where do you like to go? Look at your paper. Circle the face you might make when thinking about going outside



What do I see when I play outside?

Figure 5. Example of modified Likert scale questions given to the children in the 2016 program, Helping Make Nature Natural for Urban Children

Table 17 *Piaget's Stages of Cognitive Development*

STAGE OF DEVELOPMENT	AGE (YEARS)	DESCRIPTION
<b>SENSORIMOTOR</b>	0-2	Thinking at this stage is governed by physical interactions with the world. Practical knowledge is gained at this stage, along with more complex schemas as the child becomes older.
<b>PREOPERATIONAL</b>	2-7	The most significant development occurs in language and the ability to use representational systems to describe a child's environment. The ability to use symbolic play also increases; however, complex abstract thought is still difficult.
<b>CONCRETE OPERATIONAL</b>	7-12	Concepts such as time, space, and quantity are more easily understood. In addition, while hypothetical questions are still difficult, logical situations are easier to grasp.

Table 17 (Continued)

**FORMAL  
OPERATIONAL**

**12+**

**CHILDREN SHOULD BE ABLE TO  
EASILY UNDERSTAND ABSTRACT  
CONCEPTS AND BEGIN TO WORK ON  
HYPOTHETICAL PROBLEMS.**

---

Table 17: Piaget's theory of cognitive and affective development. Foundations of constructivism created from information listed in Wadsworth, B. J. (1996).

### Rationale

This research contributed to existing works not only in the field of science education but also in environmental justice (EJ), environmental education, and sustainability. It is the hope of this researcher that the perspectives of African American children can be used constructively to help further educate the masses. The researcher believed to find new and promising solutions, more understanding was required about the feelings associated with African American children's lack of participation in nature. This study provides new information that can be used to increase awareness of children's attitudes about nature, thus increasing the understanding.

On a more personal level, learning about the challenges that African American communities face is beneficial to mankind. An aversion to nature impacts the overall health and quality of life of many minorities. There was an opportunity to assist those in need by infusing the scientific community with both novel and rich data. An evaluation of the unique perspective (for example, frames of reference and an understanding of nature) of children aged 6-10 could possibly provide a distinct understanding.

The researcher chose an MM study to offset the disadvantages of QUAN and QUAL studies while making the results of both better in a synergistic manner. QUAN

research generates generalizable data and tends to be positivist in stance and belief. QUAL research, on the other hand, is more interpretive in its design and framework. This type of research holds the belief that multiple realities can be shaped by personal viewpoints, context, and meaning (Tariq and Woodman, 2013).

The strength of QUAN research is that the procedures are designed to minimize confounding variables, whereas QUAL research can provide a rich and robust description of belief and meaning. However, both have their flaws. First, QUAN research is not suited to explain complex social or cultural phenomena. Although deductive in nature, it is not useful for generating hypotheses to explain why things are occurring. Second, QUAL research is usually limited by small sample sizes and lacks generalizability (Tariq and Woodman, 2013).

There are many reasons why combining the two is advantageous to research (Greene, Caracelli, and Graham, 1989 & Pope and Mays, 1995). In this study, the primary reasons are complementarity and triangulation. The concept of complementarity allows for the utilization of data from one method to expand on the results of the other method. The data obtained from both methods can also be used to corroborate findings (triangulation).

#### Future Research

This monograph and the data within should be seen as a starting point for the betterment of the “*Helping Make Nature Natural for Urban Children*” program. It is now known that more work is required in the area of occupation selection as the camp did not focus much on the careers themselves and instead focused on representation. Exposure alone may not have been enough to increase desire. As mentioned previously, occupation

selection is related to self-concept and social identity (Gibbs and Griffin, 2013). Racial representation alone may not have been enough to provoke a change in the children.

Also, monitoring the change in career aspiration is not the same as assessing whether the children learned that African Americans can work in environment-related professions. The researcher thus concludes that the career selection portion of the study should be remade for future incarnations of the program. If career selection is the outcome variable of choice, then an instrument would need to be developed that is similar to the comfort-in-nature assessment, which is designed to be understood by children. Determining whether the campers were reacting to the minority representation is a question all on its own. This is a question of both social and cultural identity and would require a synthesis of instruments for proper analysis. A more refined version of the current semi-structured interview could also be used in connection to keep any future work in the realm of mixed methods.

The comfort-in-nature assessment is an offshoot of the instrument developed by Herron et al. (In review). The version presented here was designed to be a single question, and the researcher took this outcome variable and expanded on the questions themselves using questions from the parental questionnaire. The self-efficacy concept of mastery experiences was also used to tailor the questions to measure attitudes, or rather attitudes about nature. Mastery experiences, which is one of four constructs of self-efficacy, is the experience of successfully completing an activity. Successful completion of an activity can increase a participant's belief that he or she can complete another activity. As mastery experiences is the most important aspect of self-efficacy, it was important to ensure that this construct was measured (Bandura, 1977, 1982; Gist, 1987 &

Potosky, 2002). However, the questions had to be further altered to ensure that no false answers could be provided, given the complexity of the questions themselves. Another round of testing should ideally be done to increase the total sample size and ultimately yield a more accurate reading of Cronbach's alpha for internal reliability. Adding more questions to the survey would hold a two-fold benefit: 1) asking more questions that are similar in design to measure the same item would increase parallel-form reliability, and 2) increasing the length of the assessment is one way in which to increase an alpha coefficient (Nunnally et al., 1994 & Streiner, 2003). Finally, a larger sample size would benefit both the statistical analysis and the determination of a coefficient alpha (Charter, 1993, 2003;Klien, 1986, & Nunnally and Bernstein 1994).

Upon the writing of this manuscript, the research reports that is was no inventory developed that properly assessed self-efficacy in relation to attitudes about nature for children. This made it difficult to improve construct validity by working with existing questions that were already made and tested by years of research. However, due to the increase in comfort seen in direct interaction with objects, confidence can be placed in the analysis and instruments made. More time will be needed to properly create scaled instrument that is as complex as what has been seen in other self-efficacy scales and this endeavor will likely involve crosscutting amongst multiple disciplines as any scale for adults will prove to be too complicated for the age group studied in this monograph.

