

8-2014

INVESTIGATING THE INFLUENCE OF INTERPRETATION ON CHILDREN'S NATIONAL PARK STEWARDSHIP BEHAVIORS USING THE ELABORATION LIKELIHOOD MODEL

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INVESTIGATING THE INFLUENCE OF INTERPRETATION ON CHILDREN'S
NATIONAL PARK STEWARDSHIP BEHAVIORS USING THE
ELABORATION LIKELIHOOD MODEL

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Parks, Recreation & Tourism Management

by
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August 2014

Accepted by:
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ABSTRACT

Interpretation efforts are commonly used in park and protected area management to communicate information about a place to visitors, and in some cases, are also intended to persuade visitors to engage in stewardship behaviors. The National Park Service (NPS) Junior Rangers (JR) programs are intended to develop a sense of stewardship within participating children; however, few studies have explored the effectiveness of these programs. In addition, despite considerable research investigating interpretation and its influence, further exploration of the factors that influence stewardship behaviors in participants of interpretation are needed. The purpose of this dissertation research was to: 1) develop scales to measure national park stewardship behaviors and elaboration in children, 2) examine the relationship between elaboration and the performance of national park stewardship behaviors, and 3) explore the influence of interpretation on youth participants' (ages 8-13) national park stewardship behaviors and behavioral intentions through an evaluation of the Great Smoky Mountains National Park (GRSM) JR program.

GRSM, the site selected for this study, is the most visited national park in America, averaging over nine million visitors per year over the past twenty years (National Park Service, 2012). GRSM is also a park in which the NPS has invested a great deal of effort in providing visitor interpretation programs intentionally designed to enhance the visitor experience and support resource stewardship. One of the park's most popular interpretation programs has been the JR program which aims to inspire youth participants to engage in national park stewardship behaviors (such as appropriate in-park

behaviors), and to promote the transference of those behaviors to children's homes and communities; however, no research had previously investigated the efficacy of the GRSM JR program.

A communication theory known as the elaboration likelihood model (ELM) (Brown, Ham, & Hughes, 2010; Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1981, 1986; Petty & Wegener, 1998) provided the theoretical foundation for surveys developed for this research. Survey data were collected during the summer of 2009 from two independent samples of GRSM visitors: 1) children (ages 8-13) who had not yet participated in the JR program, and 2) children (ages 8-13) who had completed the program and been sworn in as Junior Rangers.

Results indicated that the GRSM JR program had significant immediate impacts on youth participants' behavioral intentions and behaviors associated with national park stewardship. One longer-term positive effect was found pertaining to in-park stewardship behaviors while home and community behaviors returned to pre-visitation levels. The results suggest that interpretation programs, such as the GRSM JR program, have the potential to influence youth participants (ages 8-13) to engage in stewardship behaviors on-site, and to inspire intentions to participate in stewardship behaviors at home and in their communities.

This dissertation makes a contribution to the field with the development of two new scales for measuring the outcomes of interpretation on youth participants (ages 8-13). The first scale is the stewardship elaboration scale (SES), which includes sub-scales to measure program participants' interest and cognitive engagement in national park

stewardship issues. The second scale is the national park stewardship behavior scale (NPSBS), comprised of sub-scales measuring in-park, home, and community behaviors, which supports the concept of national park stewardship behaviors as a complex mix of distinct behavior types. Finally it was found that individuals with enhanced awareness, interest, and cognitive engagement, which were combined to represent elaboration, predicted intentions to perform, and the performance of, national park stewardship behaviors.

DEDICATION

I would like to dedicate this research to my husband, Steve Edelman, for his love and support, and for bringing peace and beauty into my life; to my parents, Jerry and Jackie Vezeau, for providing me a rock solid foundation, they are always with me, always loved and respected; to my children, Brian and Jasmine Beck, who have brought me more joy and fulfillment than they could possibly imagine; and to the memory and inspiration of George B. Hartzog, Jr., seventh director, of the National Park Service.

ACKNOWLEDGMENTS

Heartfelt thanks go out to the chair of my committee, Bob Powell, Ph.D., whose guidance, encouragement, and kindness have meant the world to me over the years. I would also like to express my appreciation to the members of my committee: DeWayne Moore, Ph.D., for his expert guidance in the area of statistical analysis and for having the patience of a saint; Brett Wright, Ph.D., for always having an open door and most importantly, for believing in me (I will forever be humbled and honoured at being selected as a George B. Hartzog, Jr. Fellow); and Marc Stern, Ph.D., for his vision, expertise and support throughout this entire process. Friends and colleagues in need of recognition include Susan Slocum, Ph.D., for going the distance with me in statistics; doctoral candidate, Carla Mora, for being the best research assistant and friend one could hope for; Jeff Skibins, Ph.D., and Matt Brownlee, Ph.D., for their guidance in SEM; Lynne Cory, Ph.D., for helping me through the trials and tribulations; and Karin Emmons, for her support and for always having a smile and a kind word to share. This research was sponsored by the Friends of Great Smoky Mountains National Park, and funded through a grant from Toyota, much appreciation to both organizations for their inspirational stewardship. Special thanks are also due to all of the outstanding rangers at Great Smoky Mountains National Park, especially to Cathleen Cook and Karen Ballentine for their initial vision and support throughout the study. Finally, I would like to acknowledge the park visitors, especially the children, who volunteered to completed a questionnaire, without your assistance, this project would not have been possible.

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CHAPTER I

INTRODUCTION

Recent reports, such as the Millennium Ecosystem Assessment (2005), and the fourth assessment report of the Intergovernmental Panel on Climate Change (IPCC, 2007), have acknowledged that human activity has negatively impacted environmental and cultural resources, resulting in the loss of cultural and bio-diversity, climate change, and the decline of the planet's ecosystem services, among others. These global issues indicate a need for improved stewardship behaviors at all levels of human society.

The development of parks and other protected areas is one way in which society attempts to preserve or conserve important resources. Setting the precedent on a national scale was the Organic Act of 1916, which created the National Park Service (NPS), requiring that national parks be preserved for the use and enjoyment of present and future generations. At the field level, this means providing services for both resource protection and enjoyment. Two of the most common ways in which the NPS protects park resources, promotes stewardship, and enhances visitor experiences are: 1) through law enforcement, ensuring that visitors comply with prescribed regulations or statutes which are intended to protect resources and visitor experiences alike; and 2), through voluntary interpretation programs.

Public education in parks and other informal settings, often called interpretation, is commonly used in park and protected area management to communicate information about a place to visitors (Ham, 1992; Ham, Brown, Curtis, Weiler, Hughes, & Poll, 2007; Tilden, 1957). In some cases, interpretation efforts are also intended to persuade visitors

to engage in stewardship behaviors, pro-environmental behaviors related to protecting the values of that place (Ham & Weiler, 2003; Barr, 2007; Dietz, Stern, & Guagnano, 1998; Dutcher, Finley, Luloff, & Johnson, 2007; Halpenny, 2006a; Olli, Grendstad, & Wollebaek, 2001; Olofsson & Ohman, 2006; Monroe, 2003; Stern, 2000; Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Winter, Volk, & Hungerford, 1994). However, differences of opinion exist within the field of interpretation regarding the purpose of interpretation programs. Some interpreters believe that these programs should focus on enhancing the visitor experience and connecting visitors to a place by revealing the meanings behind resources (e.g., Beck & Cable, 2002; Knudson, Cable, & Beck, 2003), while others believe that the primary purpose of interpretive programming is to motivate citizens to become pro-active stewards of the land (e.g., Farmer, Knapp, & Benton, 2007; Hungerford, Peyton, & Wilke, 1980; United Nations Educational, Scientific, and Cultural Organization-United Nations Environmental Programme [UNESCO-UNEP], 1978; United States Environmental Protection Agency, 2006). There are also those who believe in both, that interpretation focused on inspiring, or reinforcing, the adoption of stewardship behaviors may enhance visitor enjoyment and satisfaction (e.g., Powell & Ham, 2008), and that interpretation should also be used as a management tool for influencing specific visitor behaviors which may directly affect park resources (e.g., Ham, 2009).

One of the core values of the National Association for Interpretation (NAI) is to “connect people with their cultural and natural heritage to promote stewardship of resources” (2013). The NPS’ goals for interpretation include enhancing the visitor

experience and inspiring stewardship behaviors, both of which are central to the mission (see NPS Director's Orders *A Call to Action: Preparing for a Second Century of Stewardship and Engagement*, and *Advancing the National Park Idea: National Parks Second Century Commission Report*). Within the context of the national parks, stewardship is the responsibility for the protection of natural and cultural resources shared by all those who are interested in, or whose actions affect, a specific environment. In 2011, the *National Parks Second Century Commission Report* recommended that the nation enhance stewardship and citizen service (United States Department of the Interior). That same year, NPS Director, Jonathan B. Jarvis, issued orders calling on the park service to prepare for a "second century of stewardship" (NPS, August 25, 2011):

One of our most important responsibilities is to use the power and place of the National Park Service to ensure that everyone knows what it means to be an American. To accomplish this, we must invite our 307 million fellow citizens to get to know these places that they own, and discover the services the National Park Service performs in communities. That will help them experience their America and join us in stewardship.

The NPS has put a great deal of effort into developing visitor interpretation programs that enhance the visitor experience and support resource stewardship. For example, Great Smoky Mountains National Park (GRSM), the most visited national park in America with nearly 9.5 million visitors annually (NPS, 2012), has used interpretation and other forms of education as a means of dealing with such vast numbers of visitors.

One of the GRSM's most popular interpretation programs is its Junior Ranger (JR) program designed for children. Children are thought to have different cognitive, linguistic, emotional, and social skills than adults (Kohlberg, 1958; Piaget, 1932/1965, 1970; Woolley, Bowen, & Bowen, 2004), and it has been a commonly held belief that childhood is the time when an appreciation for nature should be instilled (Carson, 1956). It has been a commonly held belief that the stage of development during middle childhood is the time when an appreciation for nature should be instilled. Experts such as psychologist, David Sobel, explain that middle childhood (somewhere between the ages of six and twelve) "is a critical period in the development of the self and in the individual's relationship to the natural world" (1993, p. 159). It is during this period that children begin to care for nature as a matter of conscience and establish a sense of responsibility (Kellert, 2005). Outdoor settings experienced during middle childhood create significant memories that also create emotional attachments which cause people to care about nature, encouraging them to become stewards of the environment (Chawla, 1992; Cobb, 1977; Tanner, 1980).

Following suggestions from this research, the NPS has focused on providing interpretation specifically for children. For example, GRSM is one of 249 national park units which offer JR programs for children. NPS JR programs are intended to encourage children to develop a stewardship ethic by offering them the opportunity to participate in environmental stewardship as Junior Rangers (NPS, 2012). According to National Park Foundation President and CEO, Vin Cipolla: "[The Junior Ranger program] is an important part of our nationwide effort to connect children to America's heritage so that

they can develop the sense of pride and ownership necessary to be the future stewards of these magnificent places'" (NPS, 2007).

Problem Statement

The NPS JR programs are intended to develop a sense of stewardship within participating children; however, few studies have explored the effectiveness of these programs. In addition, despite considerable research investigating interpretation and its influence, further exploration of the factors that influence stewardship behaviors in participants of interpretation are needed.

Purpose Statement

The purpose of this dissertation research was to: 1) develop scales to measure national park stewardship behaviors and elaboration in children, 2) examine the relationship between elaboration and the performance of national park stewardship behaviors, and 3) explore the influence of interpretation on youth participants' (ages 8-13) national park stewardship behaviors and behavioral intentions through an evaluation of the GRSM JR program.

This research provides data to improve the provision of interpretation to the public by:

- Identifying and developing a scale to measure national park stewardship behaviors and behavioral intentions

- Identifying and developing a scale to measure elaboration, comprised of sub-scales for interest and cognitive engagement, found to influence national park stewardship behaviors and behavioral intentions
- Providing evidence in support of the Elaboration Likelihood Model, a behavioral theory from the field of communication

In addition, the results of this research provide information and direction to the GRSM interpretive management team through an evaluation of the JR program by:

- Gauging the influence of interpretation on youth participants' (ages 8-13) national park stewardship intentions and behaviors
- Suggesting improvements to current offerings by identifying immediate and longer-term program outcomes

It is hoped that these findings will be used to enhance the efficient functioning of future interpretive program administration and to increase the potential for positive impacts that interpretation can have on participants' national park stewardship behaviors.

Background

Research Site

GRSM, established on May 22, 1926, straddles a ridgeline of the Appalachian Mountains encompassing land in both Tennessee and North Carolina (Figure 1). The park covers 816 square miles, making it one of the largest protected areas in the eastern United States, with elevations ranging from a low of 876 feet (267 m), to a high of 6,643 feet (2,025 m) at the summit of Clingmans Dome (NPS, 2013a). The wide range of elevations, along

with abundant rainfall (averaging from 55 inches per year in the valleys to 85 inches per year on the peaks), provide diverse habitat for a great variety of species and the park was designated an International Biosphere Reserve in 1976 (NPS, 2013a).



Figure 1. Map of Great Smoky Mountains National Park

Known for its exceptional natural beauty, with forests covering 95% of the land (35% of which are old growth that include the worlds' largest remaining tract of virgin red spruce), GRSM is also rich in cultural resources, with evidence of human habitation reaching back thousands of years to prehistoric Paleo Indians (NPS, 2013a). In 1983, GRSM was certified as a UNESCO World Heritage Site in recognition of its unique and exceptional natural and cultural qualities (NPS, 2013a).

The Junior Ranger Program at Great Smoky Mountains National Park

JR program activities are traditionally conducted spring, summer, and fall, throughout GRSM, so that children are provided multiple opportunities to explore and learn about park resources. There are two ways for children to earn their GRSM Junior Ranger badge: 1) by attending three, ranger-led, JR program activities, or 2) by attending one ranger-led JR program activity, picking up one (grocery store size) bag of litter, and completing a certain percentage of the self-guided activities in an age-appropriate JR booklet.

JR booklets include place-based activities, reflective exercises, scientific experiments, puzzles, and other cognitive challenges. Although there has been a minimal charge for JR booklets, the ranger-led activities are free to all participants. Ranger-led JR activities are generally experiential in nature and place-based; they include, but are not limited to, ranger-led walks, presentations, and demonstrations. Examples of JR activities include children learning to make historic toys, such as corn husk dolls, and creating dinner bells in a blacksmith shop, visiting touch tables with animal skins, skulls, and scat, and conducting citizen science by collecting water quality and salamander data. All JR programs have been designed to provide opportunities for children to form connections between themselves and the park.

In order to attend any of the JR programs, an adult or guardian must accompany children; although, in general, entire families from very young children to the very elderly accompany JR program participants to ranger-led activities. This gives the NPS an opportunity to provide meaningful educational programs to a wide audience. Since

the GRSM JR program, like most interpretive park programs, involves voluntary audiences, park rangers attempt to influence behaviors by encouraging interaction between visitors and park resources.

Dissertation Overview

Following this introductory chapter, in chapters two through four, are three manuscripts intended for publication in appropriate academic journals as a means of presenting the findings of this dissertation to a broader audience. The first manuscript, within chapter two, discusses the use of structural equation modeling (SEM) confirmatory factor analysis (CFA), to determine the construct validity, reliability, and psychometric properties of the scales developed to evaluate the influence of the JR program on youth participants' (ages 8-13) behavioral intentions and behaviors associated with national park stewardship.

The second manuscript, chapter three, discusses an investigation of the theoretical relationships between concepts derived from the elaboration likelihood model (ELM), and stewardship behaviors using structural regression modeling. The third manuscript, chapter four, discusses the results of the JR program evaluation on stewardship behavioral intentions and behaviors of children (ages 8-13), including: the effects of participation, as well as the implications and applications of these findings for JR program managers. A final chapter summarizes dissertation findings, discusses the theoretical implications of this research, offers suggestions for future research, and

discloses limitations. Several appendices are attached which contain comments from the surveys, the surveys themselves, and all supporting documents.

CHAPTER II (MANUSCRIPT 1)
DEVELOPMENT & VALIDATION OF TWO SCALES TO MEASURE
ELABORATION & BEHAVIORS ASSOCIATED WITH
NATIONAL PARK STEWARDSHIP IN CHILDREN

This investigation examines two newly developed scales associated with elaboration and behaviors associated with national park stewardship in children. The scales have been developed using confirmatory factor analysis to investigate their construct validity, reliability, and psychometric properties. Results suggest that a second-order factor model structure provides the best fit. This model produced: 1) a national park stewardship behavior scale (NPSBS) measuring in-park, community, and home behaviors, and 2) a stewardship elaboration scale (SES) measuring interest and cognitive engagement in national park stewardship issues. These scales will be useful for designing and evaluating interpretation and educational programs focused on environmental and park stewardship. The scales may also help researchers assess whether a communication strategy or interpretive program results in participants elaborating on persuasive messaging, thereby increasing the likelihood that behavioral intentions leading to behavior change will occur.

Keywords: Confirmatory factor analysis, scale development, National Park Service, Junior Ranger program, elaboration likelihood model, stewardship behavior, children.

Introduction

The Organic Act of 1916, which created the U.S. National Park Service (NPS), mandates the NPS to preserve the important resources of each national park, while also providing opportunities for the use and enjoyment of these resources by present and future generations. In parks and protected areas worldwide, one strategy for protecting valuable resources and mitigating environmental impacts associated with visitation includes providing public education, otherwise known as interpretation, regarding the meanings and importance of park resources and the need for their stewardship (NPS, 2005).

One of the most popular interpretation programs offered by the NPS is the Junior Ranger (JR) program, which is intended to develop a sense of stewardship within youth participants (NPS 2007). Yet few evaluations of this program have been undertaken, and there exists no scale that measures national park stewardship in children. This chapter discusses the development of two scales: 1) the national park stewardship behavior scale (NPSBS), designed to measure, home, community, and in-park stewardship behaviors, and 2) the stewardship elaboration scale (SES), designed to measure interest and cognitive engagement in issues pertaining to national park stewardship.

The development of these scales were part of a broader research effort that sought to investigate and test the factors that influence intentions to perform environmentally positive behaviors associated with national park stewardship. To develop these scales, surveys were distributed to two independent samples of youth (ages 8-13) in Great Smoky Mountains National Park (GRSM1) children who intended to participate in the Junior Ranger program, and 2) children who had completed the program. Their

responses were used to investigate the scales' construct validity, reliability and psychometric properties using structural equation modeling.

Research Site and Context

Established by Congress on June 15, 1934, GRSM is the most visited national park in America, with over nine million annual visitors (NPS, 2012). As a means of dealing with such vast numbers of visitors, the NPS provides visitor interpretation programs in an effort to enhance the visitor experience and support resource stewardship. One of GRSM's most well attended interpretation programs has been its JR program. Children can become Junior Rangers by attending three ranger-led interpretive programs, or by attending one ranger-led interpretive program, picking up one (grocery store size) bag of litter, and completing the self-guided activities in an age-appropriate JR activity booklet.

Theoretical Framework

In 2007, GRSM staff and invited stakeholders participated in a focus group to identify specific desired outcomes for the GRSM JR program following guidelines from the Sustainable Evaluation Program development process (Powell, Stern & Ardoin, 2006; Powell, Stern, Krohn, & Ardoin, 2007). Programmatic objectives revolved around increasing performance of national park stewardship behaviors by: a) raising awareness of issues pertaining to stewardship, b) sparking an interest in participants to learn about park resources, c) cognitively engaging participants, and d) modeling appropriate in-park behaviors. A relatively new objective for the JR program involved influencing the

transference of national park stewardship behaviors to other public lands, as well as encouraging participants to engage in stewardship behaviors at home and in their communities.

With these goals in mind, the elaboration likelihood model (ELM), a communication theory from the field of social psychology (Petty & Cacioppo, 1981, 1986), was selected as the theoretical foundation for this research. The ELM suggests that interpretation and other persuasive communications may influence behaviors through two potential routes, the central route and the peripheral route (Ham, Brown, Curtis, Weiler, Hughes, & Poll, 2007; Petty & Cacioppo, 1981, 1986).