### *Conclusion*

Throughout history, it has been demonstrated that children were freer to play and would even choose to explore and interact with numerous elements outdoors (Pyle, 2002). Although starting in nature, over time, children began to retreat from this natural

element. Globally, urbanization, pollution, fear, discrimination, poverty, and other factors have changed the way in which children interact with nature (Chawla 1994; Chavis et al., 1987; Lerner, 2005 & Skelton, 2011). Our children have been left with the remnants of this urbanization, since our fields, streams, forests, and even yards have changed. The age of widespread interaction with nature has been replaced with fear and aversion at worst, and a lack of resources or time at best (Moore, 2004, White & Stoecklin 1998). Children, with less freedom to play, explore, and interact with the natural world, could be seen to be afflicted with what is known by some as NDD (Louv, 2006). Whereas some researchers wanted to determine why this condition has been affecting our youth, the purpose of this study was to understand and capitulate the attitudes of African Americans in south Mississippi and determine if an program could be developed to deter its growth if indeed negative (Kareiva, 2008 & Pergams & Zaradic, 2006, 2008).

Before the research could be implemented, baseline information needed to be gathered about the population at large. The OF (2012, 2017) provided ample responses regarding Americans' outlook on nature. Thanks to the information here, the rationale for many Americans was uncovered, thus allowing for the start of the development of the tools used in this study. Many resources were required to determine whether children's current attitudes are much different and whether they have fewer opportunities for outdoor play and regular contact with the natural world (Francis 1991). Much evidence also points to racism, and fear is another factor that specifically affects African American children (Chand et al., 2015; Cloutier et al., 2014; Duro, 2016; Juwana et al.. 2016; Pinar et al., 2014 & Reisi et al., 2014). This fear also affects the parents. Reports have indicated that parents are now more uncomfortable than ever when asked about their children's



safety outdoors (Pyle 2002; Herrington & Studtmann 1998& Moore & Wong 1997).

However, these findings do not directly provide insight into the narrative of a typical African American parent or child in Hattiesburg, Mississippi. Therefore, a new program was created in 2017, developed to reteach children about the wonders and value of nature. In 2018, the program downsized, allowing for a more personalized investigation into the issue and a more hands-on interaction with the children. Now, more extensive analyses could be utilized with the campers to determine the attitudes that are currently held by children, and to a smaller extent the parents, in Hattiesburg, MS.

Four weeks in length, the program addressed children's discomfort in nature using CLT. Activities were utilized from numerous peer-reviewed sources (e.g., GLOBE, NASA, NOAA, and PLT). Each weekday built upon the last, addressing aversion to the environment directly, while increasing incidences of mastery experience, social persuasion, and vicarious experience, to ultimately reduce the campers stress response and increase self-efficacy. A survey created from Herron et al. (in review) was modified for use to discover what attitudes the campers already held. This same survey was used again upon completion of the program to determine whether the program (summer camp) could change the campers' attitudes. Qualitative data was collected via artwork and semi-structured interviews, and artwork activity sheets were issued to the campers throughout the program. Most activity sheets were associated with the GLOBE lesson plans that accompany the GLOBE storybooks, while others were created with the assistance of experts in the community. As it was difficult to find an adequate measure that was already established, a decision was made to measure attitudes before the start of the program by comparing the campers scores to an negative score on the inventory. This

portion of the study determined that campers have what could be considered a negative outlook on nature, which was not shared by their parents, as they scored significantly higher than normal ( $p = < 0.001$ ). While the QUAL portion was smaller in magnitude ( $n = 2$ ), it provided some areas to analyze. The researcher found that children do not seem to focus on many of the fears that adults face, such as fears of ultraviolet rays, insect-borne diseases, and various forms of pollution (Wilson, 2000). Instead, even the negative views of nature stem more from negative encounters that can be treated using social persuasion from both peers and non-parental mentors. It ultimately appears that summer camp was able to increase the students' comfort in nature even further. The change in scores from the beginning of the program to the end was both significantly different ( $p = .007$ ) and positive (+13.4).

Next, misrepresentation was tackled. A second facet of the program was to expose the campers to other African American figures in the scientific community. At least once a week, a new POC was shown to the campers before the storybook was read. Roughly five minutes were allocated to the discussion of the highlighted scientist, delimiting his or her contributions to the field along with a brief description of what his or her career entails. The researcher is also African American and served as a primary source of non-parental membership. A career aspiration questionnaire was developed to determine whether these cards could bring about a change in the campers' occupational outlooks.

Representation was not directly tested, as this was left for future iterations of the program. Instead, the researcher wanted to see if showcasing African American figures would make campers want to pursue more careers in nature. Using McNemar's test, it

was determined that representation alone ( $p = .500$ ) was not enough to change the career selection of the children at the summer camp (Gibbs & Griffin, 2013).

According to the children, mixed results have been given to the role that the parents have played in the students' career selection. Neither subject in the qualitative section appear to be allowing his or her parents' desires to sway his or her decision; however. Parental expectations are determinates of future aspirations, especially in today's age where children's lives have become increasingly structured and scheduled by adults in preparation for adulthood (Moore & Wong 1997 & White & Stoecklin 1998).

Taken together, this researcher reports that the campers came into the program with a negative outlook on nature, differing from their parents more positive outlook, and the children's attitudes were able to be improved by using the activities listed throughout this manuscript, coupled with copious amounts of rich experiences to increase self-efficacy in relation to nature. The campers underwent growth that was seen not only in quantitative assessments but also in their artworks. While the semi-structured interviews offer a brief glimpse into the psyche of campers, more work needs to be done to truly understand nature through the lens of the campers. Furthermore, their career aspirations are currently unclear, and additional work should be done before a true conclusion can be drawn. The foundation for occupation preference has been laid, but at the time, an instrument needed to be than can be analyzed using a parametric test. With all the facts laid out, the researcher considers this work to be a valid expansion of the current literature and a stable bridging point for future research.