The central route to persuasion is thought to draw upon a person's awareness of a subject and their level of interest, or motivation, to become cognitively engaged in thoughts regarding a persuasive message (Petty & Cacioppo, 1981, 1986). If a communication effort leads to an increase in awareness, interest, and cognitive engagement, "elaboration" is said to occur, and the potential to develop a lasting change in a person's salient beliefs and behaviors increases (Kenrick, Neuberg, & Cialdini, 2002; Petty & Cacioppo, 1981, 1986; Petty, McMichael, & Brannon, 1992). Beliefs developed through the central route to persuasion tend to be relatively accessible, persistent over time, resistant to change, and predictive of behavior (Figure 2) (Kenrick, Neuberg, & Cialdini, 2002; Petty, McMichael, & Brannon, 1992).

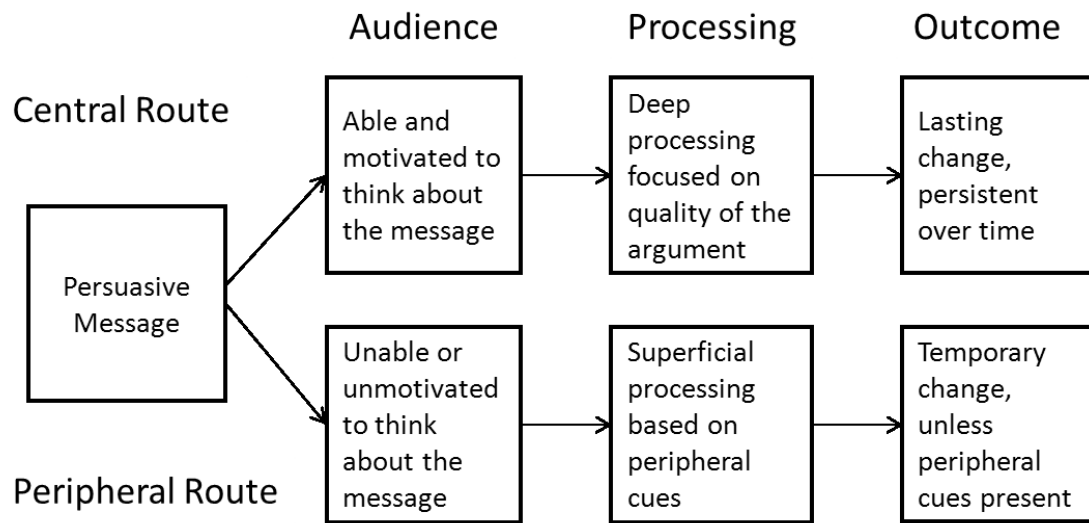


Figure 2. Elaboration Likelihood Model: Routes to Persuasion (Based on a model by Kenrick, Neuberg, & Cialdini, 2002)

The peripheral route to persuasion involves much less mental effort and is strongly influenced by peripheral cues such as the characteristics of the message, the messenger, or the context in which the message was received (Petty & Cacioppo, 1981, 1986). In a park setting, for example, a sign that targets littering behavior often elicits the peripheral route. When a message is short and contextual, elaboration may be unnecessary (Brown, Ham, & Hughes, 2010; Ham, Brown, Curtis, Weiler, Hughes, & Poll, 2007). Similarly, if a person's interest or awareness is low, an individual may be unwilling to engage in elaborative thoughts. When this happens, peripheral cues like the presence of park staff or the park setting may influence behaviors. The peripheral route to persuasion is likely to cause only a temporary change in behaviors and is apt to be less influential or enduring unless peripheral cues are constantly present or repetitive (Brown, Ham, & Hughes, 2010; Ham, Brown, Curtis, Weiler, Hughes, & Poll, 2007).

Following recommendations by Ham, et al., (2007), constructs associated with the ELM were developed to determine if they influence participation in national park stewardship behaviors (e.g., Brown, Ham, & Hughes, 2010; Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986; Petty & Wegener, 1998).

Conceptualization & Survey Development

Following recommended procedures for scale development (DeVellis, 2003; Presser, Couper, Lessler, Martin, Martin, Rothgeb, & Singer, 2004), a review of the existing literature on stewardship behaviors and the variables associated with the ELM: awareness, interest, and cognitive engagement, was conducted to aid in their conceptualization and operationalization. An item pool was created in conjunction with this literature review. All items were screened for possible inclusion in the survey instrument, and were also examined for item formatting, including response options, instructions, and item order, while keeping the cognitive ability of the study population, children ages 8-13, in mind. Other survey items were developed using the operational definitions, corresponding goals and specific objectives of each construct.

National Park Stewardship Behaviors

Stewardship behaviors are generally considered pro-environmental behaviors. The same holds true for national park stewardship behaviors, which focus on behaviors that minimize impacts caused by visitation and enhance the protection of natural and cultural landscapes, yet are also transferable to visitors' homes and communities. There is some debate in the literature whether pro-environmental behaviors are a cohesive group of

general behaviors with similar intentions and motivations for performance (e.g., Powell et. al, 2008, 2009; Beaumont, 2001; Kellert, 1998; Cottrell, 2003) or are multi-dimensional. Environmental or stewardship behaviors may be considered multi-dimensional if intentions and motivations for performance vary based on the types of behavior, such as political behaviors, consumer behaviors, and ecosystem behaviors (e.g., Barr, 2007; Dietz, Stern, & Guagnano, 1998; Dutcher, Finley, Luloff, & Johnson, 2007; Olofsson & Ohman, 2006; Monroe, 2003; Stern, 2000).

The literature on scales developed to measure pro-environmental behaviors contain examples of both specific environmental behaviors (e.g., “conserved water by turning off the tap while washing dishes”), and general environmental behaviors (e.g., “try to learn what I can do to help solve environmental issues”). In some scales both specific and general behaviors are used (e.g., Vaske & Korbin, 2001). In other studies, specific behaviors (even those forming discrete factors) are lumped together as composite variables to measure general pro-environmental behaviors (e.g. Olli, Grendstad, & Wollebaek, 2001).

Recent literature presents pro-environmental behaviors as a complex concept comprised of general and discrete types of behaviors which are dependent upon social context and influenced by a range of predictors (e.g., Halpenny, 2006a; Olli, Grendstad, & Wollebaek, 2001; Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Winter, Volk, & Hungerford, 1994). These findings provided support for this studies’ hypothesis that national park stewardship behaviors (in general) could be conceptualized as a single

latent construct comprised of three specific, context based, types of behaviors including in-park, home, and community behaviors.

In-park behaviors. In-park behaviors were defined in this study as positive stewardship behaviors that minimize environmental and cultural impacts while visiting the park. One of the primary JR program objectives is encouraging participants to practice positive in-park behaviors and minimizing the occurrence of negative behaviors that cause environmental and cultural impacts. Seven survey items, three of which were negatively worded and therefore needed to be reverse-coded, were developed to measure in-park stewardship behaviors (see Table 1). Behavioral frequency item response options included: 1) Never, 2) Rarely, 3) Sometimes, 4) Often, and 5) Always. Similar items were used by Stern, Powell, and Ardoin (2008) in their exploration of the influences of 3-day and 5-day residential environmental education programs at the Great Smoky Mountains Institute at Tremont.

Home behaviors. Home behaviors were defined in this study as personal stewardship behaviors intended to conserve natural resources in the home. JR program objectives include the transference of stewardship skills and ethics to the home environment. Six items were developed to measure home stewardship behaviors (Table 1), with response options of 1) Never, 2) Rarely, 3) Sometimes, 4) Often, and 5) Always. Several researchers have examined similar concepts using scales related to environmental outcomes. Examples include: Stern, Powell, and Ardoin's (2008) environmental stewardship index ($\alpha = 0.70$); Leeming, Dwyer, and Bracken's (1995) children's environmental attitude and knowledge scale (CHEAKS, $\alpha = 0.88$); Milfont, Duckitt, and

Cameron's (2006) proenvironmental [sic] behavior scale ($\alpha = 0.73$); and Musser and Diamond's (1999) children's attitudes toward the environment scale, preschool version ($\alpha = 0.68$). Each of these scales included items pertaining to home stewardship behaviors such as: recycling, riding public transportation, and energy and water conservation, to measure pro-environmental behaviors.

Community behaviors. Community behaviors were defined in this study as stewardship behaviors that seek to influence a pro-environmental use of natural resources within a community, or the positive actions of others towards such use, through direct or indirect action. JR program objectives included civic engagement such as volunteerism, donating to environmental causes, and participation in stewardship behaviors on other public lands. Six items were developed to measure community behaviors (Table 1), with answer choices of 1) Never, 2) Rarely, 3) Sometimes, 4) Often, and 5) Always. Scales designed to measure similar pro-environmental behaviors include: Dutcher, Finley, Luloff, and Johnson's (2007) environmental behavior scale ($\alpha = 0.67$); Malkus' (1992) adults' attitudes toward the environment scale ($\alpha = 0.61$ for women, and 0.72 for men); Stone, Barnes, and Montgomery's (1995) ECOSCALE ($\alpha = 0.93$); Stern, Dietz, and Kalof's (1993) awareness of consequences scale ($\alpha = 0.82$); and Weigel and Weigel's (1978) environmental concern scale ($\alpha = 0.88$).

Elaboration

Findings from studies using the ELM as a theoretical framework have been encouraging, providing evidence that elaboration is a potential precursor of behavior change (e.g., Brown, Ham, & Hughes, 2010; Lackey & Ham, 2003, 2004). Elaboration is thought to

occur through the central route to persuasion due to personal involvement, the credibility of sources, and positive message framing (e.g., Bruyere, 2008; Göckeritz, Schultz, Rendon, Cialdini, Goldstein, & Griskevicius, 2010; Gore, Knuth, Scherer, & Curtis, 2008; Jones, Sinclair, & Courneya, 2003; Kim, Airey, & Szivas, 2011; Petty & Cacioppo, 1986). Interest, awareness, and cognitive engagement are believed to lead to elaboration (Petty & Cacioppo, 1986).

Interest. Interest was defined in this study as a desire to learn about general, and specific, national park stewardship issues. GRSM JR program objectives include: a) an interest in learning about park resources; b) an interest in learning about other national parks and the outdoors; and c) an interest in learning about the protection of natural and cultural resources. Several studies have found that having an interest in learning is related to changes in behavior (e.g., Leeming, Dwyer, & Bracken, 1995; Malkus, 1992; Musser & Malkus, 1994; Tarrant & Green 1999). Stern, Powell, and Ardoin (2008) included a separate index of “interest in learning and discovery” (comprised of five items) in their children’s environmental stewardship scale ($\alpha = 0.70$). These items were designed to gauge a participants’ degree of interest in learning about natural and cultural resources and directly exploring them (e.g., “interest in learning about plants, animals, and the places they live;” “interest in visiting national parks”). Several of these items were borrowed, and others developed, to construct the interest scale which contained a total of six items with the following response options: 1) Not at all interested, 2) Slightly interested, 3) Somewhat interested, 4) Very interested, and 5) Extremely interested (Table 2).

Awareness. Awareness has been defined in this study as an awareness of park resources and stewardship issues and events. JR program objectives include an: a) awareness of the NPS Mission; b) awareness of the importance of park resources to wellbeing; and c) awareness of the consequences of actions on resources. Six items were developed for the awareness scales (Table 2), with response options of 1) Strongly disagree, 2) Disagree, 3) Neutral, 4) Agree, and 5) Strongly agree. Environmental awareness was defined by Kollmuss and Agyeman (2002) as “knowing of the impact of human behavior on the environment” who described it as having both cognitive and affective dimensions (p. 253).

Awareness has been found to be a separate dimension from knowledge (Stone, Barnes, & Montgomery, 1995), however, and has been related to participation in stewardship behaviors (Scholl, Inui, & Lankford, 2006). Concepts similar to, or related to, awareness, including consequences of human environmental actions and concern for the environment, have been used in several studies (e.g., Schultz, 2000, 2001; Weigel & Weigel, 1978). Scales employing these concepts include Leeming, Milfont, Duckitt, and Cameron’s (2006) environmental motives scale ($\alpha = 0.86-0.90$ for three categories of environmental concern); Wall, Devine-Wright, and Mill’s (2007) awareness of consequences scale ($\alpha = 0.86$); as well as the NEP (Dunlap & Van Liere, 1978), the revised NEP (Dunlap et al., 2000), and the NEP for children (Manoli, Johnson & Dunlap, 2007).

The NEP focuses on differences in ecological worldviews, beliefs thought to arise from an awareness of the interconnectedness of all living things (Gardner & Stern, 2002).

It has been argued, however, that the NEP measures awareness of the consequences of human behavior on the environment rather than ecological worldviews (Stern, Dietz, & Guagnano, 1995). An item from the NEP related to the consequences of human behavior on the environment was modified for inclusion in the awareness scale.

Cognitive engagement. Cognitive engagement has been defined in this study as the amount of time people have spent thinking about a stewardship subject. Another JR program objective was for participants to engage in experiencing, and thinking about, natural and cultural resources with an emphasis on national parks. Six items were developed for the cognitive engagement scale (Table 2), with response options of 1) Never, 2) Little, 3) Somewhat, 4) Much, and 5) A great deal. Several scales have included items asking about the frequency in which individual's engaged in reading about the environment, attended meetings on environmental issues, or watched environmental programs on television; examples include Powell, Kellert, and Ham's (2008, 2009) environmental behaviors and future intentions index ($\alpha = 0.82$), Malkus' (1992) home environmental practices inventory, and Tarrant and Green's (1999) study of the predictive validity of environmental attitudes. Other examples of cognitive engagement may include cognitive involvement or analytical conversation (Leinhardt & Crowley, 2002).

Methods

Pilot Testing

Cognitive testing is a critical process for designing surveys for children, as adult designers of surveys have different cognitive, linguistic, emotional, and social skills than children (Kohlberg, 1958; Piaget, 1932/1965, 1970; Woolley, Bowen, & Bowen, 2004). Cognitive testing for this research involved surveying and then interviewing (with parental permission) 50 children (ages 8-13) visiting GRSM to understand their thought processes (Bowen, 2008). Brief interviews were conducted with each child after they answered one of five different mini surveys, with up to 10 items, in order to identify any sources of confusion or misunderstanding (de Leeuw, Borgers, & Smits, 2004).

Next the survey instrument was pilot tested during the summer of 2008 with 180 respondents, children ages 9-13, at a weeklong residential summer camp located in Williamsburg, VA. The pilot test was analyzed using both exploratory and confirmatory factor analysis (CFA), which included the use of Lagrange Multiplier calculations, factor loadings, error variances, correlations, validity, and reliability estimates, to determine item fit. All questionable items were revised or removed. The revised survey instrument included three constructs based on differing types of national park stewardship behaviors: in-park, community, and home stewardship behaviors (Table 1), and three theoretical constructs to measure elaboration: awareness, interest and cognitive engagement (Table 2).

Data Collection

Using a systematic sampling technique, pre-test surveys were administered to children (ages 8-13) who had not yet participated in the JR program yet intended to do so during their visit and post-test surveys to children (8-13) who had just completed the JR program. Independent groups (i.e., pre-tests and post-tests were completed by different individuals) were used to reduce participant burden and eliminate the potential for testing bias.

Pre-test survey data was collected between Wednesday, July 15th and Saturday, July 18th, 2009 at four high-use park locations where GRSM rangers conduct JR programs, Clingman's Dome and the three park visitor centers: Oconaluftee, Sugarlands, and Cades Cove. Parental consent was obtained by approaching adults with a child who appeared to be in the targeted age range (8-13) and asking permission for their child to complete a questionnaire. If permission was given, the child was then invited to participate in the study. In total, 193 pre-test surveys were collected with a response rate of 79%. Post-test surveys were administered to JR program participants (ages 8-13), with the permission of accompanying parents or guardians, at each of the three park visitor centers from June 21st through August 8th, 2009. A total of 211 post-test surveys were collected with a response rate of 97%.

Data Screening

All data were screened for outliers and missing data. Data screening involved calculations for leverage, kurtosis, and skew as a way to eliminate outliers and evaluate

assumptions of normality (Gould, Moore, McGuire & Stebbins, 2008; Tabachnick & Fidell, 2001). Data screening resulted in the removal of fifty-five cases from the combined samples for various reasons: a) twenty-four cases were removed for not providing age; b) seventeen cases were removed because either more than 25% of the data was missing overall, or more than 50% was missing from one construct; c) nine cases were removed as outliers, and d) five cases were removed due to non-normality when checking for kurtosis and skew. The final sample used for analysis was a total of 349 surveys, 164 pre-test and 185 post-test, with an effective response rate of 67% and 85% respectively.

Equivalence across Samples

A statistical comparison of the categorical variables gender and race was conducted using Chi-square analysis to verify the comparability of pre- and post-test groups. Results showed no statistically significant difference between the two samples, leading to the conclusion that comparisons between test groups were valid.

Item Screening

After the completion of data screening and determining the comparability between test groups, the corrected item-total correlations, item means, and variances were examined (Table 1 & Table 2) (DeVellis, 2003, p. 93-94). While all of the items demonstrated significant skew, the majority of awareness items had little to no variance (e.g., SDs below 1) (Table 2).

In scale development, an item must have sufficient variance in order to covary with other items and represent a latent variable; having “either a lopsided mean or low variance for any reason will usually tend to reduce an item’s correlation with other items” limited variance, the awareness items were removed from further analysis. CFA was then used to determine the structural and psychometric properties of the remaining five constructs: interest, cognitive engagement, in-park stewardship behavior, community stewardship behavior, and home stewardship behavior.

Table 1. Dependent Stewardship Behaviors Variables’ Means & Std. Deviations

Concept (Item Stem)	Items	Pre		Post	
		M	SD	M	SD
Awareness: (Pre & Post) Do you agree or disagree with the following statements?	Climate change can harm Great Smoky Mountains National Park	3.94	1.01	4.15	0.97
	Protecting a lot of different kinds of animals will help keep our planet healthy	4.54	0.68	4.77	0.51
	Having healthy trees in the park helps clean the air we breathe	4.71	0.48	4.84	0.39
	The National Park Service takes care of historic places so people can enjoy them	4.52	0.66	4.77	0.44
	Leaving garbage out in the park can make wild animals sick	4.57	0.95	4.80	0.64
	My family will benefit because the National Park Service protects parks for the future	4.28	0.88	4.64	0.61
Interest: (Pre & Post) How interested are you in learning about the following things?	The plants in Great Smoky Mountains National Park	3.47	1.00	3.66	0.90
	How to keep the park’s rivers and streams clean	3.91	0.93	4.11	0.91
	How to preserve cultural sites in the park	3.82	1.09	4.14	0.98
	The history of Great Smoky Mountains National Park	4.08	0.95	4.39	0.87
	How to protect animals in the park	4.56	0.70	4.66	0.61
	Other national parks	3.80	0.98	4.24	0.88
Cognitive Engagement: (Pre & Post) How much have you thought about the following things?	The benefits of being in the outdoors	4.16	0.91	4.31	0.88
	How I should behave when visiting the park	4.19	0.90	4.46	0.76
	The harm some people do to the park by their actions	3.94	1.06	4.37	0.92
	The ways I can help protect our national parks	3.98	0.96	4.29	0.84
	How important parks are to the planet	4.18	0.99	4.39	0.85
	The history of Great Smoky Mountains National Park	3.95	1.06	4.15	1.05

Table 2. Independent Variables' Means & Std. Deviations

Concept (Item Stem)	Items	Pre		Post	
		Mean	SD	Mean	SD
<i>In-Park Behaviors:</i> <i>(Pre)</i> How often did you do the following things while visiting Great Smoky Mountains National Park? <i>(Post)</i> After starting the Jr. Ranger program, how often did you do the following things while visiting Great Smoky Mountains National Park?	*Feed wild animals	4.54	1.01	4.92	0.48
	*Pick wildflowers	4.29	1.06	4.79	0.60
	*Take artifacts found in the park	4.62	0.82	4.92	0.35
	Clean up litter left by others	3.34	1.23	3.89	1.05
	Learn more about the park's natural environment	3.76	1.09	4.16	0.98
	Dispose of trash properly	4.63	0.78	4.86	0.35
	Store food out of reach of wildlife	4.30	1.21	4.78	0.74
<i>Community Behaviors:</i> <i>(Pre)</i> How often do you plan on doing the following things within the next three months? <i>(Post)</i> Due to your participation in the Junior Ranger program how often do you plan on doing the following things within the next three months?	Volunteer to help the environment	3.24	1.15	3.88	0.94
	Make places for wildlife in my neighborhood	3.21	1.25	3.48	1.25
	Talk to others about protecting nature	3.28	1.17	3.84	1.05
	Ask my family to use less electricity at home	3.28	1.33	3.95	1.08
	Suggest visiting national parks to other people	3.45	1.18	4.08	1.03
	Help clean up a local park when asked	3.67	1.27	4.31	0.89
<i>Home Behaviors:</i> <i>(Pre)</i> How often do you do the following things? <i>(Post)</i> How often do you plan on doing the following things within the next three months?	Turn off the water when brushing my teeth	4.52	0.90	4.64	0.68
	Recycle	4.07	1.07	4.40	0.92
	Ride public transportation when available	2.88	1.38	2.93	1.36
	Reuse things like plastic bottles or bags	4.24	0.97	4.43	0.74
	Walk or bike instead of riding in the car	3.30	1.23	3.32	1.09
	Turn off lights when not being used	4.18	0.94	4.41	0.80

* Reverse coded items; Items in bold were retained in the final scales.