## APPENDIX A Interview questions for Research Questions 1 &2

### Interview Questions for Research Questions 1 & 2

\*Questions created with design suggestions from de Leeuw and Otter (1995),

Markopoulos and Bekker (2002) and Morgan et al (2002)

1. Tell me about playing outside. What do you notice? What do you like to do?
2. What do you like to do outside that is fun? Where do you go outside to play? Tell me about what you might think is scary about outside.
3. Tell me about the animals you like to watch or play with. Tell me about the animals you do not like.
4. Tell me about the plants you like. Tell me about the plant you don't like.
5. Tell me about your artwork?

## APPENDIX B – Interview Questions for Research Question 3

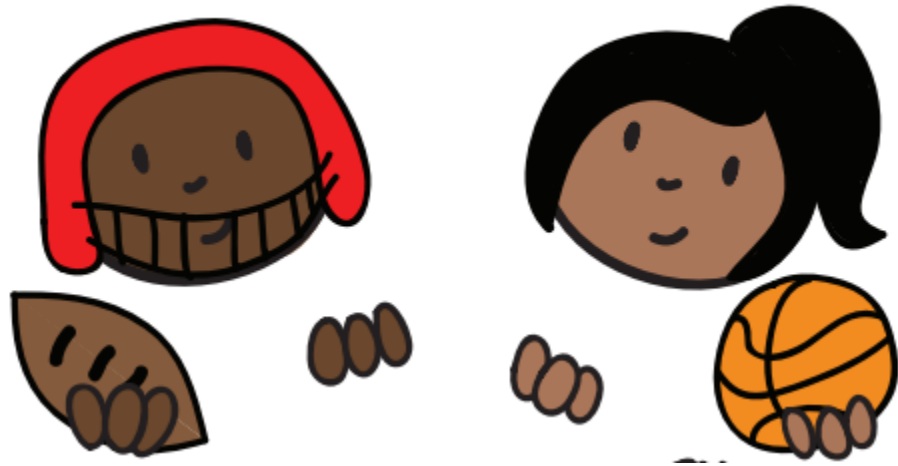
### Interview Questions for Research Question 2

\*Questions created with design suggestions from Bandura (200). Bandura et al., (2001), de Leeuw and Otter (1995), Markopoulos and Bekker (2002) and Morgan et al (2002)

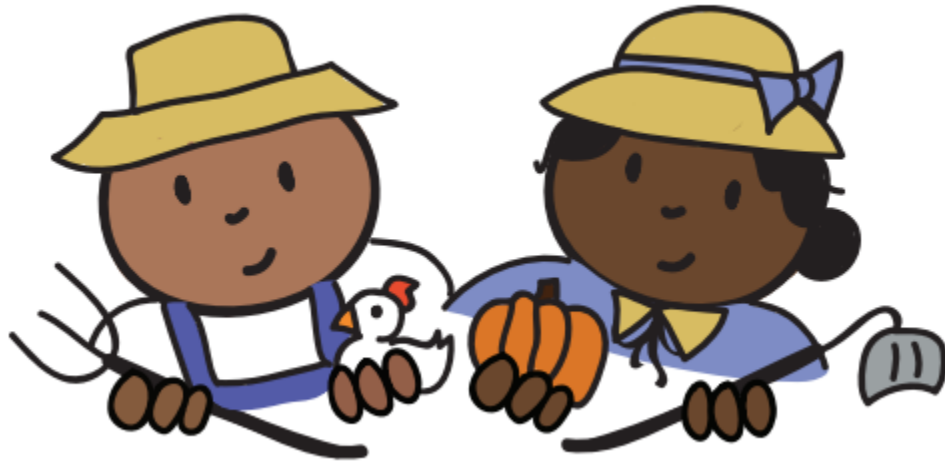
1. Think about the grownups in your life, at home, at school or church. What do you think they do outside.
2. Tell me about what you want to be when you grow up?

APPENDIX C - Career Aspiration Questionnaire

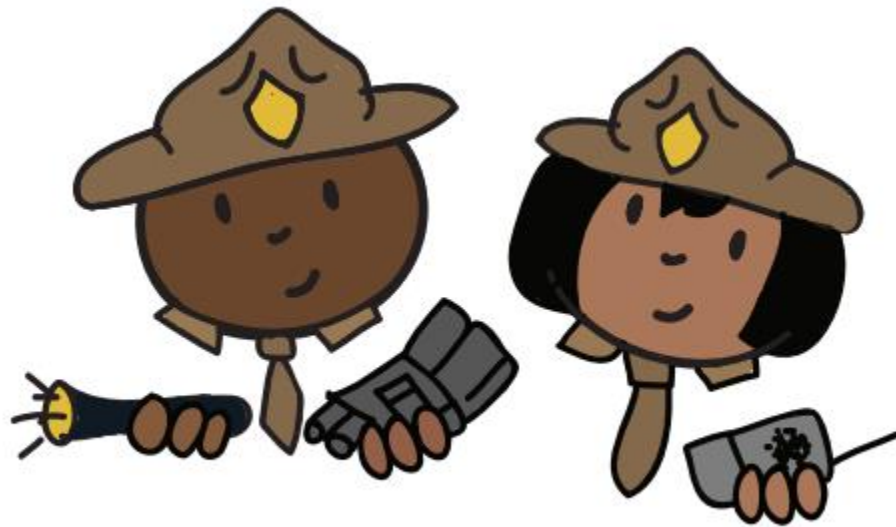
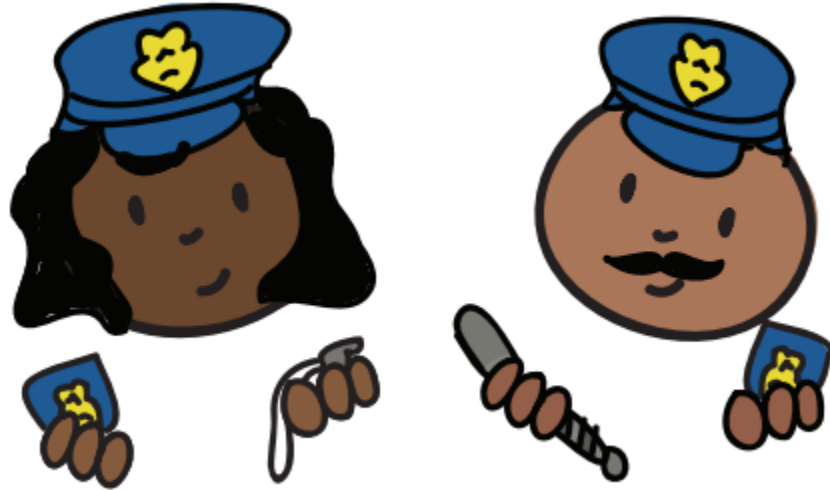
Which job would you rather have?



Which job would you rather have?

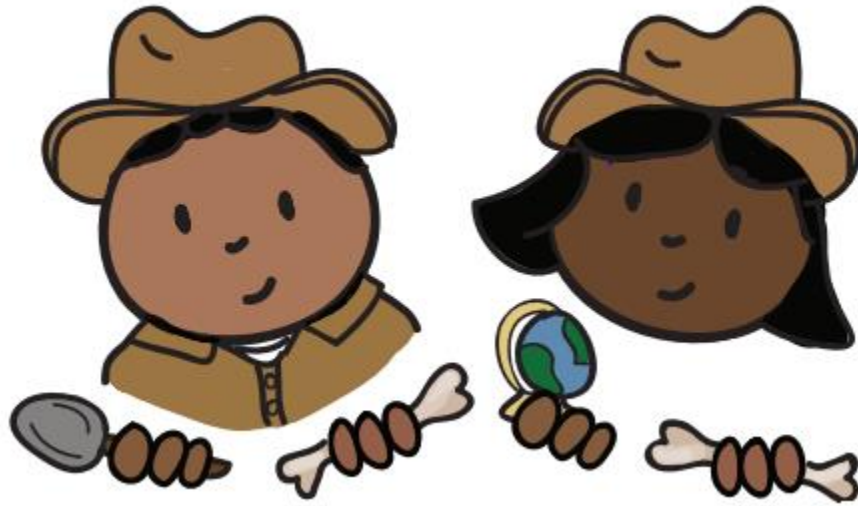


Which job would you rather have?