Confirmatory Factor Analysis

CFA explicitly tests a hypothesized measurement model, identifying factor structure through fit indices, which describe the model's ability to account for covariances in the data (Gould, et. al., 2008). EQS v6.1 software (Bentler, 2005) was used to perform CFA,

and Lagrange Multiplier calculations, factor loadings, error variances, correlations, validity, and reliability estimates together provided empirical support for the retention of those items that best fit the model.

During model development, four different models were tested, first with the pre-test data and then with the post-test data, to compare different conceptualizations of the factor structure and to see if the hypothesized factor structure was consistent across groups (Kyle, Graefe, & Manning, 2005; Whiteside-Mansell & Corwyn, 2003). The models tested included: 1) a one factor model to see if the 31 items represented a one-dimensional construct; 2) a five-factor model with 31 items; 3) a modified five-factor model (after items were discarded for poor performance); and 4) a second-order factor model, to see if the three behavior constructs comprised a higher order stewardship behavior factor, and if the interest and cognitive engagement factors comprise a higher order elaboration factor.

In addition to model development, the data was tested using both a constrained multi-group model, in which all factor loadings were constrained to be equal (Byrne, 2006), and an unconstrained multi-group model, to see if there was equivalence across samples (invariance testing). The potential for method bias was investigated by combining the modified five-factor model with the addition of a single unmeasured latent method factor (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The method bias model was then tested for equivalence across samples by examining both constrained and unconstrained multi-group method bias models.

Several fit indices were evaluated and reported, including both absolute and relative fit measures. Absolute fit measures do not depend on a comparison with another model, but instead measure the difference between the observed covariances (the sample) and the model implied covariances (estimated for the population). Relative fit measures identify how much a model differs from the null model, a model with the indicators' covariances specified at zero (Gould et. al., 2008, p. 55). In all cases, robust fit indices were used, accounting for non-normality of data (Bentler, 1990; Byrne, 2006).

Absolute fit indices reported included the root mean square error of approximation (RMSEA) and the Satorra-Bentler Scaled Chi-Square (S-B χ^2). The S-B χ^2 adjusts model chi-square for non-normality and measures the goodness of fit between the null model and the observed data (Fornell & Larcker, 1981). The RMSEA draws a comparison to a perfect, or saturated, model to determine the lack of fit (Tabachnick & Fidell, 2001). In general, an absolute fit index value of 0.09 is considered good model fit, and a value below 0.05 excellent model fit (Gould et. al., 2008, p. 55).

Relative fit indices reported included the Comparative Fit Index (CFI) and the Non-Normed Fixed Index (NNFF). The NNFF evaluates the estimated model by comparing the Chi-square (χ^2) value of the model to the χ^2 value of the independent model, incorporating the degrees of freedom (Tabachnick & Fidell, 2001). The independence model assumes that all the variables in the model are unrelated. The CFI is an incremental fit index that determines differences in fit between the hypothesized model and the independence model (Byrne, 2006, p. 97; Kline, 2005, p. 140). In general,

relative fit index values can range from zero to 1.0, with >0.90 being acceptable model fit, and >0.95 being good fit (Gould et. al., 2008, p. 55; Hu & Bentler, 1998).

The Lagrange Multiplier (LM) function, along with theoretical considerations, was used to determine sources of misfit in the models (items that eroded model fit). The LM test attempts to improve model fit by changing parameters, such as estimating fixed parameters or removing an item all together (Tabachnick & Fidell, 2001, p. 721). Misfit occurs when items have covariances that do not match the model-implied covariances, indicating that the factors are not accounting for the covariance between items (Gould et. al., 2008, p. 55). When items have very high or very low covariance, or they covary a great deal with items from other factors, they have common variance unaccounted for by the latent variable and cause harm to the model fit. This may be due to a number of issues, such as a similarity in wording between items, indicating the need for their removal or revision in order to eliminate redundancy in the model.

Lastly, the Rho coefficient was used to check for reliability. The Rho coefficient is similar to and interpreted in the same way as Cronbach's alpha, with scores above 0.6 considered adequate for group prediction (Gay, 1991); however, the Rho coefficient adjusts for multiple factors, unequal factor loadings, and the use of error terms in confirmatory factor analysis, making it more appropriate for use in this context (Byrne, 2006).

Results of Model Assessment using CFA

Following suggested CFA procedures, five constructs: 1) interest, 2) cognitive engagement, 3) in-park behaviors, 4) community behaviors, and 5) home behaviors, were tested by using both conceptually based factor structure, and alternative models. National park stewardship behaviors and behavioral intentions have been combined for CFA procedures in this research due to the fact that these analyses employ independent pre- and post-test samples, and are not longitudinal. Separate models were tested using the pre-test data, and a second time using the post-test data set, to determine correlations and to allow comparison both within and between samples. While this does create some redundancy in reporting, the ability to compare results across samples was important for confirming the metric and structural validity of the scales (Breckler, 1990; Browne & Cudeck, 1993); therefore, the resulting fit indices from both groups are reported (Table 3).

Model 1 employed a one factor model built on the hypothesis that all items contributed to a single latent factor. The model from the pre and post data produced indices indicating poor fit (Pre-test fit indices: S-B $\chi^2=843.82$, $p=.000$, NNFI=.524, CFI=.555, RMSEA=.082; Post-test fit indices: S-B $\chi^2=713.73$, $p=.000$, NNFI=.677, CFI=.698, RMSEA=.063).

The next model, Model 2, tested a five-factor model structure with all 31 items. The factors included: interest (6 items), cognitive engagement (6 items), community behaviors (6 items), in-park behaviors (7 items), and home behaviors (6 items). While there was improvement in the fit indices for Model 2, the results were still indicative of a

poorly fitting model (Pre-test fit indices: S-B $\chi^2=644.86$, $p=.000$, NNFI=.737, CFI=.760, RMSEA=.061; Post-test fit indices: S-B $\chi^2=578.61$, $p=.000$, NNFI=.817, CFI=.833, RMSEA=.047). Examination of additional empirical evaluation methods, including factor loadings, error variance, correlations, and the LM test results, indicated there were a number of items that were contributing to misfit within the model.

In order to improve the fit and obtain a more parsimonious solution, 13 items out of the original 31 were deleted from the model due to low factor loadings, large residuals, or highly correlated error terms (Bentler & Chou, 1987). Model 3, represents a modified five-factor model with the remaining 18 items. Eliminated items included two each from the community behavior, cognitive engagement, and home behavior factors, three items from the interest factor, and four items from the in-park behavior factor, three of which were negative behaviors (behaviors that people should not perform in parks) which had been reverse coded. Fit indices indicated this was an acceptable model (Pre-test fit indices: S-B $\chi^2=140.91$, $p=.157$, NNFI=.958, CFI=.966, RMSEA=.029; Post-test fit indices: S-B $\chi^2=116.34$, $p=.698$, NNFI=1.000, CFI=1.000, RMSEA=.000).

Next, a second-order factor model (Model 4), was used to test the hypothesis that two, second-order factors might exist. One of the second-order factors represented stewardship behaviors, accounting for the covariation between the three, first-order latent behavior factors: community, in-park, and home behaviors. The other second-order factor represented elaboration, accounting for the covariation between the first-order factors of interest and cognitive engagement. The results of the model indicated that the three stewardship first-order factors, in-park, community, and home behaviors, were

highly correlated and had acceptable factor loadings, both indications of a second-order stewardship behavior factor. Likewise, the first-order factors interest and cognitive engagement, when constrained to take care of the issue of being under-identified, provided evidence of a second-order elaboration factor with acceptable factor loadings, which was also highly correlated with the second-order behavior factor (Figure 3).

Table 3. Results of CFA Model Development, Method Bias & Multi-group Testing

MODEL	Test	SB χ^2	df	p	NNFI	CFI	RMSEA*
Model 1: One Factor (31 Items from 5 Constructs)	Pre	843.82	434	.000	.524	.555	.082 (.073-.089)
	Post	713.73	434	.000	.677	.698	.063 (.054-.071)
Model 2: Five-factor Model (31 Items)	Pre	644.86	424	.000	.737	.760	.061 (.051-.070)
	Post	578.61	424	.000	.817	.833	.047 (.037-.056)
Model 3: Modified Five-factor Model (18 items)	Pre	140.91	125	.157	.958	.966	.029 (.000-.051)
	Post	116.34	125	.698	1.000	1.000	.000 (.000-.031)
Model 4: Second-order Factor Model (5 First & 2 Second-order Factors)	Pre	148.83	129	.112	.967	.972	.032 (.000-.053)
	Post	141.38	129	.215	.973	.977	.024 (.000-.045)
Unconstrained Multi-group Modified Five-factor Model (18 items)		256.98	250	.367	.991	.993	.013 (.000-.035)
Constrained Multi-group Modified Five-factor Model (18 items)		277.91	265	.281	.985	.987	.018 (.000-.037)
Method Bias Model (18 Items - 6 Factors)	Pre	111.3	107	.369	.987	.991	.016 (.000-.046)
	Post	87.51	107	.916	1.000	1.000	.000 (.000-.015)
Unconstrained Multi-group Method Bias Model (18 Items - 6 Factors)		198.43	214	.770	1.023	1.000	.000 (.000-.024)
Constrained Multi-group Method Bias Model (18 Items - 6 Factors)		243.53	245	.515	1.002	1.000	.000 (.000-.032)

*90% confidence interval around the RMSEA in parenthesis

MODEL	Test	SB χ^2	df	p	NNFI	CFI	RMSEA*
Second-order Factor Model	Pre	148.83	129	0.112	0.967	0.972	0.032 (.000-.053)
	Post	141.38	129	0.215	0.973	0.977	0.024 (.000-.045)

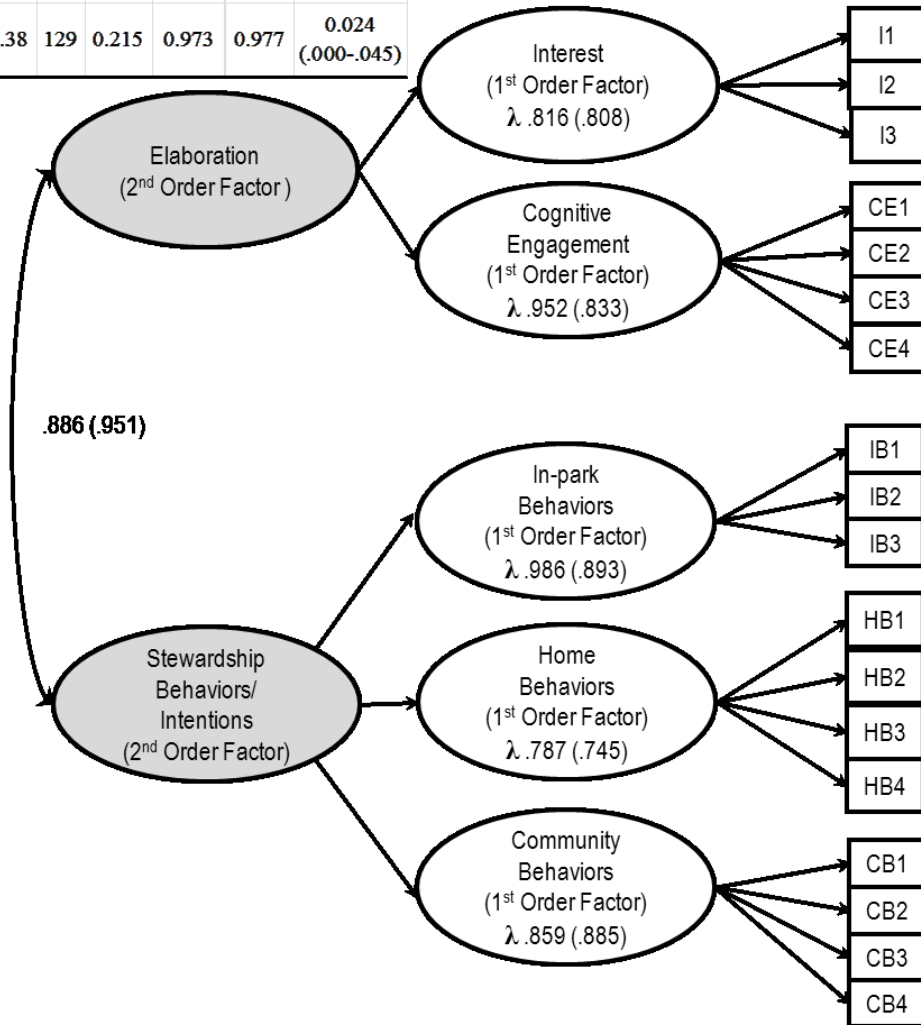


Figure 3. The Second-Order Factor Model (#4) with Pre & (Post-Test) Second-Order Factor Loadings (λ) & Correlations

Model 4, which contained the second-order factors stewardship behavior and elaboration, also had acceptable fit indices (Pre-test fit indices: S-B $\chi^2=148.83$, $p=.112$, NNFI=.967, CFI=.972, RMSEA=.032; Post-test fit indices: S-B $\chi^2=141.38$, $p=.215$,

NNFI=.973, CFI=.977, RMSEA=.024). Results of a comparison made between Model 4 and Model 3 using the Chi Square difference test (Byrne, 2006) showed a significant difference between the two models using both pre-test fit indices (S-B χ^2 scaled difference=11.83, df=4, Chi Square p=0.019) and post-test fit indices (S-B χ^2 scaled difference=420.10, df=4, Chi Square p=0.00); thus indicating that while the two models are similar in terms of model fit, they are not identical.

Invariance Testing

Determining how consistently a scale functions can be addressed by assessing validity within different groups, and the use of an independent sampling technique provided two appropriate sets of data, the pre- and post-test groups, for this purpose. Validity can be examined by considering measurement invariance within different groups by determining whether a set of items are related to the same factors (Kline, 2005, p. 295). Configural invariance was tested to determine if an identical factor structure existed, while metric invariance was tested to find out if the factor loadings were equivalent across samples (Byrne, 2006; Kline, 2005; Vandenberg & Lance, 2000).

Configural invariance was determined by comparing the two groups simultaneously using multiple-group CFA (Byrne, 2006). Labelled as the “unconstrained multi-group modified five-factor model” (Table 3), the fit indices for the data in the unconstrained model were acceptable (S-B χ^2 =256.98, p=.367, NNFI=.991, CFI=.993, RMSEA=.013). This indicates that the number of factors and the pattern of item-factor loadings were essentially the same between both groups, providing support for the

existence of identical factor structure (i.e., the model was configurally invariant across both samples).

Metric invariance between the two data sets was determined by comparing the “unconstrained multi-group modified five-factor model” with the “constrained multi-group modified five-factor model” in which all factor loadings were constrained to be equal (Byrne, 2006). The Chi Square difference test was non-significant at the .05 level (S-B χ^2 scaled difference=21.12, df=15, Chi Square p=0.13) (Byrne, 2006). Although the models were not significantly different, three items, one in-park behavior item “Storing food out of reach of wildlife,; and two home behavior items “Recycling” and “Reusing things like plastic bottles or bags,” did have significantly lower factor loadings in the post-test group as compared to the pre-test group when the single degree of freedom univariate tests were examined. All factor loadings, for both the pre- and post-test groups, were positive and in the expected direction (Table 4).

Testing Method Variance

While excellent fit indices were obtained from Model 3, the modified five-factor model, a more rigorous model was tested by adding an additional unmeasured latent method factor to the structure to evaluate the potential effects of common method variance. Method variance, related to the method of measurement rather than the items or constructs of interest, can have a serious impact on empirical outcomes, resulting in the possibility of misinterpreting results (Campbell & Fiske, 1959; Podsakoff et. al., 2003). CFA results, using both the pre- and post-test data, showed little improvement, however, over Model 3, the modified five-factor model (Pre-test fit indices: S-B χ^2 =111.3, p=.369, NNFI=.987;

CFI=.991, RMSEA=.016; Post-test fit indices: S-B $\chi^2=87.51$, $p=.916$, NNFI=1.000, CFI=1.000, RMSEA=.000), indicating that results are not due to the method of measurement.

Table 4. Individual Item Factor Loadings (λ)

Factor	Item Stem	Item	PRE	POST
Interest	How interested are you in learning about the following things?	The plants in Great Smoky Mountains National Park	.639	.547
		How to keep the park's rivers and streams clean	.635	.706
		How to preserve cultural sites in the park	.716	.518
Cognitive Engagement	How much have you thought about the following things?	the benefits of being in the outdoors	.679	.522
		how I should behave when visiting the park	.749	.626
		how important parks are to the planet	.767	.754
		the history of Great Smoky Mountains National Park	.650	.797
In-park Behaviors	<i>(Pre)</i> How often do you plan on doing the following things while visiting Great Smoky Mountains National Park? <i>(Post)</i> How often did you do the following things while visiting Great Smoky Mountains National Park?	Clean up litter left by others	.777	.534
		Learn more about the park's natural environment	.817	.758
		Store food out of reach of wildlife	.512	.296
Home Behaviors	<i>(Pre)</i> How often do you do the following things? <i>(Post)</i> How often do plan on doing the following things within the next three months?	Recycle	.768	.533
		Reuse things like plastic bottles or bags	.931	.674
		Walk or bike instead of riding in the car	.728	.756
		Turn off lights when not being used	.525	.716
Community Behaviors	<i>(Pre)</i> How often do you do the following things? <i>(Post)</i> Due to your participation in the Junior Ranger program how often do you plan on doing the following things within the next three months?	Volunteer to help the environment	.754	.775
		Make places for wildlife in my neighborhood	.660	.506
		Talk to others about protecting nature	.841	.865
		Ask my family to use less electricity at home	.734	.683

Next, the Method Bias Models were also analyzed using multi-group CFA methods, further verifying equivalence across samples (Unconstrained: S-B $\chi^2=198.43$, $p=.770$, NNFI=1.000, CFI=1.000, RMSEA=.000; Constrained: S-B $\chi^2=243.53$, $p=.515$,

NNFI=1.000, CFI=1.000, RMSEA=.000), as the Chi Square difference test was non-significant at the .05 level (S-B χ^2 scaled difference=43.99, df=31, Chi Square p=0.06) (Byrne, 2006).

The Final Model

Model 4, the second-order factor model with the factor structure containing the two second-order factors stewardship behavior and elaboration, was the model of choice. This model produced indices with both the pre- and post-test data sets indicating excellent model fit (Pre-test fit indices: S-B χ^2 =148.83, p=.112, NNFI=.967, CFI=.972, RMSEA=.032; Post-test fit indices: S-B χ^2 =141.38, p=.215, NNFI=.973, CFI=.977, RMSEA=.024). Additional supporting evidence for the existence of the two second-order factors included the high correlations and acceptable factor loadings from each scale's first-order factors (Table 4). First-order factors retained at least three items (Table 4), with 18 items remaining: interest (3 items), cognitive engagement (4 items), community behaviors (4 items), in-park behaviors (3 items), and home behaviors (4 items). According to Kline (2005), three items are adequate for indicating a latent construct (p. 314).