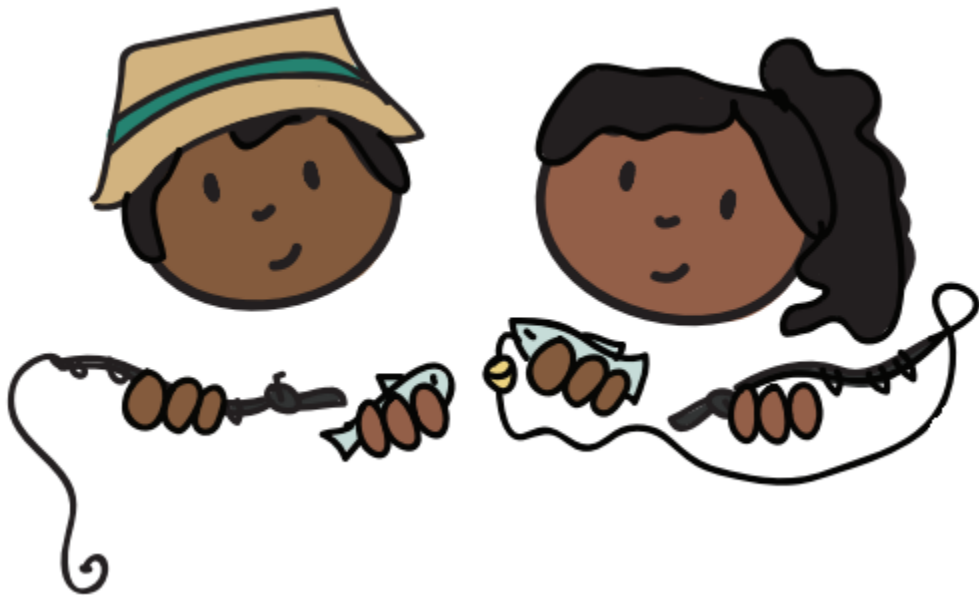




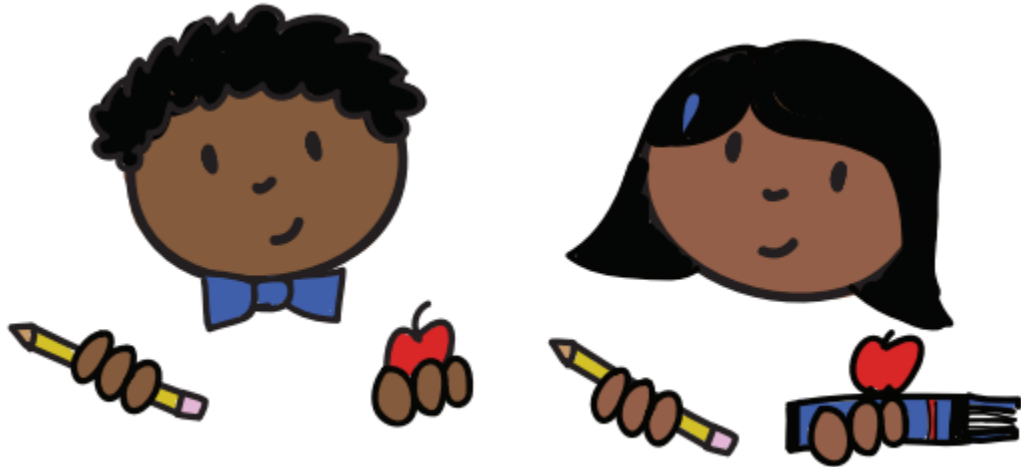
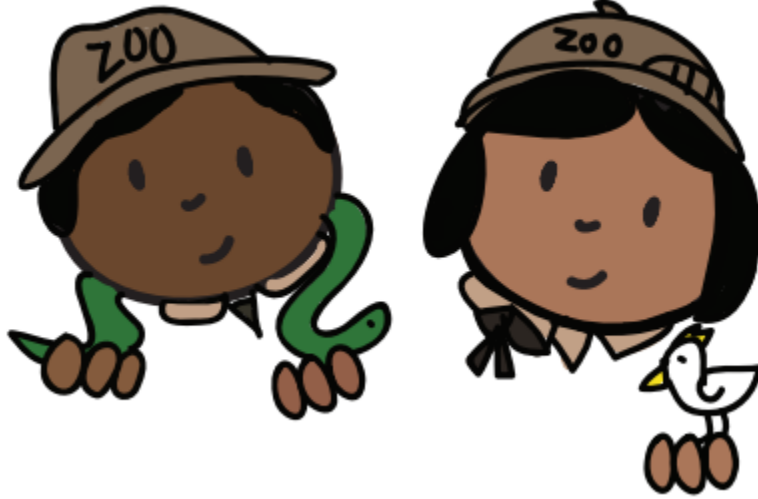
Which job would you rather have?



Which job would you rather have?



Which job would you rather have?



APPENDIX D - Quest Bank for Career Aspiration Pre and Post  
test  
Response Sheet for Career Aspiration Posttest

Name \_\_\_\_\_

Instructions: Draw an X in the space shows your choice of career

<b>1</b>	
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>5</b>	
<b>6</b>	

APPENDIX E - Art Activities for Research Question 1 & 2  
\*Not to scale

Art Activity 1




**The Mystery of the Missing Hummingbirds**





Name: \_\_\_\_\_



### The Mystery of the Missing Hummingbirds

 Name \_\_\_\_\_

 Date \_\_\_\_\_

 Weather \_\_\_\_\_

Temperature  Hot  Warm  Cool  Cold




### Big Picture View

Write or draw your observations here.



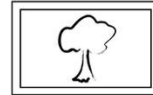
## The Mystery of the Missing Hummingbirds

Season \_\_\_\_\_

 Clothing \_\_\_\_\_

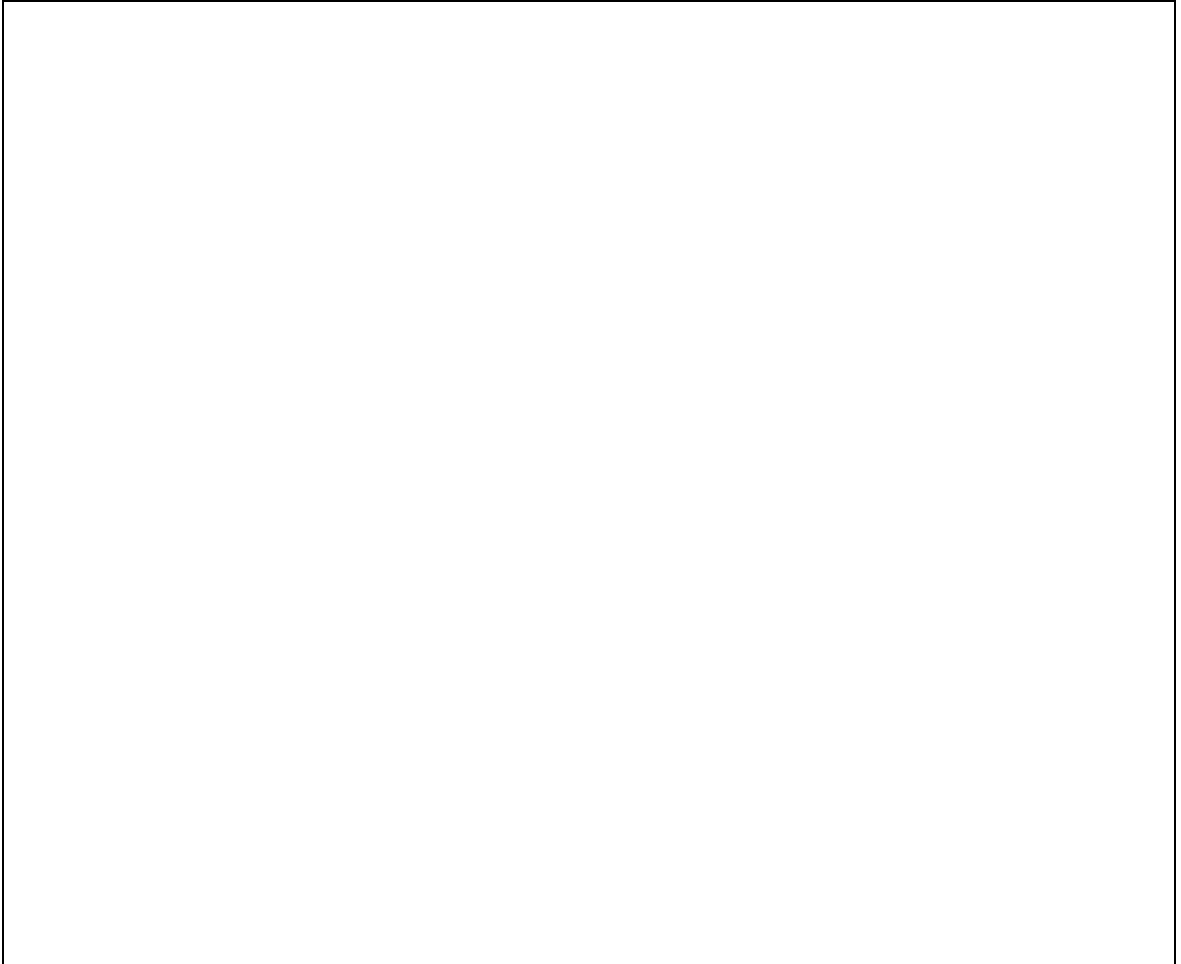
### Zoomed-in View

Write or draw your observations here.



## Art Activity 2

Instructions: Show me what you see inside of your terrarium.





### Art Activity 3

Instructions: What does the weather look like today?



Art Activity 4

\*Not to Scale



**The Scoop on Soils**

NAME: \_\_\_\_\_

Date: \_\_\_\_\_




Art Activity 5

\*Not to Scale



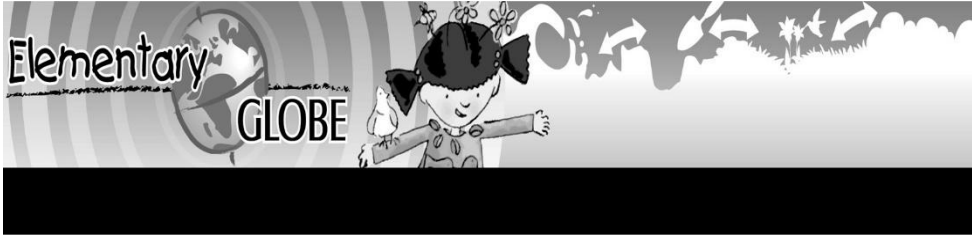
**All About Earth: Our World on Stage**

NAME: \_\_\_\_\_

<p>Date: _____</p> <p>This terrarium included:</p> <p><input type="checkbox"/> Light</p> <p><input type="checkbox"/> Soil</p> <p><input type="checkbox"/> Water</p> <p><input type="checkbox"/> Seeds/plants</p> <p><input type="checkbox"/> Air</p>	<p>Draw what you see in this terrarium.</p> 
<p>Write about what you see in this terrarium.</p> <p>_____</p> <p>_____</p> <p>_____</p>	

Art Activity 6

\*Not to Scale



**All About Earth: Our World on Stage**

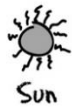
NAME: \_\_\_\_\_

Date: \_\_\_\_\_

This is what I saw outside:

I've circled the part of the Earth system that it belongs to below.

It connects these parts of the Earth system.  
Draw arrows  $\longleftrightarrow$  to show the connections!



APPENDIX F - Art Activity for Research Question 3  
Art Activity

Instructions: Draw what you want to be when you are older.



APPENDIX G - Registration Form for Student Enrollment

Directions: Parent or Guardian, please fill out the following information you are

comfortable providing. Occupation: \_\_\_\_\_

1. What is the highest level of education completed
  - A. Less than high school
  - B. high school / GED
  - C. 2-year college degree
  - D. 4-year college degree
  - E. master's degree
  - F. doctoral degree
  
2. What is your household's combined annual income?
  - A. under \$20,000
  - B. \$20,000 - \$39,999
  - C. \$40,000 - \$59,999
  - D. \$60,000 - \$79,999
  - E. > \$80,000
  
3. How often do you go outside for recreation or work in nature?
  - A. None
  - B. Once a week
  - C. Several times a week
  
4. What is your primary purpose for going outside?
  - A. Gardening
  
  - B. Fishing
  
  - C. Exercising
  
  - D. Relaxing
  
  - E. Other
  
5. How often does your child play outside?
  - A. None
  - B. Once a week
  - C. Several times a week
  
6. How often do you interact in nature with your child?

- A. None
- B. Once a week
- C. Several times a week

Please indicate your response to the following statements using the following scale:

1= strongly agree. 2= agree. 3= neutral. 4= disagree. 5= strongly disagree


- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. I am very comfortable going outside.                            | 1 | 2 | 3 | 4 | 5 |
| 2. I enjoy interacting with nature.                                | 1 | 2 | 3 | 4 | 5 |
| 3. I have plenty of time to interact with nature.                  | 1 | 2 | 3 | 4 | 5 |
| 4. My child/children spend enough time outside.                    | 1 | 2 | 3 | 4 | 5 |
| 5. I feel safe outside in nature.                                  | 1 | 2 | 3 | 4 | 5 |
| 6. I am afraid of being hurt by animals while outside.             | 1 | 2 | 3 | 4 | 5 |
| 7. There are plenty of safe places for my child to play outside.   | 1 | 2 | 3 | 4 | 5 |
| 8. Going hiking makes me feel accomplished.                        | 1 | 2 | 3 | 4 | 5 |
| 9. Going camping makes me feel accomplished.                       | 1 | 2 | 3 | 4 | 5 |
| 10. Going biking makes me feel accomplished.                       | 1 | 2 | 3 | 4 | 5 |
| 11. Going swimming makes me feel accomplished.                     | 1 | 2 | 3 | 4 | 5 |
| 12. I would go outside more if more people that I knew enjoyed it. | 1 | 2 | 3 | 4 | 5 |
| 13. Outdoor recreation is too expensive.                           | 1 | 2 | 3 | 4 | 5 |
| 14. I do not have the skills or abilities to go outside.           | 1 | 2 | 3 | 4 | 5 |
| 15. Places to enjoy outdoor recreation are not well developed.     | 1 | 2 | 3 | 4 | 5 |
| 16. I enjoy the scenic beauty when outdoors.                       | 1 | 2 | 3 | 4 | 5 |
| 17. Going outside helps me stay in shape.                          | 1 | 2 | 3 | 4 | 5 |



## APPENDIX H - Comfort in Nature Questionnaire

1. How do you feel about playing outside on a sunny day?
2. How do you feel about playing outside on a cloudy day?
3. How do you feel about playing outside on a rainy day?
4. How do you feel about playing in the park?
5. How do you feel about watching the clouds?
6. How do you feel about playing in the dirt?
7. How do you feel about touching an earthworm?
8. How do you feel about playing with a lady bug?
9. How do you feel about touching a spider web?
10. How do you feel about playing with a lizard?
11. How do you feel about helping to plant a garden?