Discussion & Suggestions for Future Research

Discussion

The purpose of this research was to develop scales to measure national park stewardship behaviors and elaboration in children so that future research might: 1) examine the relationship between elaboration and the performance of national park stewardship

behaviors, and 2) explore the influence of interpretation on youth participants. The results suggest that both the NPSBS and the SES are reliable and valid scales. National park stewardship behavior, (NPSBS) is a latent, second-order factor, consisting of three context-based, first-order behavioral factors that measure in-park, home, and community behaviors. These results support findings reported by previous studies which have found distinctly different categories of stewardship and pro-environmental behaviors (e.g., Chawla & Cushing, 2007; Hungerford & Volk, 1990; Keogh, Halpenny, & Gilligan, 2006; Sivek & Hungerford, 1989/1990).

The SES represents the only scale currently available for measuring elaboration as theorized by the ELM. The results of our analyses indicate that elaboration, as measured by the SES, is as a second-order latent factor comprised of two sub scales (first order factors), interest and cognitive engagement associated with national park stewardship. Items intended to measure the concept of awareness, theoretically related to elaboration, were removed from this analyses due to low variance. When further examining the two scales (NPSBS and SES) and their potential for evaluating the influence of interpretive programs, the low variability and high level of skew, as demonstrated by the means and standard deviations of the corresponding items (SD ranging from 0.74 to 1.33), suggest that there are limitations that should be discussed. Problems pertaining to lack of variance and skewness are not unique in scales used to evaluate interpretation and informal environmental education programs (Dawes, 2008; Peterson & Wilson, 1992). Typically this problem with measurement reflects a scale's insensitivity, or inability to effectively measure variations in a held attitude across a population or changes due to a

treatment because there is a measurement bias (e.g., high scores in pre-experience limit ability of scale to measure a change) and a potential for social desirability.

This lack of sensitivity ultimately pertains to the design and construction of the scales (Munshi, 2014; Thurstone, 1928). According to the literature, there are several ways to improve variance in responses. First, studies have found that by removing the unused response options of a skewed scale, and adding additional options so that the number of responses is not reduced, a greater degree of discrimination may be achieved with lower mean scores and higher standard deviations (Klockars & Yamagishi, 1988; Klockars & Hancock, 1995). Although this may appear to limit the possibility of measuring all potential responses to a statement (e.g., from strongly disagree-strongly agree), if prior research has determined that the full five-point range of response options were not utilized, or in the case of this study, only two or three points out of five, then it may be appropriate to realign the response options and anchor with the neutral response (Streiner, 1985).

Another scale construction technique to consider in cases where there is a lack of variation in responses is to expand the Likert-type scales from five points to seven, or even ten points, which according to literature does not erode the validity and reliability of a scale (Dawes, 2008; Hawthorne, Mouthaan, Forbes, & Novaco, 2006; Streiner & Norman, 2008). However, if one's sample is children, care must be taken when increasing the number of response options to ensure that they are able to understand the subtle differences between answer choices, or validity may be reduced (Clark & Watson, 1995). Ultimately, fewer than five items reduces the sensitivity of the scale and more

than nine items can result in cognitive overload (Hawthorne, Mouthaan, Forbes, & Novaco, 2006), while producing only marginal improvement (Cox, 1980).

Although results from this study indicate that the SES and NPSBS, as currently measured, are valid and reliable scales for determining children's elaboration and behaviors pertaining to national park stewardship, we suggest adjusting the anchors and increasing the number of response options to improve item variance and therefore scale performance. With enhanced sensitivity, these scales could be used to help researchers assess the degree to which a communication strategy or interpretive program results in participants elaborating on persuasive messaging. The utilization of these scales also has the potential to provide researchers, and managers, a way of evaluating program outcomes, establishing a baseline for the future adaptive management of communication strategies and messaging. The scales can then be used for measuring the relative effectiveness of subsequent program revisions in improving stewardship behavior in all of its different guises.

Suggestions for Future Research

It is suggested that future research address measurement issues associated with limited variance by examining outcomes using scales with alternative response options or seven point scales. The items associated with the concept of awareness had limited variance and minimal item-scale correlations. Future research should examine this construct outside of the park context or by utilizing a control group of individuals not intending to participate in environmental education or interpretive programs. An individual's awareness of an issue is theoretically important to influencing intentions and behaviors;

revising existing items or developing new ones for this concept is suggested so that a wider range of responses may be acquired in future studies.

The NPSBS and SES were purposely designed to be highly transferable to other national park interpretive programs with the caveat that some items within the in-park behavior scale may need to be revised to coincide with individual park programmatic goals. Generalizability should also extend to environmental education and interpretation programs outside of the national parks and, although further research is necessary to assess the scales' transferability, these scales are now available for use in future research to aid in the evaluation of programs with similar programmatic goals, especially goals involving communication strategies aimed at improving stewardship outcomes among children ages 8-13.

CHAPTER III (MANUSCRIPT 2)

INVESTIGATING ELABORATION LIKELIHOOD MODEL PREDICTORS & THE NATIONAL PARK STEWARDSHIP BEHAVIORS OF CHILDREN: A STRUCTURAL MODEL

Structural equation modeling (SEM) was employed to investigate whether elaboration, comprised of awareness, interest, and cognitive engagement were predictive of changes in children's behavioral intentions and behaviors associated with national park stewardship. The Elaboration Likelihood Model provided the theoretical foundation for surveys developed to explore the influence of interpretation on youth participants (ages 8-13) in the Great Smoky Mountains National Park Junior Ranger program. SEM procedures suggested that elaboration accounted for 88% of the variance in participants' national park stewardship behaviors/intentions, consisting of: in-park, home, and community behaviors.

Keywords: Structural equation modeling, interpretation, National Park Service, Junior Ranger, elaboration likelihood model, stewardship behaviors.

Introduction & Purpose

Interpretation is commonly used in park and protected areas to communicate information to visitors, to spark interest, and to provoke reflection (Ballantyne & Uzzell, 1999; Cole, Hammond, & McCool, 1997; Ham, 1992; Hendee, Stankey, & Lucas, 1990; Powell & Ham, 2008; Roggenbuck & Berrier, 1982; Vagias, Powell, Mainella, Moore, Norman, & Wright, 2009; Washburne & Cole, 1983). In some cases, interpretive efforts are also

intended to persuade visitors to engage in behaviors related to protecting the values of that place (e.g., Brown, Ham, & Hughes, 2010; Ham & Weiler, 2003); in fact, one of the core values of the National Association for Interpretation (NAI) is to “connect people with their cultural and natural heritage to promote stewardship of resources” (NAI, 2013).

From the early days of interpretation and environmental education a great deal of interpretive programming has been geared toward influencing the behavior of children. Children are thought to have different cognitive, linguistic, emotional, and social skills than adults (Kohlberg, 1958; Piaget, 1932/1965, 1970; Woolley, Bowen, & Bowen, 2004), and it has been a commonly held belief that childhood is the time when an appreciation for nature should be instilled (Carson, 1956). This belief is still held today, and experts, such as psychologist David Sobel, explain that middle childhood (somewhere between the ages of six and twelve) “is a critical period in the development of the self and in the individual’s relationship to the natural world” (1993, p. 159). It is during this period that children may begin to care for nature as a matter of conscience and establish a sense of responsibility (Kellert, 2005).

While interpretation efforts may be intended to instill, reinforce, or even provoke changes in a child’s beliefs or behaviors, it is difficult to determine if, and why, changes occur. The purpose of this research was to investigate, through the use of structural equation modeling (SEM), which of the theoretical factors from a communication theory known as the elaboration likelihood model (ELM) (Petty & Cacioppo, 1979, 1981, 1986) were predictive of changes in children’s (ages 8-13) behavioral intentions and behaviors associated with national park stewardship. The ELM provided the theoretical foundation

for surveys developed to explore the influence of interpretation on youth participants through an evaluation of the Great Smoky Mountains National Park (GRSM) Junior Ranger (JR) program. Data for this research was collected from children (ages 8-3) immediately following program participation.

Background

Junior Rangers is one of the National Park Service's (NPS) most popular interpretive programs. The JR program in GRSM, which reaches thousands of children annually, has been designed to enhance participants' experience of the park and support resource stewardship through the following programmatic goals:

- Raise participating children's awareness of issues pertaining to park stewardship;
- Encourage participating children to develop an interest in learning about, and an appreciation for, park resources;
- Promote appropriate in-park behaviors;
- Inspire national park stewardship behaviors, such as environmental conservation and park advocacy which can be applied in a home or community setting.

Ranger-led GRSM JR program activities are traditionally conducted in the spring, summer, and fall, throughout the park, offering children multiple opportunities to explore and learn about park resources. As part of the interpretation program, children may earn a JR badge by: 1) attending three ranger-led JR program activities, or 2) attending one ranger-led JR program activity, picking up one (grocery store size) bag of litter, and

completing a certain percentage of the self-guided activities in an age-appropriate JR activity booklet.

JR booklets include place-based activities, reflective exercises, scientific experiments, puzzles, and other cognitive challenges. Ranger-led JR program activities are generally experiential in nature and place-based; they include, but are not limited to, ranger-led walks, presentations, and demonstrations. Examples of ranger-led JR program activities include children learning to make historic toys, such as corn husk dolls, creating dinner bells in a blacksmith shop, visiting touch tables with animal skins, skulls and scat, and conducting citizen science by collecting water quality and salamander data. All JR program activities are designed to provide opportunities for visitors to form connections between themselves and the park. Despite large numbers of children participating in the GRSM JR program annually, prior to this evaluation, no research had investigated the efficacy of the GRSM JR program.

In 2007, GRSM staff and invited stakeholders participated in a focus group to identify specific desired outcomes for the GRSM JR program. Programmatic objectives revolved around improving national park stewardship behaviors by: a) raising awareness of issues pertaining to stewardship, b) sparking an interest in participants to learn about park resources, c) engaging participants, and d) teaching appropriate in-park behaviors. A relatively new objective for the JR program involves influencing the transference of national park stewardship behaviors to other public lands, as well as encouraging participants to engage in stewardship behaviors at home and in their communities.

Theoretical Framework

A Brief History on Theories of Behavioral Change

Interpretation, as a mechanism for influencing behaviors, has benefited from theoretical advancement within the fields of social psychology and persuasive communication.

Behavioral change theories have evolved from longitudinal models, which postulated that an increase in knowledge directly caused changes in attitude and behavior, to much more complex models where numerous factors, both extrinsic and intrinsic, are believed to correlate with behavior. Psychology and sociology became prominent fields of scientific inquiry in the late 19th century and scientists began developing theories to explain the relationship between attitude and behavior as early as 1862 (Brown, 2006, p.1). The term “attitude,” as a social psychological concept (Jahoda, 2007, p. 177), was defined by scholars Thomas and Znaniecki (1918-1920) as “a process of individual consciousness which determines real or possible activity of the individual in the social world;” they then defined social psychology as “the scientific study of attitudes” (vol. 1, p. 22)

Attitude became a focus of study in the 1920’s; however, results were not always what they were expected to be, and from the 1930’s on, empirical research began reporting weak relationships between attitudes and behaviors (Eagly & Chaiken, 1993, p. 155).

LaPiere (1934), for example, found people’s attitudes were often inconsistent with their actions (O’Keefe, 2002). Even faced with such poor results, psychologist G. W. Allport (1935, p. 810) declared attitude to be “the single most important concept in social psychology.” By the 1950’s, it became universally recognized that “attitude” was a multi-

dimensional concept, and the assumption that changes in attitude would influence behavior was rarely questioned (Ajzen & Fishbein, 2005). The consensus within psychology at the time was that attitudes were believed to guide people's behavior (Armitage & Christian, 2003), and the investigation of attitude as a theoretical factor of behavior change continued to be a major focus of social psychology (Jahoda, 2007).

In 1936, Sherif reported the results of his study on conformity, which suggested that group (social) norms, established by interactions between individuals, influence attitudes and behavior through the moderation of extreme opinions until a consensus or compromise could be reached. In 1954, Festinger proffered the theory of social comparison to explain how social pressures (e.g., demands to conform to group norms or goals), exerted on individuals, influence behavior change. Social norms have continued to be a theoretical factor of interest in behavior research into the present.

Control beliefs were introduced as factors of behavioral change in 1954 as part of Rotter's social learning theory. An expectancy-value theory, social learning theory suggests that a person's motivation to engage in a behavior is influenced through: 1) expectations pertaining to the outcomes of the behavior, and 2) the value of those outcomes. The theory, believed to work in both specific and generalized situations, introduced "locus of control," as a generalized expectancy (Wallston, 1992, p. 184; Cleveland, Kalamas, & Laroche, 2005). Internal control refers to a person's expectation that their behavior is dependent on their own actions or characteristics, versus their expectation that the outcome is in the control of external sources (e.g., determined by others or simply a function of chance) (Rotter, 1966). The Health Belief Model

developed in the 1950's by U. S. Public Health Service researchers (Green, 2002), also introduced control as a factor predicative of behavior. The model proposed cognitive factors, including: knowledge and understanding of the health issues, and thoughts on the consequences of treating or not treating the condition, as well as a belief in one's control over the behavior, to be predictive of a person's health behavior (Green, 2002).

Propelled by propaganda research undertaken during World War II (Hovland, Lumsdaine, & Sheffield, 1949), a movement was initiated in social psychology known as "persuasive communication research" and became a major focus in post-war years (Hovland, Janis, & Kelley, 1953). Message learning theory (Hovland, Janis, & Kelley, 1953) delineated a communication model of persuasion where an individual uses cognitive processes in a six stage sequence consisting of: exposure to a message, attention, comprehension, acceptance, opinion change, and attitude change. In information integration theory, Anderson (1968) asserted that attitudes toward behaviors are formed and changed through the integration of new information from a variety of sources including: existing thoughts, self-perception, and persuasive communication.

In 1969, an extensive survey and literature review was conducted on the subject of attitude and behavior by Wicker, whose results revealed the average correlation between attitude and behavior to be 0.15 ($r = 0.15$). The conclusion was that "it is considerably more likely that attitudes will be unrelated or only slightly related to overt behaviors than that attitudes will be closely related to actions" (Wicker, 1969, p. 65). Researchers responded by investigating why there was not a direct relationship between behavior and

attitude, and began looking for potential moderators and mediators (Armitage & Christian, 2003).

A notable contribution to this search was made by social psychologists Fishbein and Ajzen (1975), with the theory of reasoned action (TRA). Within the TRA, behavioral beliefs are the underlying foundation of attitudes, which are a person's beliefs related to the likely outcomes of a behavior, while normative beliefs, the basis of subjective norms, are beliefs based on societal and peer pressures about performing the behavior (Fishbein & Ajzen, 1975). The TRA suggests that attitudes toward behaviors and subjective norms are the determinants of behavioral intention, and that intention is the most important predictor of a person's behavior (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980).

In 1977, Bandura presented social cognitive theory, proposing that: a) people learn by watching others; b) that thought processes are key to understanding personality; and c) that control beliefs, termed perceived self-efficacy, influence people's emotions, thoughts, motivations, and behaviors. Bandura defined self-efficacy as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (1994, p. 71). Schwartz also employed self-efficacy in the 1977 norm-activation theory (NAT). NAT postulates that pro-social behavior is determined by personal norms (feelings of strong moral obligation to engage in the behavior), which are activated by four situational variables (variables that differ in strength across situations): awareness of need, ascription of responsibility, outcome efficacy, and self-efficacy (Schwartz, 1977). Acting on personal norms is believed to result in positive cognitive and emotional rewards, such as feelings of pride and improved

self-worth, while negative self-thoughts and feelings of guilt may result from not taking action (Schwartz, 1977).

In 1985, Ajzen proposed the theory of planned behavior (TPB) by adding control beliefs, known as perceived behavioral control (PBC), as an adaptation of the theory of reasoned action (Fishbein & Ajzen, 1975), to address the problem of volitional control (Ajzen, 1988). PBC is defined as control beliefs regarding one's perceived ability to perform a behavior (i.e., the extent to which a person judges the performance of a behavior to be both possible and under their control) (Ajzen, 1988, 2002). The TPB suggests that PBC, along with behavioral beliefs, attitude toward the behavior, normative beliefs, and subjective norms, are the determinants of behavioral intention, and that intention along with PBC are predictive of behavior (Ajzen, 1988, 1991, 2002).

The Elaboration Likelihood Model

Unlike social cognitive theories of social psychology like the TRA and TPB, the elaboration likelihood model (ELM) (Petty & Cacioppo, 1979, 1981), a theory from the field of communication, suggests that attitude change resulting from persuasive communication may often be based on peripheral cues, rather than a great deal of cognitive processing. While the effect of interpretation on changes in attitudes and behavior may be more of a continuum than a dichotomy, the ELM suggests that interpretation and other communication may influence attitudes and behaviors through two potential routes (Figure 4), the central route and the peripheral route (Ham, Brown, Curtis, Weiler, Hughes, & Poll, 2007; Petty & Cacioppo, 1979, 1981, 1986).

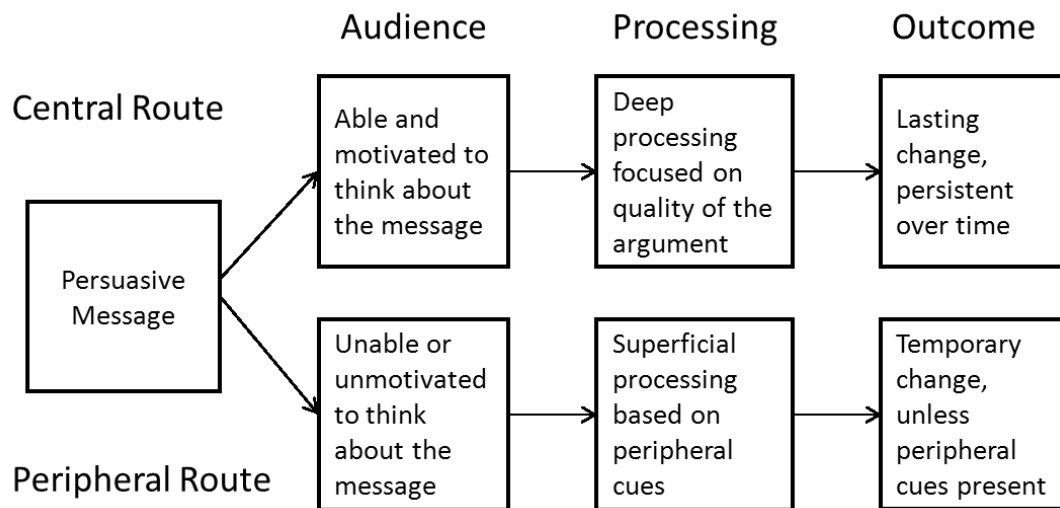


Figure 4. Elaboration Likelihood Model: Routes to Persuasion (Based on a model by Kenrick, Neuberg, & Cialdini, 2002)

The central route to persuasion has two prerequisites, 1) motivation, and 2) the ability to think about the message and its topic (Petty & Cacioppo, 1979, 1981, 1986). The central route to persuasion is believed to draw upon a person's awareness of a subject and their level of motivation or interest to engage in elaborative thoughts regarding a persuasive message (Petty & Cacioppo, 1979, 1981, 1986). If a communication effort leads to "elaboration," the potential to develop a lasting change in a person's salient beliefs, attitudes, and behaviors increases (Petty & Cacioppo, 1979; Petty, Cacioppo, & Goldman, 1981). Attitudes developed through the central route to persuasion tend to be relatively accessible, persistent over time, resistant to change, and predictive of behaviors (Petty, McMichael, & Brannon, 1992).