# APPENDIX I – Black Scientist Cards



A geographic information system (GIS) is a computer system that can capture, store, analyze, manage, and display geographic data. A GIS professional uses the computer system to perform spatial analyses on geographic data to answer scientific questions and present the results in maps.

**Ms. Erika Cohen**  
Physical Scientist  
specializing in GIS  
M.S., The University of Mississippi  
USDA Forest Service scientist

<http://www.naturalinquirer.org> <http://www.scienceinvestigator.org>

**Ms. Erika Cohen**

**Important Scientist Characteristics**

- ★ My ability to be detail-oriented and enjoy a challenge contribute most to my research. My work is like putting together a puzzle. The data layers are my puzzle pieces, and I have to figure how to put them together to answer the scientific question.

**Example of a simple research question I have tried to answer:** I work with the Water Supply Stress Index (WaSSI) model. This model looks at the effects of climate change, land use change, and water use change on water supply across the United States. Will future climate or land use changes have the most impact on water supply?

**Technology or equipment used in research:** I use computer mapping software called ArcGIS and a computer programming language called Python in my research. I use Python to automate tasks too complex to do by hand. I use ArcGIS for spatial analysis. Spatial analysis takes different kinds of information, each connected to a location on a map, and combines it. The result is like a map sandwich, with each location on the map having layers of information.

**Most Exciting Discovery**

- Using the WaSSI model
- that on a regional scale
- we have determined
- future climate could
- have a greater impact on
- water stress than land
- use changes, however
- on a local scale land use
- changes have a great
- impact on water stress.

**When did you know you wanted to be a scientist?**

- I knew in the 7<sup>th</sup> grade
- that I wanted to become
- a scientist. My initial
- goal was becoming
- a seismologist, which
- required majoring in
- geology. My focus changed
- from seismology to GIS my
- sophomore year of college.
- I loved that GIS could be
- applied to any discipline.

<http://www.forestthreats.org/research/tools/WaSSI/>



A soil microbiologist studies the diverse groups of organisms in soil, their functions, and their effect on soil structure, soil properties, and plant growth.

**Dr. Sharon Parker**  
Soil Microbiologist  
Program Leader for Science Synthesis  
Ph.D., Cornell University  
USDA Forest Service scientist

<http://www.naturalinquirer.org>

**Dr. Sharon Parker**

**Important Scientist Characteristics:**

- Good record-keeping contributed most to my research. Record-keeping is central in the scientific process for managing and planning research, for reproducing results, and for publishing and peer review.

**Example of a simple research question I have tried to answer:** What happens to bacterial populations when simple carbon compounds are limited? I was able to show that populations of bacteria decline in soil because of a limited supply of usable simple carbon compounds. The simple carbon compounds are used by fungi which are more efficient at adjusting and storing nutrients than bacteria.


**Technology or equipment used in research:** Currently, I use computers to communicate science information. When I was working as a soil microbiologist, I used traditional laboratory methods and equipment to isolate and identify bacteria from soil samples and diseased tree rings.

**Most Exciting Discovery**

- In my current position as Program
- Leader for Science Synthesis, I
- am most excited about helping
- to communicate the wonder of
- science to different audiences. My
- job includes ensuring that Forest
- Service science meets standards
- of excellence and reaches the
- people who can benefit from the
- knowledge.

**When did you know you wanted to be a scientist?**

- I was eight years old when I knew
- I wanted to become a scientist. I
- was a freshman in college when
- I decided I wanted to become a
- microbiologist. Bacteria intrigued
- me when I viewed them through
- the microscope, especially the
- differences between good and
- bad bacteria. Their shapes, sizes,
- and colors were fascinating!



As a forest and soil ecologist, I am interested in how forest management practices impact soils.

**Dr. Dexter Strother**  
Forest/Soil Ecologist  
Ph.D., University of Georgia  
USDA Forest Service scientist

<http://www.naturalinquirer.org>

**Dr. Dexter Strother**

**Important Scientist Characteristics:**  
Curiosity contributes most to my scientific research. It is the reason I became a scientist. I am always questioning things, and these questions lead me down many different paths.


**Example of a simple research question I have tried to answer:** What are the effects of black carbon on labile carbon? Black carbon is a product created naturally during wildland fires. Labile carbon is the portion of carbon in soils that can be easily decomposed by soil organisms.

**Technology or equipment used in research:**  
I often use a PP Systems EGM-4 Environmental Gas Monitor. It is not very big, weighing about 4 pounds. This equipment allows me to measure how much carbon dioxide is in a soil sample that I am using for research.

**Most Exciting Discovery**  
I am still in the process of conducting research, so my most exciting discovery is still to come.

**When did you know you wanted to be a scientist?**  
I believe I have been studying science for a long time, even when I was little. I did not know I would become a scientist until my time in college.

<http://www.naturalinquirer.org>



A biological scientist explores the interaction between the natural systems (e.g. living and nonliving) and humans.

**Dr. Viniece Jennings**  
Biological Scientist  
Ph.D., Florida A&M University  
USDA Forest Service scientist

<http://www.naturalinquirer.org> <http://www.scienceinvestigator.org>

**Dr. Viniece Jennings**

**Important Scientist Characteristics**  
Analytical skills and the ability to "connect the dots" between different areas are important in science.

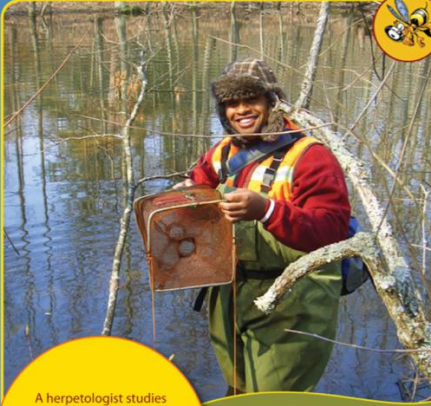
**Example of a simple research question I have tried to answer:** How does the presence of tree cover influence human health?

**Technology or equipment used in research:**  
I often use statistical software on my computer. This software allows me to analyze data and perform mathematical functions that would be very difficult to calculate by hand.

**Most Exciting Discovery**  
I wrote a paper on the relationship between greenspaces (e.g. parks, forests, gardens), ecosystem services (e.g. the benefits we receive from nature), and health concerns in low-income and minority communities. This was an exciting project because it clarified common ground between different subject areas.

**When did you know you wanted to be a scientist?**  
I knew I wanted to study science when I met a researcher at my high school career day. She discussed how her scientific background helped to answer research questions in environmental justice. I was a strong student in science. Seeing how she applied science to social justice issues sealed the deal.

<http://www.srs.fs.usda.gov/staff/145>



A herpetologist studies reptiles and amphibians. I assess how reptile and amphibian populations respond to forest management and land-use changes.

**Dr. Tim Baldwin**  
Herpetologist  
Ph.D., Alabama A&M University  
USDA Forest Service scientist

<http://www.naturalinquirer.org> <http://www.scienceinvestigator.org>

**Dr. Tim Baldwin**

**Important Scientist Characteristics:**  
I use careful observation, extensive record keeping, and my statistical background in my research. Amphibian and reptile communities are exciting to me. It is important that I take notes, photographs, and keep track of the information that is compiled for each captured individual.

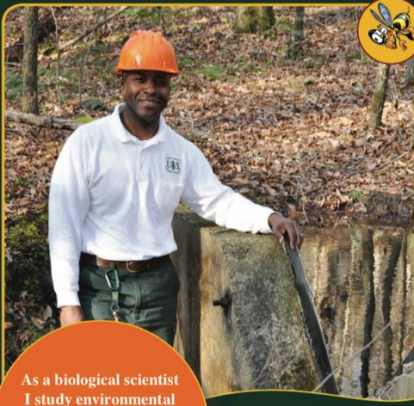
**Example of a simple research question I have tried to answer:** How does forest management influence amphibians' abilities to reproduce in ephemeral, or temporary, pools of water?

**Technology or equipment used in research:**  
I use snake hooks. A snake hook helps me immobilize a snake so that I can measure and weigh the individual. Once the animal is processed, I return the organism to the environment. Snake hooks can also be used to lift logs or other cover objects that herpetofauna use for refuge.

**Most Exciting Discovery**  
I found that eastern spadefoot tadpoles (*Scaphiopus holbrookii*) will often aggregate and consume other larval amphibians, including individuals that may be too large for one tadpole to eat. This collective feeding resembles a feeding frenzy.

**When did you know you wanted to be a scientist?**  
I have wanted to work with animals since I was 4 years old. In college, I worked as an intern on several wildlife studies, and these experiences gave me the opportunity to decide that I wanted to pursue a career in herpetology.

<http://www.srs.fs.usda.gov/staff/154>



As a biological scientist I study environmental processes related to how human and forest management activities will impact water and air quality.

**Mr. Johnny Boggs**  
Biological Scientist  
M.S., Alabama A&M University  
USDA Forest Service scientist

<http://www.naturalinquirer.org> <http://www.scienceinvestigator.org>

**Mr. Johnny Boggs**

**Important Scientist Characteristics**  
★ Curiosity and creativity are big parts of research and discovery. Formal training in math and science is also necessary to answer complex ecological questions. These talents and skills complement each other and keep exploration fun and interesting with the goal of producing sustainable environmental conditions for future generations to enjoy.

**Example of a simple research question I have tried to answer:** Forestry Best Management Practices (BMPs) are designed to prevent water pollution during tree harvest operations. A key research question that I am trying to answer is how effective are forestry BMPs at keeping streams and rivers clean and healthy.

**Technology or equipment used in research:**  
I use Sapflow Sensors and Sigma Samplers to collect large volumes of tree water use and streamflow data. I then use data analysis and statistical software to process these data and address a series of research questions related to forest water use and water pollution.

**Most Exciting Discovery**  
I discovered the effects of soils on the amount and health of water in some of North Carolina's forested areas. Since water runs underground to streams and water supply reservoirs, well-planned forest management helps reduce the amount of pollution in local water supplies. Land managers will use my discovery to improve water quality for human use.

**When did you know you wanted to be a scientist?**  
I was always curious about nature and how all aspects of it worked as an interconnected system. I started thinking about forestry or environmental science as a career after I took an environmental science class in high school.

<http://www.forestthreats.org/>

## APPENDIX J – Institutional Review Board Approval



### **INSTITUTIONAL REVIEW BOARD**

118 College Drive #5147 | Hattiesburg, MS 39406-0001

Phone: 601.266.5997 | Fax: 601.266.4377 | [www.usm.edu/research/institutional.review.board](http://www.usm.edu/research/institutional.review.board)

### **NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the “Adverse Effect Report Form”.
- If approved, the maximum period of approval is limited to twelve months.
- Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 18051001

PROJECT TITLE: A Mixed Methods Approach to Study the Effect of a Naturalist Summer Program on the Perceptions of African American Children about Nature

PROJECT TYPE: Doctoral Dissertation

RESEARCHER(S): Kendrick Buford

COLLEGE/DIVISION: College of Science and Technology

DEPARTMENT: Center for Science and Mathematics Education

FUNDING AGENCY/SPONSOR: N/A

IRB COMMITTEE ACTION: Expedited Review Approval

PERIOD OF APPROVAL: 06/07/2018 to 06/06/2019

**Edward L. Goshorn, Ph.D.**

**Institutional Review Board**

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