The peripheral route to persuasion involves much less effort and is strongly influenced by peripheral cues such as: the characteristics of the message, the messenger, or the context in which it was received (Petty & Cacioppo, 1981, 1986). In a park setting, for example, a sign that targets littering behaviors often elicits the peripheral route. When a message is short and contextual, elaboration may be unnecessary. Similarly, if a person's interest or awareness is low, an individual may be unwilling to engage in elaborative thoughts; when this happens, peripheral cues, such as signs or the park setting, may still be persuasive. The peripheral route to persuasion is likely to cause only a temporary change in attitudes or behaviors and is apt to be less influential or enduring unless peripheral cues are constantly present or repetitive (Eagly & Chaiken, 1993; Petty & Cacioppo, 1981, 1986).

The ELM was selected as the theoretical foundation for this research. It was hypothesized that if participation in the JR program could raise participants' awareness about national park resources and stewardship issues, spark an interest in learning about them, and engage participants in thinking about them, it would encourage elaboration. Elaboration, believed to occur through the central route to persuasion (Petty & Cacioppo, 1981, 1986), would be likely to increase positive behavioral intentions and behaviors associated with national park stewardship.

Theoretical Model

The GRSM goals for the JR program, along with the conceptualized predictors from the ELM, provided the foundation for the theoretical model for this research (Figure 5). The

model portrays elaboration, comprised of awareness, interest, and cognitive engagement, as a determinant of stewardship behaviors/intentions, comprised of in-park, community, and home behaviors. Stewardship behaviors and behavioral intentions have been combined for SEM procedures in this research, due to the fact that this analysis employs a post-test sample only and is not longitudinal.

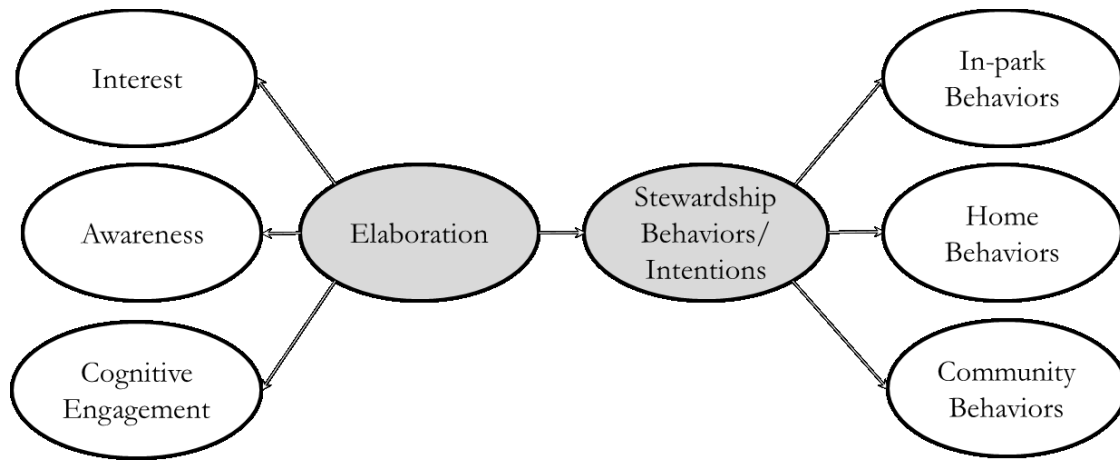


Figure 5. Theoretical Model of Elaboration Influencing Changes in National Park Stewardship Behaviors/Intentions

Conceptualization and Survey Development

Following the theoretical model (Figure 5) a review of the existing literature on stewardship behaviors and the variables associated with the ELM (awareness, interest, and cognitive engagement) was conducted to aid in their conceptualization and operationalization for this study (Brown, Ham, & Hughes, 2010; Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1981, 1986; Petty & Wegener, 1998). Definitions for each concept were developed, based on both the literature and specific JR programmatic

goals, and an item pool was generated. Several survey items were gathered from previously published surveys and modified for use, while others were developed specifically for each concept.

National Park Stewardship Behaviors

Stewardship behaviors are generally considered ethical and sustainable pro-environmental behaviors. The same holds true for national park stewardship behaviors which focus on behaviors that minimize impacts caused by visitation and enhance the protection of natural and cultural landscapes in a specific environment, yet are also transferable to visitors' homes and communities. There is some debate in the literature whether pro-environmental behaviors are a cohesive group of general behaviors with similar intentions and motivations for performance (e.g., Powell et. al, 2008, 2009; Beaumont, 2001; Kellert, 1998; Cottrell, 2003) or are multi-dimensional. Multi-dimensional behaviors may have intentions and motivations for performance which vary based on the types of behavior, such as political behaviors, consumer behaviors, ecosystem behaviors, and others (e.g., Barr, 2007; Dietz, Stern, & Guagnano, 1998; Dutcher, Finley, Luloff, & Johnson, 2007; Olofsson & Ohman, 2006; Monroe, 2003; Stern, 2000).

The literature on scales developed to measure pro-environmental behaviors contain examples of both specific environmental behaviors (e.g., “conserved water by turning off the tap while washing dishes”), and general environmental behaviors (e.g., “try to learn what I can do to help solve environmental issues”). In some scales both specific and general behaviors are used (e.g., Vaske & Korbin, 2001). In other studies,

specific behaviors (even those forming discrete factors) are lumped together as composite variables to measure general pro-environmental behaviors (e.g, Olli, Grendstad, & Wollebaek, 2001).

Recent literature presents pro-environmental behaviors as a complex concept comprised of general and discreet types of behaviors which are dependent upon social context and influenced by a range of predictors (e.g., Halpenny, 2006a; Olli, Grendstad, & Wollebaek, 2001; Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Winter, Volk, & Hungerford, 1994). These findings provided support for this studies' hypothesis that national park stewardship behaviors (in general) could be conceptualized as a single latent construct comprised of specific, context based, types of behaviors including in-park, home, and community behaviors.

In-park behaviors. In-park behaviors were defined in this study as positive stewardship behaviors that minimize environmental and cultural impacts while visiting the park. One of the primary JR program objectives is encouraging participants to practice positive in-park behaviors and minimizing the occurrence of negative behaviors that cause environmental and cultural impacts. Three survey items make up the in-park behavior sub-scale (Table 5). Behavioral frequency item response options included: 1) Never, 2) Rarely, 3) Sometimes, 4) Often, and 5) Always. Similar items were used by Stern, Powell, and Ardoin (2008) in their exploration of the influences of 3-day and 5-day residential environmental education programs at the Great Smoky Mountains Institute at Tremont.

Home behaviors. Home behaviors were defined in this study as personal stewardship behaviors intended to conserve natural resources in the home. JR program objectives include the transference of stewardship skills and ethics to the home environment. Four items are used in the sub-scale measuring home stewardship behaviors (Table 5), with response options of 1) Never, 2) Rarely, 3) Sometimes, 4) Often, and 5) Always. Several researchers have examined similar concepts using scales related to environmental outcomes. Examples include: Stern, Powell, and Ardoin's (2008) environmental stewardship index ($\alpha = 0.70$); Leeming, Dwyer, and Bracken's (1995) children's environmental attitude and knowledge scale (CHEAKS, $\alpha = 0.88$); Milfont, Duckitt, and Cameron's (2006) proenvironmental [sic] behavior scale ($\alpha = 0.73$); and Musser and Diamond's (1999) children's attitudes toward the environment scale, preschool version ($\alpha = 0.68$). Each of these scales included items pertaining to home stewardship behaviors such as: recycling, riding public transportation, and energy and water conservation, to measure pro-environmental behaviors.

Community behaviors. Community behaviors were defined in this study as stewardship behaviors that seek to influence a pro-environmental use of natural resources within a community, or the positive actions of others towards such use, through direct or indirect action. JR program objectives included civic engagement such as volunteerism, donating to environmental causes, and participation in stewardship behaviors on other public lands. Four items make up the community behaviors sub-scale (Table 5), with answer choices of 1) Never, 2) Rarely, 3) Sometimes, 4) Often, and 5) Always. Scales designed to measure similar pro-environmental behaviors include: Dutcher, Finley,

Luloff, and Johnson's (2007) environmental behavior scale ($\alpha = 0.67$); Malkus' (1992) adults' attitudes toward the environment scale ($\alpha = 0.61$ for women, and 0.72 for men); Stone, Barnes, and Montgomery's (1995) ECOSCALE ($\alpha = 0.93$); Stern, Dietz, and Kalof's (1993) awareness of consequences scale ($\alpha = 0.82$); and Weigel and Weigel's (1978) environmental concern scale ($\alpha = 0.88$).

Elaboration

Findings from studies using the ELM as a theoretical framework have been encouraging, providing evidence that elaboration is a potential precursor of behavior change (e.g., Brown, Ham, & Hughes, 2010; Lackey & Ham, 2003, 2004). Elaboration is thought to occur through the central route to persuasion due to personal involvement, the credibility of sources, and positive message framing (e.g., Bruyere, 2008; Göckeritz, Schultz, Rendon, Cialdini, Goldstein, & Gfiskevicius, 2010; Gore, Knuth, Scherer, & Curtis, 2008; Jones, Sinclair, & Courneya, 2003; Kim, Airey, & Szivas, 2011; Petty & Cacioppo, 1986). High levels of interest, awareness, and cognitive engagement are believed to lead to elaboration (Petty & Cacioppo, 1986).

Interest. Interest was defined in this study as a desire to learn about general, and specific, national park stewardship issues. GRSM JR program objectives include: a) an interest in learning about park resources; b) an interest in learning about other national parks and the outdoors; and c) an interest in learning about the protection of natural and cultural resources. Several studies have found that having an interest in learning is related to changes in behavior (e.g., Leeming, Dwyer, & Bracken, 1995; Malkus, 1992; Musser & Malkus, 1994; Tarrant & Green 1999). Stern, Powell, and Ardoin (2008)

included a separate index of “interest in learning and discovery” (comprised of five items) in their children’s environmental stewardship scale ($\alpha = 0.70$). These items were designed to gauge a participants’ degree of interest in learning about natural and cultural resources and directly exploring them (e.g., “interest in learning about plants, animals, and the places they live;” “interest in visiting national parks”). Several of these items were borrowed, and others developed, to construct the interest scale which contains a total of three items with the following response options: 1) Not at all interested, 2) Slightly interested, 3) Somewhat interested, 4) Very interested, and 5) Extremely interested (Table 5).

Awareness. Awareness has been defined in this study as an awareness of park resources and stewardship issues and events. JR program objectives include an: a) awareness of the NPS Mission; b) awareness of the importance of park resources to wellbeing; and c) awareness of the consequences of actions on resources. Six items were developed for the concept of awareness (Table 5), with response options of 1) Strongly disagree, 2) Disagree, 3) Neutral, 4) Agree, and 5) Strongly agree. Environmental awareness was defined by Kollmuss and Agyeman (2002) as “knowing of the impact of human behavior on the environment” who described it as having both cognitive and affective dimensions (p. 253).

Awareness has been found to be a separate dimension from knowledge (Stone, Barnes, & Montgomery, 1995), however, and has been related to participation in stewardship behaviors (Scholl, Inui, & Lankford, 2006). Concepts similar to, or related to, awareness, including consequences of human environmental actions and concern for

the environment, have been used in several studies (e.g., Schultz, 2000, 2001; Weigel & Weigel, 1978). Scales employing these concepts include Leeming, Milfont, Duckitt, and Cameron's (2006) environmental motives scale ($\alpha = 0.86-0.90$ for three categories of environmental concern); Wall, Devine-Wright, and Mill's (2007) awareness of consequences scale ($\alpha = 0.86$); as well as the NEP (Dunlap & Van Liere, 1978), the revised NEP (Dunlap et al., 2000), and the NEP for children (Manoli, Johnson & Dunlap, 2007).

The NEP focuses on differences in ecological worldviews, beliefs thought to arise from an awareness of the interconnectedness of all living things (Gardner & Stern, 2002). It has been argued, however, that the NEP measures awareness of the consequences of human behavior on the environment rather than ecological worldviews (Stern, Dietz, & Guagnano, 1995). An item from the NEP related to the consequences of human behavior on the environment was modified for inclusion in the awareness scale.

Cognitive engagement. Cognitive engagement has been defined in this study as the amount of time people have spent thinking about a stewardship subject. Another JR program objective was for participants to engage in experiencing, and thinking about, natural and cultural resources with an emphasis on national parks. Four items are included in the cognitive engagement sub-scale (Table 5), with response options of 1) Never, 2) Little, 3) Somewhat, 4) Much, and 5) A great deal. Several scales have included items asking about the frequency in which individual's engaged in reading about the environment, attended meetings on environmental issues, or watched environmental programs on television; examples include Powell, Kellert, and Ham's (2008, 2009)

environmental behaviors and future intentions index ($\alpha = 0.82$), Malkus' (1992) home environmental practices inventory, and Tarrant and Green's (1999) study of the predictive validity of environmental attitudes. Other examples of cognitive engagement may include cognitive involvement or analytical conversation (Leinhardt & Crowley, 2002).

Methods

Pilot Testing

An item pool was created in conjunction with the literature review. All items were screened for possible inclusion in the survey instrument, and were also examined for item formatting, including response options, instructions, and item order, while keeping the cognitive ability of the study population, children ages 8-13, in mind. Consistent with the majority of scales reviewed, Likert type scales with five response options were selected as the format for measurement for all items. Several questions were taken and revised from the “connection with nature,” “environmental stewardship,” and “interest in learning” scales (Stern, Powell, & Ardoin, 2008). Other survey items were developed using the operational definitions, corresponding goals and specific objectives, along with examples from the existing literature, following recommended procedures (DeVellis, 2003; Presser, Couper, Lessler, Martin, Martin, Rothgeb, & Singer, 2004), which included expert review and cognitive testing.

Cognitive testing is a critical process for designing surveys for children, as adult designers of surveys have different cognitive, linguistic, emotional, and social skills than

children (Kohlberg, 1958; Piaget, 1932/1965, 1970; Woolley, Bowen, & Bowen, 2004). Cognitive testing for this research involved interviewing (with parental permission) 50 children (ages 8-13) visiting GRSM to understand their thought processes (Bowen, 2008). Brief interviews were conducted with each child after they answered one of five different mini surveys, with up to 10 items, in order to identify any sources of confusion or misunderstanding (de Leeuw, Borgers, & Smits, 2004).

The survey instrument was pilot tested during the summer of 2008 with 180 respondents, children ages 9-13, at a weeklong residential summer camp located in Williamsburg, VA. The pilot test was analyzed using confirmatory factor analysis (CFA), which included the use of Lagrange Multiplier calculations, factor loadings, error variances, correlations, validity, and reliability estimates, to determine item fit. All questionable items were revised or removed. The revised survey instrument included three constructs based on differing types of national park stewardship behaviors: in-park, community, and home stewardship behaviors, and three theoretical constructs to measure elaboration: awareness, interest and cognitive engagement (Table 5). Items were then further refined through the use of CFA after data was collected from the population sample for the JR program evaluation. CFA results provided evidence of a national park stewardship behaviors scale (NPSBS) comprised of three sub-scales to measure stewardship behaviors undertaken in different contexts, including in-park, home, and community behaviors, and a stewardship elaboration scale (SES), comprised of two sub-scales, interest, and cognitive engagement, in stewardship issues.

Data Collection

Surveys were administered to JR program participants (ages 8-13 with parental consent) at each of GRSM's three park visitor centers, Oconaluftee (NC), Sugarlands (TN), and Cades Cove (TN) from June 21st - August 8th, 2009, using a systematic sampling technique. JR program activities are generally conducted throughout the park, however, surveys were administered at park visitor centers where program participants came to be sworn in as Junior Rangers after completing all program requirements. Surveys from all three locations combined totalled 211 surveys (response rate = 97%). All data were screened for univariate and multivariate outliers and missing data; surveys which were missing the participants' age, more than 25% of the data overall, or more than 50% from one construct, were removed. Data screening involved calculations for leverage, kurtosis, and skew as a way to eliminate outliers and evaluate assumptions of normality (Gould, Moore, McGuire & Stebbins, 2008; Tabachnick & Fidell, 2001). A total of 26 surveys were removed, leaving 185 surveys for analysis (effective response rate = 85%).

Analyses

EQS v6.1 software (Bentler, 2005), was employed to conduct structural regression modeling with two goals in mind: 1) to understand the relationships among variables by observing patterns of correlations, and 2) to explain as much variance as possible within a specified model (National Institute of Mental Health, 2013). SEM estimates the regression coefficients of a variable and examines measurement error as well as the stability of factor structure even when the properties of latent variables are unstable

(Hong, 1998; Kline, 2005). Prior to conducting structural regression modeling, all items and factors were screened for low factor loadings, large residuals, or highly correlated error terms (Bentler & Chou, 1987), using confirmatory factor analysis (CFA). The items for awareness, were all removed from the CFA model as they had little variance (all participants responded very positively to these items).

Results of the CFA model showed that first-order factors: interest (factor loading $[\lambda]=.701$) and cognitive engagement ($\lambda=.68$), when constrained to take care of the issue of being under-identified, provided evidence of a second-order elaboration factor with acceptable factor loadings; likewise, the three stewardship first-order factors: in-park behaviors ($\lambda=.897$), community behaviors ($\lambda=.686$), and home behaviors ($\lambda=.813$), were highly correlated and had acceptable factor loadings, both indications of a second-order national park stewardship behavior factor. Using robust fit indices to account for non-normality of data (Bentler, 1990; Byrne, 2006), and following recognized guidelines for generally acceptable levels of model fit (e.g., $SB\chi^2 p > 0.05$; $CFI > 0.9$; $NNFI > 0.90$; $SRMR < 0.1$; $RMSEA < 0.08$) (Byrne, 2008; Kline, 2011), all fit indices for the post-test sample CFA final model were found to be acceptable: $S-B \chi^2=116.34$ $p=.698$; $NNFI=1.000$; $CFI=1.000$; $RMSEA=.000$.

All items remaining from the CFA final model and all six of the original items for awareness, which had been removed from the CFA due to a lack of item variance, were included in the composite variables for structural regression modeling (Table 5).

Composite variables were created using the sum of the means of the components divided by the number of components.

Table 5. Means, Standard Deviations, & Reliability using Cronbach's Alpha (α)

Factors, Composites & Items	Mean	SD	α
<i>Elaboration Factor</i> (Awareness, Interest, & Cognitive Engagement composites)	4.39	0.36	.75
Awareness (<i>Do you agree or disagree with the following statements?</i>)	4.65	0.34	.60
Climate change can harm Great Smoky Mountains National Park	4.15	0.97	
Protecting a lot of different kinds of animals will help keep our planet healthy	4.77	0.51	
Having healthy trees in the park helps clean the air we breathe	4.84	0.40	
The National Park Service takes care of historic places so people can enjoy them	4.77	0.44	
Leaving garbage out in the park can make wild animals sick	4.80	0.64	
My family will benefit because the National Park Service protects parks for the	4.63	0.61	
Interest (<i>How interested are you in learning about the following things?</i>)	3.95	0.67	.55
The plants in Great Smoky Mountains National Park	3.64	0.90	
How to keep the park's rivers and streams clean	4.10	0.92	
How to preserve cultural sites in the park	4.14	0.98	
Cognitive Engagement (<i>How much have you thought about the following things?</i>)	4.33	0.65	.70
The benefits of being in the outdoors	4.31	0.88	
How I should behave when visiting the park	4.46	0.76	
How important parks are to the planet	4.39	0.85	
The history of Great Smoky Mountains National Park	4.15	1.05	
Stewardship Behaviors Factor (In-Park, Community & Home composites)	4.09	0.55	.72
In-Park Behaviors (<i>After starting the Jr. Ranger program, how often did you do the following things while visiting Great Smoky Mountains National Park?</i>)	4.27	0.64	.40
Clean up litter left by others	3.89	1.06	
Learn more about the park's natural environment	4.16	0.98	
Store food out of reach of wildlife	4.78	0.74	
Community Behaviors (<i>Due to your participation in the Junior Ranger program how often do you plan on doing the following things within the next three months?</i>)	3.77	0.80	.72
Volunteer to help the environment	3.87	0.94	
Make places for wildlife in my neighborhood	3.50	1.25	
Talk to others about protecting nature	3.85	1.06	
Ask my family to use less electricity at home	3.95	1.08	
Home Behaviors (<i>How often do you plan on doing the following things within the next three months?</i>)	4.14	0.63	.65
Recycle	4.40	0.92	
Reuse things like plastic bottles or bags	4.43	0.74	
Walk or bike instead of riding in the car	3.32	1.09	
Turn off lights when not being used	4.41	0.80	

Results

Description of the Sample

The study sample contained slightly more females (53%), than males (47%), with a mean age of 9.83 years. Participants were asked what the highest grade level they had completed in school and reported a mean of a fourth grade education (3.94 years of schooling). Race was primarily Caucasian, representing 91.7% of all survey respondents (Table 6).

Table 6. Participants' Demographic Statistics of Gender & Race

	Demographics	N	Percentage
Gender	Male	87	47.0
	Female	98	53.0
	Total	185	100.0
Race	White, not of Hispanic Descent	166	91.7
	Black, not of Hispanic Descent	3	1.7
	Hispanic	3	1.7
	Asian	1	.6
	Mixed, two or more races	7	3.9
	Native Hawaiian or other Pacific Islander	0	0
	American Indian or Alaskan Native	1	.6
	Total	181	100.0*

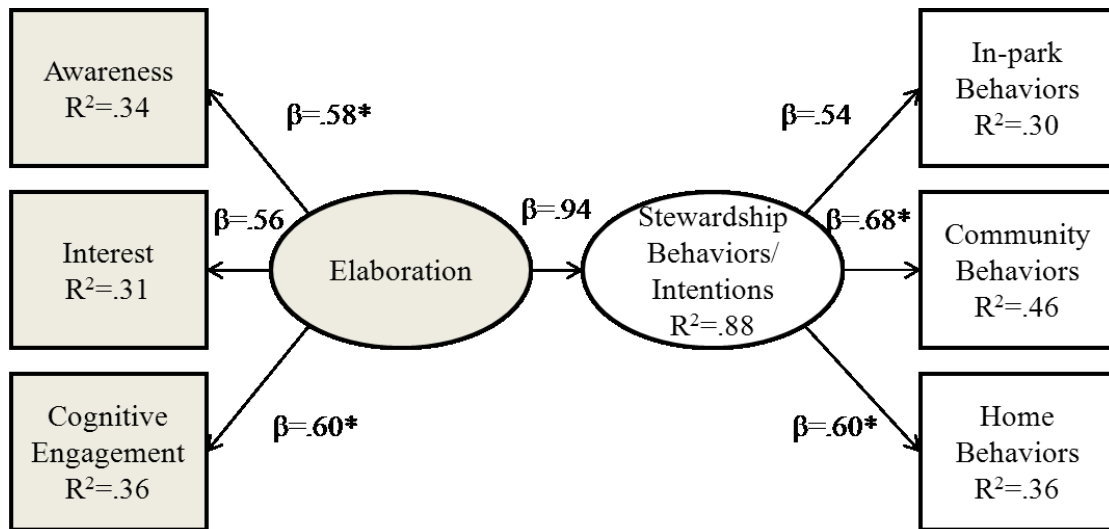
*Totals may not equal 100% due to rounding

Structural Regression Modeling

Structural regression modeling was employed to examine the relationships between the variables associated with the ELM, in-park national park stewardship behaviors, and behavioral intentions for home and community behaviors. Based on the CFA results, the structural regression model included an elaboration factor, comprised of the composite variables: awareness, interest, and cognitive engagement, as the sole predictor of a

stewardship behaviors/intentions factor comprised of: in-park, home, and community behaviors composite variables.

The resulting fit indices were excellent (Table 7), and all standardized parameter estimates (β) were positive and in the expected direction, with R^2 statistics revealing that elaboration explained 88% of the variance in stewardship behaviors (Figure 6); a correlation matrix with means and standard deviations of the models' measured variables are reported in Table 8. Correlations are a standardized measure of the linear dependence between two variables denoting the strength and direction of the relationship.



***Free parameters; R²=explained variance; β =standardized parameter estimates**

Figure 6. Structural Regression Model Results

Table 7. Fit Indices Resulting from SEM

MODEL	S-B χ^2	Df	p	NNFI	CFI	RMSEA*
Elaboration as the Sole Predictor of Stewardship Behaviors	9.237	8	.323	.985	.992	.030 (.000 - .097)

*90% confidence interval around the RMSEA in parenthesis; all measurements robust

Table 8. Correlation Matrix

	Awareness	Interest	Cognitive Engagement	In-park Behaviors	Community Behaviors	Home Behaviors
Awareness	1.000					
Interest	0.325	1.000				
Cognitive Engagement	0.378	0.298	1.000			
In-park Behaviors	0.221	0.326	0.293	1.000		
Community Behaviors	0.367	0.416	0.381	0.349	1.000	
Home Behaviors	0.357	0.242	0.346	0.390	0.384	1.000
Standard Deviations	0.338	0.672	0.654	0.643	0.795	0.630
Means	4.654	3.951	4.326	4.272	3.774	4.139

Discussion

Results of SEM procedures support the hypothesis that elaboration, comprised of awareness, interest, and cognitive engagement, would be predictive of in-park national park stewardship behaviors, and behavioral intentions for home and community behaviors. Elaboration, comprised of awareness, interest, and cognitive engagement, explained 88% of the variance of national park stewardship behavioral intentions and behaviors. This amount of explained variance in predicting national park stewardship behavioral intentions and behaviors is much greater than the amount of explained variance found in similar behaviour change studies. For example, a 2001 meta-analysis (Armitage & Conner, 2001) suggests that the theory of planned behavior, one of the most

frequently applied theories of behavior change, accounted for, on average, 39% of the variance in behavioral intentions and 27% of the variance in behaviors. The support provided for the ELM by SEM procedures revealed that elaboration, comprised of awareness, interest, and cognitive engagement was directly related to behavioral intentions and participation in positive stewardship behaviors.

These findings suggest that the greater the degree of awareness, interest, and cognitive engagement, the more likely elaboration will occur. If a communication effort leads to elaboration there is an increase in the potential to develop a lasting change in a person's salient beliefs and behaviors. Beliefs developed through this "central route" to persuasion tend to be relatively accessible, persistent over time, resistant to change, and predictive of behavior (Kenrick, Neuberg, & Cialdini, 2002; Petty, McMichael, & Brannon, 1992).

The peripheral route to persuasion may also influence an immediate increase in any one of these variables through the use of peripheral cues such as: the characteristics of the message, the messenger, or the context in which it was received. In the case of the GRSM JR program, peripheral cues were abundant and of great quality. For example: a) the park context, GRSM is known for its exceptional natural and cultural resources; b) the messengers, JR program activities were led by NPS rangers; and c) the message, JR program messages, whether presented in ranger-led activities or program booklets, were primarily placed-based, pertaining to in-park behaviors, and were reinforced throughout the park in multiple modes of delivery (by signs, park newspapers, park rangers, and volunteers). When messages are processed through the peripheral route to persuasion,

any subsequent shift in behavioral intentions or behaviors would tend to be temporary. Longitudinal data would need to be examined to determine if participation in the JR program leads to a lasting change in participants' behavioral intentions and behaviors.

The results also suggest that practitioners in the field of interpretation may use the ELM in designing and implementing interpretation programs for youth participants. Interpretive programs aimed at influencing stewardship behaviors should work toward ways to elicit elaboration by raising awareness of stewardship issues, sparking an interest in learning about resources, and getting participants actively engaged in experiencing resources and thinking about stewardship issues. A number of interpretive program elements have been found (Stern, Powell, & Hill, 2013, p. 20-21) which may positively influence outcomes:

- Active and experiential engagement in real world environmental problems;
- Placed-based programs (in natural settings) focused on issues, projects, or investigations;
- Participant-centered learning (e.g., developing skills and perceived self-efficacy);
- Social engagement (e.g., cooperative group work, inter-generational communications, and instructor participation);
- Ability to create emotional connections (e.g., through interactions with animals and places, extensive group discussion, and/or community collaboration);
- Provide an holistic experience (tell the whole story, in context);
- Focus on specific places/issues and link program content to home or community experiences;

- Provoke student reflection; and
- Instructors who care about participants and have a passion for the subject matter

Changes in behavioral intentions were found to be significantly correlated with several characteristics associated with the interpreter, including: confidence, authentic emotion, charisma, message clarity, verbal engagement, a focus on targeted behavior change as the desired outcome, and the use of appropriate logistics (Stern & Powell, 2013).

For the GRSM JR program and others like it, where influencing positive changes in stewardship behaviors or behavioral intentions are primary programmatic goals, encouraging participants to process interpretive messages via the central route to persuasion seems to be a good option because the persuasive messages can be integrated into participants' pre-established beliefs through this route (Bator & Cialdini, 2000). SEM procedures used in this study have added a degree of understanding to the complex nature of influencing behavior change associated with national park stewardship behaviors which, whether enacted within the national parks, at home, or in our communities, are strongly encouraged in our society as a means of restoring and or preserving important natural and cultural resources.

Limitations

The complexity of the subject matter, and the subjects themselves (children), were limitations in this study. In any survey research, some participants, especially children, may have difficulty reading or comprehending a survey, which can affect responses. Issues of measurement are common to semantic scales, such as Likert type scales,

attempting to measure subjective human opinions and self-reported behavior.

Limitations in this study included low variance of individual items, resulting in the use of composite measures.

Conclusions

The purpose of this research was to investigate, through the use of structural equation modeling (SEM), which of the theoretical factors from the ELM (Petty & Cacioppo, 1979, 1981, 1986) were predictive of changes in children's (ages 8-13) behavioral intentions and behaviors associated with national park stewardship. Results provided evidence in support of the ELM, which suggests that the greater the degree of awareness, interest, and cognitive engagement, the more likely that elaboration will result. In addition, this research also increased our understanding of in-park national park stewardship behaviors, and behavioral intentions for home and community behaviors, found to be influenced by elaboration.

If the ultimate goal of interpretation is to influence positive stewardship behaviors (NAI, 2013; UNESCO-UNEP, 1978), then improving the design and implementation of interpretive programming through the use of a theoretical foundation such as the ELM, is essential to reaching that goal. It is hoped that researchers and practitioners alike employ the findings from this research, not only to advance our understanding of the theoretical factors that facilitate behavior change, but also to help with the practical application of interpretation as a means of influencing citizens, young and old alike, to become better stewards of our natural and cultural resources.

CHAPTER IV (MANUSCRIPT 3)

EVALUATING THE GREAT SMOKY MOUNTAINS NATIONAL PARK JUNIOR RANGER PROGRAM: EXAMINING THE EFFECTS OF INTERPRETATION ON CHILDREN'S STEWARDSHIP BEHAVIORS

This research explored the influence of interpretation on youth participants' (ages 8-13) behavioral intentions and behaviors associated with national park stewardship behaviors through an evaluation of the Junior Ranger (JR) program at Great Smoky Mountains National Park. The newly developed national park stewardship behaviors scale, comprised of in-park, home, and community behaviors, was used to collect data from children before they attended the interpretive program, immediately after, and six months after becoming Junior Rangers. Findings revealed that the JR program had immediate, positive, and significant impacts on in-park behaviors and behavioral intentions for home and community behaviors. However, six months after participation, effects returned to pre-visitation levels. Results suggest that the Junior Ranger program successfully involves visiting children in national park stewardship behaviors on-site and inspires intentions to transfer stewardship behaviors to homes and communities. However, programmatic revisions are needed to effect longer-term changes in national park stewardship behaviors.

Keywords: Behavior, evaluation, Great Smoky Mountains National Park, interpretation, Junior Ranger, National Park Service, stewardship.

Introduction

The Organic Act of 1916 (National Park Service, 1916), which created the National Park Service (NPS), requires that the NPS preserve the national parks for the use and enjoyment of present and future generations. At the field level, this means providing services for both resource protection and enjoyment. Two of the most common ways in which the NPS preserves park resources, promotes stewardship, and enhances visitor experiences are: 1) through law enforcement, ensuring that visitors comply with prescribed regulations or statutes which are intended to protect resources and visitor experiences alike; and 2), through voluntary interpretation programs, such as the Junior Ranger (JR) program.

Differences of opinion exist within the field of interpretation regarding the purpose of interpretation programs. Some interpreters believe that these programs should focus on enhancing the visitor experience and connecting visitors to a place by revealing the meanings behind resources (e.g., Beck & Cable, 2002; Knudson, Cable, & Beck, 2003). Others believe that the primary purpose of interpretive programming is to motivate citizens to become pro-active stewards of the land (e.g., Farmer, Knapp, & Benton, 2007; Hungerford, Peyton, & Wilke, 1980; United Nations Educational, Scientific, and Cultural Organization-United Nations Environmental Programme [UNESCO-UNEP], 1978; United States Environmental Protection Agency, 2006). There are also those who believe that interpretation focused on inspiring, or reinforcing, the adoption of stewardship behaviors may enhance visitor enjoyment and satisfaction (e.g., Powell & Ham, 2008), and that interpretation should be used as a management tool for

influencing specific visitor behaviors which may directly affect park resources (e.g., Ham, 2009).

The NPS's goals for interpretation include enhancing the visitor experience and inspiring national park stewardship behavior, both of which are central to the mission (see NPS Director's Orders *A Call to Action: Preparing for a Second Century of Stewardship and Engagement*, and *Advancing the National Park Idea: National Parks Second Century Commission report*). In addition to influencing park-specific visitor behaviors, some NPS interpretive programs, like the JR program at Great Smoky Mountains National Park (GRSM), are taking this one step further by attempting to influence visitors to engage in what they deem to be important national park stewardship behaviors, such as environmental conservation and park advocacy behaviors, which can be applied in a home or community setting. Despite considerable research investigating interpretation and its influence, additional exploration is needed to determine how effective interpretation programs actually can be in changing children's behavior, especially longer-term behavior. The purpose of this dissertation research was to explore the influence of interpretation on youth participants' (ages 8-13) national park stewardship behaviors and behavioral intentions through an evaluation of the GRSM JR program.

The Junior Ranger Program

Averaging over nine million visitors per year over the past twenty years, GRSM is the most visited national park in America (NPS, 2012). As a means of enhancing the visitor

experience and supporting resource stewardship, GRSM has invested a great deal of effort into providing visitor interpretation. One of the park's most popular interpretation programs is the JR program. Currently GRSM is one of 249 National Park units offering children the opportunity to participate in a JR program and become Junior Rangers by completing a series of activities during their park visit (NPS, 2012). In GRSM, there are two ways for children to earn their JR badge: 1) by attending three, ranger-led, JR program activities, or 2) by attending one ranger-led, JR program activity, picking up one (grocery store size) bag of litter, and completing a certain percentage of the self-guided activities in an age-appropriate JR activity booklet. JR booklets include place-based activities, reflective exercises, scientific experiments, puzzles, and other cognitive challenges.

Once a child has completed the JR requirements, he or she is then “sworn in” as a Junior Ranger by repeating the official Junior Ranger Promise in a ceremony led by a NPS ranger: “As a Junior Ranger, I (insert participant’s name) promise to help protect the plants and animals of (insert park name) National Park and keep the air, water, and land clean. I will continue to learn more about the park so that I can help protect it for all the years to come.” The new Junior Ranger then receives an official JR badge, a JR certificate, and a JR pin or patch (NPS, 2013b).

In 2007, in cooperation with the Great Smoky Mountains Association, GRSM updated their JR curriculum, creating four, age-appropriate, place-based, activity booklets and adding numerous ranger-led experiential activities. That summer, attendance in the program almost tripled compared to previous years (Great Smoky Mountains National

Park, 2007) and has continued to grow (E. Guss, NPS interpretive ranger, personal communication, October, 2009). Content analyses were used to create a list of persuasive messaging related to stewardship behaviors contained within the JR program booklets (Table 9). In addition, over a dozen different types of ranger-led activities were observed during the summers of 2008 and 2009, many of them multiple times, in different locations, and/or led by different rangers, to determine the extent of persuasive messaging regarding national park stewardship behaviors. While a few of the ranger-led activities did stress the importance of performing home or community behaviors, such as recycling and reusing materials, the majority of the persuasive messages in both the ranger-led activities and the JR booklets were aimed at influencing stewardship behaviors within the park, especially leaving wildlife alone and storing food appropriately.

Table 9. GRSM Junior Ranger Program Booklets Persuasive Messaging

<i>% of Total</i>	<i>Persuasive Message</i>
19.2%	Watch wildlife, don't get too close or take any wildlife home; leave wildlife alone
19.2%	Don't pick flowers or other plants
11.5%	Store food away from animals, don't feed the wildlife
11.5%	Don't leave marks or carve on historic buildings
7.7%	Pick up litter
7.7%	Help protect the plants and animals of GRSM
7.7%	Keep air, water, and land clean
7.7%	Learn about the park
3.8%	Leave plants and things just as you found them
1.9%	Keep pets on a leash
1.9%	Be prepared (take a map, food, and water) when hiking
100.0%	Total (may not sum to total due to rounding)

Despite the large numbers of children participating in the GRSM JR program, no research had previously investigated the program's influence on stewardship behaviors, and few studies have focused on the longer-term behavioral impact of interpretation

programs in similar settings. This study investigated both; examining the GRSM JR program's effectiveness in influencing immediate, and more long-term, positive behavioral intentions and behaviors associated with national park stewardship among youth participants (ages 8-13).

Interpretation in the National Park Service

During the early years of the NPS (established in 1916), before the field of interpretation was recognized, a program was established to disseminate educational materials in the form of information booklets in the national parks (Mackintosh, 2000). Nature guiding, a European concept, was already being conducted in Yosemite National Park, and along with similar educational programs, soon spread to other parks. As the number of parks grew, so did the fledgling field of interpretation.

In 1957, Freeman Tilden published *Interpreting Our Heritage* in response to recognition by the NPS that education, in growing demand by visitors, was one of the primary functions of the parks. This was the first effort to delineate specific principles and guidelines for interpreters and defined interpretation as it is known today (Ham, 1992). Tilden defined interpretation as: "An educational activity which aims to reveal meanings and relationships through the use of original objects, by first-hand experience, and by illustrative media, rather than simply to communicate factual information" (1957, p. 8).

An important premise found within the pages of *Interpreting Our Heritage*, was a line Tilden quoted from an obscure administrative manual written by an anonymous NPS

ranger: “Through interpretation, understanding; through understanding, appreciation; through appreciation, protection” (1957, p. 38). These words have since become the philosophical orientation of interpreters worldwide (Ham, 2009). Tilden believed that interpretation could lead to positive stewardship behaviors: “He that understands will not wilfully deface, for when he truly understands, he knows that it is in some degree a part of himself...If you vandalize a beautiful thing, you vandalize yourself. And this is what true interpretation can inject into the consciousness” (1957, p. 38). Ultimately, the goals of interpretation efforts are to communicate information about a place, to spark an interest in the place, and to provoke people to think about it; in some cases this communication may also be aimed at promoting behaviors related to protecting the resources and values of that place (Brown, Ham, & Hughes, 2010; Ham & Weiler, 2003).

Within the context of the national parks, stewardship, as reflected in the NPS mission, is believed to be about preserving “unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations” (NPS, 1916). This responsibility for protection should be shared by all those who are interested in, or whose actions affect, the natural and cultural landscapes found within a specific environment. In 2011, the *National Parks Second Century Commission Report* recommended that the NPS be “provided with resources and direction to expand and enhance service learning, internship, and volunteer programs everywhere the Service works” (United States Department of Interior, p. 29). That same year, NPS Director, Jonathan B. Jarvis, issued orders calling on the park service to prepare for a second century of stewardship (NPS, August 25, 2011):

One of our most important responsibilities is to use the power and place of the National Park Service to ensure that everyone knows what it means to be an American. To accomplish this, we must invite our 307 million fellow citizens to get to know these places that they own, and discover the services the National Park Service performs in communities. That will help them experience their America and join us in stewardship.

NPS staff members at GRSM have already been striving toward these ideals; one example is the goals established for the JR program, which include: a) closing the gap between children and nature, b) helping children establish a stewardship ethic, and c) promoting national park stewardship behaviors.

Effects of Interpretation on Stewardship Behaviors

The NPS and other organizations use interpretation to enhance the visitor experience and to influence visitors' stewardship behaviors. Although many studies have addressed the issue, it is still unresolved whether or not interpretation can influence intentions and behaviors associated with stewardship, especially in the longer-term. It is fairly common for studies to report positive outcomes for pro-environmental interpretive programs immediately after participation (e.g., Dettman-Easler & Pease, 1999; Ferreira, 2012; Hines, Hungerford, & Tomera, 1986; Knapp & Benton, 2006; Knapp & Poff, 2001; Smith-Sebasto & Semrau, 2004), yet few studies have conducted longer-term assessments (e.g., Kubota & Olstad, 1991; Powell, Kellert, & Ham, 2009). When follow-up assessments are included, results often show that effects of interpretation return to pre-

test levels (Abrahamse, Steg, Vlek, & Rothengatter, 2005). There are exceptions, however, which reported longer-term positive outcomes (e.g., Pallak & Cummings, 1976; Staats, 2004).

The National Environmental Education Advisory Council (1998) has criticized the field of environmental education evaluation research because of the lack of longitudinal studies being conducted; even follow-up studies are rare. Schneider and Cheslock (2003) published a literature review of research measuring the impact of informal education programs, and found only five studies during the previous decade that had included longer-term measures (e.g., Bocarra & Richards, 1998; Bogner, 1998; Dettman-Easler & Pease, 1999; Hanna, 1995; Ryan, 1991).

A 2012 meta-analysis of 70 published studies pertaining to interpretive research conducted by Skibins, Powell, and Stern showed that only 15 of the 70 studies (21%) examined intention outcomes, with 73% resulting in positive changes in behavioral intentions. Only 13 of the 70 studies (18.5%) examined behavior outcomes, with 69% resulting in positive changes in behavior. Of even greater concern, the authors reported two limiting trends found in their analysis: 1) “that most articles reported only positive findings, suggesting the possibility that negative or null results may be published less frequently,” and 2) only five of the 70 assessments (7%) included a follow-up test six months or more after the intervention (Skibins, et. al., 2012, p. 37).

Still scarcer were longer-term studies of the effects of interpretation programs on the pro-environmental behavioral intentions and behaviors of children, believed to have different cognitive, linguistic, emotional, and social skills than adults (Kohlberg, 1958;

Piaget, 1932/1965, 1970; Woolley, Bowen, & Bowen, 2004). The 2012 meta-analysis found that out of 70 studies, only four (5.7%) utilized children as the study population (Skibins, et. al.), and only one (1.4%) examined children's behavioral intentions or behavior outcomes (Knapp & Poff, 2001). None of the studies on children, however, examined longer-term effects.

A more recent literature review (Stern, Powell, & Hill, 2013), examined 66 peer-reviewed articles published between 1999-2010 that reported outcomes of 86 empirically evaluated environmental education and interpretive programs specifically for children (18 years and under). Results from this literature review revealed that: a) intention outcomes were examined in 23 (27%) of the 86 studies, with 48% resulting in positive changes in behavioral intentions and 26% resulting in mixed (or ambiguous) findings; b) behavior outcomes were examined in 19 (22%) of the 86 studies, with 16% resulting in positive changes in behavior and 74% resulting in mixed (or ambiguous) findings, and c) follow-up measures were conducted in 14 (16%) of the 86 studies (Stern, Powell, & Hill, 2013).

While positive changes have been found in the few peer-reviewed studies evaluating the immediate and longer-term influence of interpretation programs on children's behavioral intentions and behaviors, many have reported mixed results. Consequently, even though it appears that interpretation programs can lead to an increase in pro-environmental behavioral outcomes, it is difficult to determine the potential impact such programs may have on national park stewardship behaviors.

Conceptualization & Survey Development

Conceptualization for this study involved NPS staff and invited stakeholders in a participatory process following guidelines from the Sustainable Evaluation Program framework development process (Powell, Stern & Ardin, 2006; Powell, Stern, Krohn, & Arodin, 2007). The 2007 focus group identified specific desired outcomes for the GRSM JR program. These programmatic objectives led to the selection of a theoretical foundation, and together with a review of the literature, provided the conceptual framework for the development of operational definitions and specific items for measuring each of the research constructs.

National Park Stewardship Behaviors

Stewardship behaviors are generally considered ethical and sustainable pro-environmental behaviors. The same holds true for national park stewardship behaviors which focus on behaviors that minimize impacts caused by visitation and enhance the protection of natural and cultural landscapes in a specific environment, yet are also transferable to visitors' homes and communities. There is some debate in the literature whether pro-environmental behaviors are a cohesive group of general behaviors with similar intentions and motivations for performance (e.g., Powell et. al, 2008, 2009; Beaumont, 2001; Kellert, 1998; Cottrell, 2003) or are multi-dimensional. Multi-dimensional behaviors may have intentions and motivations for performance which vary based on the types of behavior, such as political behaviors, consumer behaviors, ecosystem behaviors, and others (e.g., Barr, 2007; Dietz, Stern, & Guagnano, 1998;

Dutcher, Finley, Luloff, & Johnson, 2007; Olofsson & Ohman, 2006; Monroe, 2003; Stern, 2000).

The literature on scales developed to measure pro-environmental behaviors contain examples of both specific environmental behaviors (e.g., “conserved water by turning off the tap while washing dishes”), and general environmental behaviors (e.g., “try to learn what I can do to help solve environmental issues”). In some scales both specific and general behaviors are used (e.g., Vaske & Korbin, 2001). In other studies, specific behaviors (even those forming discrete factors) are lumped together as composite variables to measure general pro-environmental behaviors (e.g. Olli, Grendstad, & Wollebaek, 2001).

Recent literature presents pro-environmental behaviors as a complex concept comprised of general and discrete types of behaviors which are dependent upon social context and influenced by a range of predictors (e.g., Halpenny, 2006a; Olli, Grendstad, & Wollebaek, 2001; Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Winter, Volk, & Hungerford, 1994). These findings provided support for this studies’ hypothesis that national park stewardship behaviors (in general) could be conceptualized as a single latent construct comprised of specific, context based, types of behaviors including in-park, home, and community behaviors.

In-park behaviors. In-park behaviors were defined in this study as positive stewardship behaviors that minimize environmental and cultural impacts while visiting the park. One of the primary JR program objectives is encouraging participants to practice positive in-park behaviors and minimizing the occurrence of negative behaviors

that cause environmental and cultural impacts. Three survey items make up the in-park behavior sub-scale (Table 10). Behavioral frequency item response options included: 1) Never, 2) Rarely, 3) Sometimes, 4) Often, and 5) Always. Similar items were used by Stern, Powell, and Ardoin (2008) in their exploration of the influences of 3-day and 5-day residential environmental education programs at the Great Smoky Mountains Institute at Tremont.

Table 10. Items from the National Park Stewardship Behaviors Scale (NPSBS)

<i>Sub-scale</i>	<i>Question stem</i>	<i>Item</i>
In-Park Behaviors	(Pre) <i>How often do you plan on doing the following things while visiting Great Smoky Mountains National Park?</i>	Clean up litter left by others
	(Post) <i>How often did you do the following things while visiting Great Smoky Mountains National Park?</i>	Learn more about the park's natural environment
	(Follow-up) <i>How often did you do the following things while visiting parks or natural areas since participating in the Junior Ranger program?</i>	Store food out of reach of wildlife
Community Behaviors	(Pre) <i>How often do you do the following things?</i>	Volunteer to help the environment
	(Post) <i>Due to your participation in the Junior Ranger program how often do you plan on doing the following things within the next three months?</i>	Make places for wildlife in my neighborhood
	(Follow-up) <i>How often do you do the following things since participating in the Junior Ranger program?</i>	Talk to others about protecting nature Ask my family to use less electricity at home
Home Behaviors	(Pre) <i>How often do you do the following things?</i>	Recycle
	(Post) <i>How often do you plan on doing the following things within the next three months?</i>	Reuse things like plastic bottles or bags
	(Follow-up) <i>How often do you do the following things since participating in the Junior Ranger program?</i>	Walk or bike instead of riding in the car Turn off lights when not being used

Home behaviors. Home behaviors were defined in this study as personal stewardship behaviors intended to conserve natural resources in the home. JR program objectives include the transference of stewardship skills and ethics to the home environment. Four items are used in the sub-scale measuring home stewardship behaviors (Table 10), with response options of 1) Never, 2) Rarely, 3) Sometimes, 4) Often, and 5) Always. Several researchers have examined similar concepts using scales related to environmental outcomes. Examples include: Stern, Powell, and Ardoin's (2008) environmental stewardship index ($\alpha = 0.70$); Leeming, Dwyer, and Bracken's (1995) children's environmental attitude and knowledge scale (CHEAKS, $\alpha = 0.88$); Milfont, Duckitt, and Cameron's (2006) proenvironmental [sic] behavior scale ($\alpha = 0.73$); and Musser and Diamond's (1999) children's attitudes toward the environment scale, preschool version ($\alpha = 0.68$). Each of these scales included items pertaining to home stewardship behaviors such as: recycling, riding public transportation, and energy and water conservation, to measure pro-environmental behaviors.

Community behaviors. Community behaviors were defined in this study as stewardship behaviors that seek to influence a pro-environmental use of natural resources within a community, or the positive actions of others towards such use, through direct or indirect action. JR program objectives included civic engagement such as volunteerism, donating to environmental causes, and participation in stewardship behaviors on other public lands. Four items make up the community behaviors sub-scale (Table 10), with answer choices of 1) Never, 2) Rarely, 3) Sometimes, 4) Often, and 5) Always. Scales designed to measure similar pro-environmental behaviors include: Dutcher, Finley,

Luloff, and Johnson's (2007) environmental behavior scale ($\alpha = 0.67$); Malkus' (1992) adults' attitudes toward the environment scale ($\alpha = 0.61$ for women, and 0.72 for men); Stone, Barnes, and Montgomery's (1995) ECOSCALE ($\alpha = 0.93$); Stern, Dietz, and Kalof's (1993) awareness of consequences scale ($\alpha = 0.82$); and Weigel and Weigel's (1978) environmental concern scale ($\alpha = 0.88$).

Methods

Pilot Testing

An item pool was created in conjunction with the literature review. All items were screened for possible inclusion in the survey instrument, and were also examined for item formatting, including response options, instructions, and item order, while keeping the cognitive ability of the study population, children ages 8-13, in mind. Consistent with the majority of scales reviewed, Likert type scales with five response options were selected as the format for measurement for all items. Several questions were taken and revised from the "connection with nature," "environmental stewardship," and "interest in learning" scales (Stern, Powell, & Ardoin, 2008). Other survey items were developed using the operational definitions, corresponding goals and specific objectives, along with examples from the existing literature, following recommended procedures (DeVellis, 2003; Presser, Couper, Lessler, Martin, Martin, Rothgeb, & Singer, 2004), which included expert review and cognitive testing.

Cognitive testing is a critical process for designing surveys for children, as adult designers of surveys have different cognitive, linguistic, emotional, and social skills than

children (Kohlberg, 1958; Piaget, 1932/1965, 1970; Woolley, Bowen, & Bowen, 2004). Cognitive testing for this research involved interviewing (with parental permission) 50 children (ages 8-13) visiting GRSM to understand their thought processes (Bowen, 2008). Brief interviews were conducted with each child after they answered one of five different mini surveys, with up to 10 items, in order to identify any sources of confusion or misunderstanding (de Leeuw, Borgers, & Smits, 2004).

The survey instrument was then pilot tested during the summer of 2008 with 180 respondents, children ages 9-13, at a weeklong residential summer camp located in Williamsburg, VA. The pilot test was analyzed using confirmatory factor analysis (CFA), which included the use of Lagrange Multiplier calculations, factor loadings, error variances, correlations, validity, and reliability estimates, to determine item fit. All questionable items were revised or removed. The revised survey instrument included three constructs based on differing types of national park stewardship behaviors: in-park, community, and home stewardship behaviors. Items were then further refined through the use of CFA after data was collected from the population sample for the JR program evaluation. CFA results provided evidence of a national park stewardship behaviors scale (NPSBS) comprised of three sub-scales to measure stewardship behaviors undertaken in different contexts, including in-park, home, and community behaviors (Table 10).

Data Collection

Using a systematic sampling technique, pre- and post-test data were collected from visitors within GRSM during the summer of 2009 by administering surveys to two independent samples of children (ages 8-13). Collecting surveys from independent groups is widely used in social science research to evaluate short educational programs (e.g., Beaumont, 2001; Erford, O'Brocki, & Moore-Thomas, 2007). Having pre-tests and post-tests completed by different individuals reduces participant burden (how much time or effort visitors are asked to donate) and testing bias (knowledge introduced to participants as a result of a pre-test which may impact answers to subsequent tests).

Survey respondents included: 1) the pre-test sample, consisting of children who had not yet participated in the JR program yet intended to do so during their visit, 2) the post-test sample, consisting of children who had just completed the program and been sworn in as Junior Rangers, and six months later, 3) the follow-up sample consisting of post-test volunteers. Parental consent was obtained by approaching adults with a child who appeared to be in the targeted age range (8-13) and asking permission for their child to complete a questionnaire. If permission was given, the child was then invited to participate in the study.

Post-test surveys were administered at the three park visitor centers: Oconaluftee, Sugarlands, and Cades Cove, throughout the summer, from June 21st through August 8th, 2009, to JR program participants (ages 8-13) at the completion of their program, after they were sworn in as Junior Rangers. Pre-test survey data was collected between Wednesday, July 15th and Saturday, July 18th, 2009, at four high-use park locations,

Clingman's Dome and the three park visitor centers, where GRSM rangers conduct JR programs.

To investigate the more long-term influences of participation, 86% of post-test respondents volunteered to provide their name and address to participate in a six-month "follow up" questionnaire and 160 follow up surveys were mailed in January 2010 using a modified Dillman approach (Dillman, 2007).

Data Screening

In total, 193 pre-test surveys were collected with a response rate of 79%, along with 211 post-test surveys, with a response rate of 97%, and 87 follow-up surveys, with a response rate of 54%. All data were screened for univariate and multivariate outliers and missing data; surveys which were missing the participants' age, more than 25% of the data overall, or more than 50% from one construct, were removed. Data screening involved calculations for leverage, kurtosis, and skew as a way to eliminate outliers and evaluate assumptions of normality (Gould, Moore, McGuire & Stebbins, 2008; Tabachnick & Fidell, 2001). After accounting for outliers and missing data, 164 pre-test surveys, 185 post-test surveys, and 86 follow-up surveys were used for analyses; the effective response rate equalled 67%, 85%, and 53% respectively.

Results

Descriptive Statistics & Sample Equivalence

With the exception of gender, visitor demographics were consistent across groups (Table 11). Gender for all three groups combined was 51.5% female and 48.5% male. The mean age was 10.25 years old, with an average of 4.26 years of education. Race was primarily Caucasian (89.8% of all survey participants), although, JR program participants were slightly more diverse than visitors overall, which were reported as being 97% Caucasian in a 2008 GRSM Visitor Study (Papadogiannaki, Eury & Hollenhorst).

Table 11. Children's Demographic Statistics

Children's Demographics	Pre		Post		Follow-Up	
<i>AGE</i>	<i>N</i>	<i>Mean</i>	<i>N</i>	<i>Mean</i>	<i>N</i>	<i>Mean</i>
Children's Age	164	10.2	185	9.83	86	10.71
<i>EDUCATION</i>	<i>N</i>	<i>Mean</i>	<i>N</i>	<i>Mean</i>	<i>N</i>	<i>Mean</i>
Children's Education	157	4.29	181	3.94	86	4.55
<i>GENDER</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Male	87	53	87	47	37	43
Female	77	47	98	53	49	57
Total	164	100	185	100	86	100
<i>RACE</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
White, not of Hispanic Descent	137	86.2	166	91.7	76	92.7
Black, not of Hispanic Descent	2	1.3	3	1.7	3	3.7
Hispanic	2	1.3	3	1.7	1	1.2
Asian	0	0	1	0.6	1	1.2
Mixed, two or more races	14	8.8	7	3.9	1	1.2
Native Hawaiian or other Pacific Islander	0	0	0	0	0	0
American Indian or Alaskan Native	3	1.9	1	0.6	0	0
Other	1	0.6	0	0	0	0
Total	159	100	181	100	82	100

A statistical comparison of the categorical variables gender and race was conducted using Chi-square analysis to verify the comparability of pre, post, and follow-up test groups (Table 12). Results showed no statistically significant difference between the three samples, leading to the conclusion that comparisons between test groups were valid.

Table 12. Chi-Square Test of Independence on Categorical Variables Gender & Race

Variable	df	Chi-Sq	Sig. All	df	Chi-Sq	Sig. Pre-Post	df	Chi-Sq	Sig. Pre-FU	df	Chi-Sq	Sig. Post-FU
Gender	2	2.55	.279	1	1.26	.261	1	2.27	.132	1	0.38	.538
Race	12	15.27	.227	6	7.12	.310	6	10.77	.096	5	3.15	.677

Effects of Participation

The NPSBS (Table 10), comprised of three sub-scales measuring in-park, home, and community behaviors, administered in surveys to children (ages 8-13) immediately after their participation in the GRSM JR program and six months after participation, was used to evaluate any effects the interpretive program may have had on national park stewardship behaviors.

Immediate effects. The NPSBS measured immediate effects by comparing the post-test resulting mean scores with those reported by pre-test respondents. Results from one-way analyses of variance (ANOVA) using composite scores for each index, and a significance level of $p < .05$, indicate that the GRSM JR program had immediate, positive, and significant impacts on stewardship intentions and behaviors (Table 13).

Items from the in-park behaviors sub-scale asked pre-test respondents how they intended to behave while visiting the park, and asked post-test and follow-up test

respondents to self-report actual in-park behaviors. Results revealed significant gains from children's pre-test behavioral intentions to self-reported post-test behaviors for items: a) "clean up litter left by others," b) "learn more about the park's natural environment," and c) "store food out of reach of wildlife."

Items from the community behaviors sub-scale asked pre-test and follow-up test respondents to self-report community stewardship behaviors and asked post-test respondents about their intentions toward community behaviors. Post-test results reflected a significant increase compared to pre-test participants' self-reported behaviors, including: a) "volunteering to help the environment," b) "making places for wildlife in my neighborhood," c) "talking to others about protecting nature," and d) "asking my family to use less electricity at home."

Items from the home behaviors sub-scale asked pre-test and follow-up test respondents to self-report home stewardship behaviors, and asked post-test respondents to describe their intentions toward future home stewardship behaviors after participation in the JR program. Immediate effects included significant gains between pre-test self-reported behaviors and post-test behavioral intentions for the home behaviors: a) "recycle," b) "reuse things like plastic bottles or bags," and c) "turn off lights when not being used."

Longer-term effects. Although significant positive effects were measured immediately after participation in the JR program, longer-term effects were found for only one item. The NPSBS measured longer-term effects by comparing mean score results from follow-up test participants' with pre-test results. Six months after

participating in the JR program, children reported following through on their intentions for one item only, to store food out of reach of wildlife, with follow-up results showing a significant increase over pre-test scores. There were no longer-term effects reported for community or home behaviors, as pre-test and follow-up test scores were not significantly different. Although post-test participants had reported significant positive behavioral intentions for all but one item immediately following program participation, their self-reported behaviors after six months were significantly lower, similar to pre-test levels. An exception was the item related to walking or using a bike instead of riding in a car, which resulted in similar scores for all three test groups.

In summary, children reported immediate positive effects after participation in the JR program for all stewardship behaviors associated with the three NPSBS sub-scale indices except for “walk or bike instead of riding in the car.” Positive longer-term effects, evident by a significant difference occurring between the mean scores of the follow-up group with those of pre-test participants, were reported for only one behavior, “store food out of reach of wildlife.”

Table 13. National Park Stewardship Behavior Scale ANOVA for Composite Indices & Items

Index	Pre (1)		Post (2)		Follow-Up (3)		ANOVA			
	Mean	SD	Mean	SD	Mean	SD	F	df	p	LSD Post Hoc
National Park Stewardship Behavior Scale ($\alpha = 0.81$)	3.68	0.67	4.07	0.53	3.73	0.61	19.67	2	< .001	1<2***; 1=3; 2>3***
In-Park Behavior Sub-scale ($\alpha=0.55$)	3.80	0.89	4.28	0.63	4.07	0.65	17.27	2	< .001	1<2***; 1<3**; 2>3*
Clean up litter left by others	3.34	1.23	3.89	1.06	3.62	1.03	10.40	2	< .001	1<2***; 1=3; 2=3
Learn more about the park's natural environment	3.76	1.09	4.16	0.98	3.94	0.99	6.80	2	0.001	1<2***; 1=3; 2=3
Store food out of reach of wildlife	4.30	1.21	4.78	0.74	4.64	0.87	10.97	2	< .001	1<2***; 1<3**; 2=3
Community Behavior Sub-scale ($\alpha=0.76$)	3.26	0.90	3.79	0.79	3.21	0.98	20.84	2	< .001	1<2***; 1=3; 2>3***
Volunteer to help the environment	3.24	1.15	3.88	0.94	3.24	1.05	19.67	2	< .001	1<2***; 1=3; 2>3***
Make places for wildlife in my neighborhood	3.21	1.25	3.48	1.25	3.12	1.35	3.25	2	0.040	1<2*; 1=3; 2>3*
Talk to others about protecting nature	3.28	1.17	3.84	1.05	3.34	1.22	12.27	2	< .001	1<2***; 1=3; 2>3**
Ask my family to use less electricity at home	3.28	1.33	3.95	1.08	3.13	1.27	18.76	2	< .001	1<2***; 1=3; 2>3***
Home Behavior Sub-scale ($\alpha=0.66$)	3.95	0.79	4.14	0.62	3.96	0.63	3.84	2	0.022	1<2*; 1=3; 2>3*
Recycle	4.07	1.07	4.40	0.92	4.20	1.14	4.39	2	0.013	1<2***; 1=3; 2=3
Reuse things like plastic bottles or bags	4.24	0.97	4.43	0.74	4.16	0.91	3.55	2	0.029	1<2*; 1=3; 2>3*
Walk or bike instead of riding in the car	3.30	1.23	3.32	1.09	3.14	1.22	0.74	2	0.477	1=2; 1=3; 2=3
Turn off lights when not being used	4.18	0.94	4.41	0.80	4.31	0.79	2.80	2	0.062	1<2*; 1=3; 2=3

*p <.05; **p <.01; ***p <.001

Discussion & Recommendations

One of the goals of this study was to examine the effectiveness of the GRSM JR program in promoting national park stewardship behaviors among youth participants (ages 8-13). Results suggest that the JR program was successful in immediately improving both intentions and behaviors for all items under consideration, with the exception of walking or riding a bike instead of riding in a car. These same children, however, did not appear to carry through with their intentions to perform national park stewardship behaviors six months later. Only one behavior, storing food out of reach of wildlife, resulted in longer-term gains. All other follow-up test results associated with in-park, home, and community stewardship behaviors were equal to those of the pre-test respondents.

Findings from the follow-up group are similar to other research on the outcomes of interpretation in park settings, where individuals immediate intentions to perform a range of stewardship behaviors did not result in an increase in their performance of these behaviors in longer-term measures (e.g., Powell, Kellert, & Ham, 2009; Stern, Powell, & Ardoin, 2008). For many years GRSM interpretive programming has focused messaging on appropriate in-park stewardship behaviors as a means of complementing natural and cultural resource protection efforts. For example, the persuasive message pertaining to “storing food out of reach of wildlife” seems to have been delivered consistently, through multiple sources, perhaps accounting for its success in achieving longer-term results. GRSM programmatic goals to influence home and community stewardship behaviors are relatively recent additions. Messaging found in JR program booklets and delivered in

ranger-led activities addressing these behaviors was not as frequent or as consistent as messaging related to in-park behaviors. A content analysis of the JR program booklets found that the majority of the persuasive messages were related to in-park behaviors with over 30% pertaining to wildlife, (11.5% specifically aimed at storing food appropriately and not feeding the wildlife). Only a few of the ranger-led activities observed for this study touched on home or community stewardship behaviors, primarily discussing the ways children can improve the environment and save energy by recycling or reusing materials.

Immediate positive effects on in-park behaviors, and intentions for home and community behaviors, may not all be directly attributed to participation in the JR program, as it is impossible to eliminate all outside influences (e.g., family, friends, previous experience, etc.). For example, the context in which the programs took place, inside GRSM, was intentionally used to reinforce program outcomes. JR program activity booklets and ranger-led activities are also place-based; they are intended to develop lasting connections between participants and the park by immersing them in experiences involving the natural and cultural landscape. The JR program is designed to be an experiential program, one in which participants are purposefully engaged in direct experience and focused reflection. Experiential education is believed to increase knowledge, strengthen values, and develop skills to improve citizenship (Association for Experiential Education, 2014).

Interpretive programs aimed at influencing stewardship behaviors and behavioral intentions should strategize ways to influence both immediate and longer lasting effects.

Positive longer-term effects for national park stewardship behaviors, including home and community behaviors, are much more difficult to achieve, perhaps due to being outside the context of the park. A number of interpretive program elements have been found which may positively influence outcomes (Stern, Powell, & Hill, 2013, p. 20-21), including:

- Active and experiential engagement in real world environmental problems
- Active and experiential engagement in real world environmental problems;
- Placed-based programs (in natural settings) focused on issues, projects, or investigations;
- Participant-centered learning (e.g., developing skills and perceived self-efficacy);
- Social engagement (e.g., cooperative group work, inter-generational communications, and instructor participation);
- Ability to create emotional connections (e.g., through interactions with animals and places, extensive group discussion, and/or community collaboration);
- Provide an holistic experience (tell the whole story, in context);
- Focus on specific places/issues and link program content to home or community experiences;
- Provoke student reflection; and
- Instructors who care about participants and have a passion for the subject matter.

Changes in behavioral intentions were found to be significantly correlated with several characteristics associated with the interpreter, including: confidence, authentic emotion,

charisma, message clarity, verbal engagement, a focus on targeted behavior change as the desired outcome, and the use of appropriate logistics (Stern & Powell, 2013).

The fact that the JR program appears to have an immediate significant positive influence on a wide range of national park stewardship behaviors and behavioral intentions is heartening. Benefits for improved in-park behaviors include minimizing negative impacts on resources, improved levels of visitor enjoyment, and cost savings through reduced enforcement. Research currently suggests that while attendees to interpretive programs may be excited and enthusiastic about a program, changes in behaviors that are not specifically targeted in programming will not be influenced despite assumptions to the contrary (Ham, 2013). While the natural beauty and cultural significance of GRSM may be magical, specific programmatic goals and consistent persuasive messaging designed to influence home and community stewardship behaviors will be necessary for the program to achieve longer-term behavioral outcomes in these areas.

As a means of reinforcing the immediate effects of participation in the JR program, it was recommended that staff and invited stakeholders create opportunities for children to fulfill positive in-park behavioral intentions (e.g., picking up litter, properly storing food away from wildlife, and learning about the park), as well as to engage in home and community stewardship behaviors (e.g., recycling, volunteerism, public transportation, bike rentals, or special fundraising events), while still in the park. Providing a means of involving visitors in these types of stewardship behaviors on-site may influence both immediate and more long-term behaviors and behavioral intentions,

further supporting interpretation and educational efforts (Powell & Ham, 2008). One way the NPS can realistically address the deficiency of longer-term positive effects would be to develop a method of communicating with visitors once they leave the program setting. The purpose of these communications would be to reinforce key messages and inspire continued performance of national park stewardship behaviors.

As the NPS moves to meet the Director's "Call to Action" and build stewardship in the American public, the results of this research suggest that the GRSM JR program does have the potential to influence immediate stewardship behavior, the benefits of which are substantial. In addition, if ways were found to positively influence national park stewardship behaviors in the long-term, the benefits have the potential to protect not only NPS resources but also our homes and communities.

CHAPTER V
SUMMARY, CONCLUSION, SUGGESTIONS FOR FUTURE RESEARCH
& RESEARCH LIMITATIONS

Summary

Interpretation efforts are commonly used in park and protected area management to communicate information about a place to visitors, and in some cases, are also intended to persuade visitors to engage in stewardship behaviors related to protecting the values of that place. The NPS JR programs are intended to develop a sense of stewardship within participating children; however, few studies have explored the effectiveness of these programs. In addition, despite considerable research investigating interpretation and its influence on a wide range of outcomes, further exploration of the factors that influence stewardship behaviors in participants of interpretation programs are needed. The purpose of this dissertation research was to: 1) develop scales to measure national park stewardship behaviors and elaboration in children, 2) examine the relationship between elaboration and the performance of national park stewardship behaviors, and 3) explore the influence of interpretation on youth participants' (ages 8-13) national park stewardship behaviors and behavioral intentions through an evaluation of the GRSM JR program.

Following the introductory chapter, this dissertation has presented three manuscripts (chapters two through four) intended for publication in appropriate academic journals as a means of presenting the findings to a broader audience. Chapter two

discussed the use of confirmatory factor analysis to determine the construct validity, reliability, and psychometric properties of the scales developed to evaluate the influence of the JR program on youth participants' behavioral intentions and behaviors associated with national park stewardship. Results suggested that a second-order factor model structure provided the best fit. Within that model were two scales, the stewardship elaboration scale (SES), measuring interest and cognitive engagement in stewardship issues, and the national park stewardship behavior scale (NPSBS), measuring in-park, community, and home behaviors.

Chapter three discussed an investigation using SEM to determine which of the theoretical factors from the elaboration likelihood model influenced program participants' behavioral responses to pro-stewardship interpretive messaging delivered through the JR program in GRSM. Results suggest that 88% of the variance in participants' national park stewardship behaviors, consisting of three distinct types of behaviors: in-park, home, and community behaviors, could be explained by the latent factor of elaboration. Elaboration within the structural regression model was comprised of composite variables measuring awareness, interest, and cognitive engagement in national park stewardship.

Chapter four discussed results of the GRSM JR program evaluation on the national park stewardship behavioral intentions and behaviors of youth participants, including: the effects of participation, as well as the implications and applications of these findings for JR program managers. Evaluation outcomes revealed that the JR program had immediate, positive, and significant impacts on participating children's

behavioral intentions and behaviors associated with national park stewardship. Longer-term positive effects were found pertaining to only one in-park stewardship behavior, “storing food out of reach of wildlife,” while home and community behaviors returned to pre-visitation levels. These results suggest that interpretation programs, such as the GRSM JR program, have the potential to influence youth participants (ages 8-13) to engage in stewardship behaviors on-site and positively influence their intentions to improve stewardship behaviors at home and in communities, however, as with similar research conducted on the outcomes of interpretation in a park setting (e.g., Powell, Kellert, & Ham, 2009; Stern, Powell, & Ardoin, 2008), follow-up testing revealed a return to pre-test levels for almost all items under investigation.

Conclusions

In conclusion, this dissertation makes a contribution to the field of interpretation with the development of two new scales for measuring program participants’ (children ages 8-13) outcomes associated with elaboration and national park stewardship behaviors and behavioral intentions. CFA was used to determine the construct validity, reliability, and psychometric properties of both scales:

- The national park stewardship behavior scale (NPSBS), measuring in-park, community, and home behaviors; and
- The stewardship elaboration scale (SES), measuring elaboration, comprised of interest and cognitive engagement in issues related to national park stewardship.

The NPSBS represents a new measure with the potential to broaden our understanding of the complex nature of pro-environmental behaviors and the factors that influence them. Unlike previous studies which have identified different categories of stewardship behaviors (e.g., Chawla & Cushing, 2007; Hungerford & Volk, 1990; Keogh, Halpenny, & Gilligan, 2006; Sivek & Hungerford, 1989/1990), the NPSBS is the first scale to find that different categories of behaviors (e.g., in-park, home, and community behaviors), comprise first-order factors (sub-scales) which together, constitute a latent, second-order, factor representing general stewardship behaviors (e.g., national park stewardship behaviors).

The SES represents the only scale currently available for measuring elaboration as theorized by the ELM. CFA procedures using pre- and post-test data verified the validity and reliability of the SES, which measures elaboration as a second-order, latent, factor comprised of two first-order factors (sub-scales), interest and cognitive engagement associated with national park stewardship. Items intended to measure the concept of awareness, theoretically related to elaboration, were removed from this analysis due to very little variance. Problems of lack of variance and skewed scales are not unique in the evaluation of interpretation programs or studies pertaining to satisfaction (Dawes, 2008; Peterson & Wilson, 1992). While lack of variance resulted in the removal of all awareness items from CFA procedures, the full five-point range of response options were not utilized in any of the items measured in this study, leaving room for improvement. Suggestions to improve variance in responses included:

- Removing response options from the unused side of the scale and replacing them with additional answer choices within the relevant interval range so that the number of response options remains the same;
- Employing a greater number of response options (e.g., seven rather than five) after removing response options from the unused side of the scale.

While adjusting the anchors or increasing the number or response options may improve item variance and therefore scale performance, results from this study indicate that the SES and NPSBS, as currently measured, are valid and reliable scales for determining children's elaboration, behavioral intentions and behaviors pertaining to national park stewardship.

The development of the NPSBS and SES has meaningful implications for the field of interpretation. The utilization of these scales have the potential to provide researchers, and managers, a way of evaluating program outcomes, establishing a baseline for the future adaptive management of communication strategies and messaging. The scales can then be used for measuring the relative effectiveness of subsequent program revisions in improving stewardship behavior in all of its different guises. The scales can also be used to help researchers assess the degree to which a communication strategy or interpretive program results in participants elaborating on persuasive messaging thereby increasing the likelihood that changes to behavioral intentions and behavior occur.

While CFA procedures verified the validity and reliability of the NPSBS and SES, additional SEM analyses were needed to determine which of the theoretical factors

from the ELM influenced program participants' behavioral responses to pro-stewardship interpretive messaging delivered through the JR program in GRSM. Results of structural regression modeling, utilizing post-test data, supported the ELM. Elaboration, comprised of awareness, interest, and cognitive engagement, explained 88% ($R^2=.88$) of the variance in JR program participants' national park stewardship behavioral intentions and behaviors. In addition, the variance in national park stewardship behaviors/intentions, represented as a first-order factor, was explained by composite variables measuring in-park ($R^2=.30$), home ($R^2=.36$), and community behaviors ($R^2=.46$). While the variance in elaboration, also represented as a first-order factor, was explained by composite variables measuring awareness ($R^2=.34$), interest ($R^2=.31$), and cognitive engagement ($R^2=.36$). Each composite variable, with the exception of awareness, was comprised of the items for that concept found in the NPSBS and SES; the composite variable for awareness was made up of all six of the original items. While none of the awareness items are included in the SES due to issues of measurement, SEM procedures did suggest that awareness is a component of elaboration and further efforts should be made to successfully operationalize this important concept.

These findings should have meaningful implications for the fields of communication and social psychology, as well as the field of interpretation. Researchers and interpreters alike may wish to utilize the ELM as a basis for persuasive communication, including interpretive programming, and future studies where changes in behavior outcomes are important. Interpretive programs aimed at influencing stewardship behaviors should strategize ways to elicit elaboration by raising awareness of

stewardship issues, sparking an interest in learning about resources, and getting participants cognitively engaged by experiencing resources and thinking about stewardship issues. A number of interpretive program elements have been found by Stern, Powell, and Hill (2013, p. 20-21), which may positively influence outcomes:

- Active and experiential engagement in real world environmental problems;
- Placed-based programs (in natural settings) focused on issues, projects, or investigations;
- Participant-centered learning (e.g., developing skills and perceived self-efficacy);
- Social engagement (e.g., cooperative group work, inter-generational communications, and instructor participation);
- Ability to create emotional connections (e.g., through interactions with animals and places, extensive group discussion, and/or community collaboration);
- Provide an holistic experience (tell the whole story, in context);
- Focus on specific places/issues and link program content to home or community experiences;
- Provoke student reflection; and
- Instructors who care about participants and have a passion for the subject matter.

Changes in behavioral intentions were found to be significantly correlated with several characteristics associated with the interpreter, including: confidence, authentic emotion, charisma, message clarity, verbal engagement, a focus on targeted behavior change as the desired outcome, and the use of appropriate logistics (Stern & Powell, 2013, p.35).

The NPS's goals for JR programs include enhancing the visitor experience and influencing national park stewardship behaviors specific to each park, as well as environmental conservation and park advocacy behaviors which can be applied in a home or community setting. This research explored the influence of interpretation on youth participants' (ages 8-13) behavioral intentions and behaviors using the newly developed NPSBS. Data was collected from children before they attended the interpretive program, immediately after, and six months after becoming Junior Rangers. Findings revealed that the JR program had immediate, positive, and significant impacts on in-park behaviors, and on behavioral intentions for home and community behaviors. However, longer-term effects, measured by comparing pre-test mean scores with those reported by follow-up respondents six months after participation in the JR program, returned to pre-visitation levels for all but one in-park stewardship behavior, "storing food out of reach of wildlife."

For many years GRSM interpretive and educational programming has focused on influencing stewardship behaviors associated with the natural and cultural resources of the park as a means of complimenting resource protection efforts. JR programmatic goals to increase messaging aimed at improving home and community stewardship behaviors were relatively recent additions. While there were immediate positive effects found for intentions to perform home and community behaviors, those intentions diminished over time to pre-test levels. These findings are similar to other research on the outcomes of interpretation in park settings, where individuals intentions to perform a range of stewardship behaviors, reported immediately after participation, did not result in

an increase in their performance of these behaviors in longer-term measures (e.g., Powell, Kellert, & Ham, 2009; Stern, Powell, & Ardoin, 2008).

The GRSM JR program delivered focused messaging with specific goals to influence in-park stewardship behaviors; however, very little direct programming for home or community behaviors was found in JR program booklets or delivered in ranger-led activities. Research currently suggests that while attendees to interpretive programs may be excited and enthusiastic about a program, changes in behaviors that are not specifically targeted in programming will not be influenced despite assumptions to the contrary (Ham, 2013). While the natural beauty and cultural significance of GRSM may be impactful or influential, specific programmatic goals and consistent persuasive messaging designed to influence home and community stewardship behaviors will be necessary for the program to achieve longer-term behavioral outcomes in these areas.

The JR program is designed to be an experiential interpretive program in which educators purposefully immerse participants in experiences involving the natural and cultural landscape. As a means of reinforcing the immediate effects of participation in the JR program, it was recommended that staff and invited stakeholders create opportunities for children to fulfill positive in-park behavioral intentions (e.g., picking up litter, properly storing food away from wildlife, and learning about the park), as well as to engage in home and community stewardship behaviors (e.g., recycling, volunteerism, public transportation, bike rentals, or special fundraising events), while still in the park. Providing a means of involving visitors in these types of stewardship behaviors on-site may influence both immediate and more long-term behavioral intentions and behaviors,

further supporting interpretation and educational efforts (Powell & Ham, 2008). One way the NPS can realistically address the deficiency of longer-term positive effects would be to develop a method of communicating with visitors once they leave the program setting. The purpose of these communications would be to reinforce key messages and inspire continued performance of national park stewardship behaviors.

Although the GRSM JR program did not result in longer-term effects, other than for the in-park behavior of storing food out of reach of wildlife, this evaluation has proven the program to be successful at influencing participants' national park stewardship behavioral intentions and behaviors immediately after participation. The evaluation of the GRSM JR program was facilitated by the use of the NPSBS, specifically developed for this research, and now available for use in future studies to aid in the evaluation of interpretation programs with similar programmatic goals designed for children. There are multiple ways in which informal pro-environmental interpretation programs for children (ages 8-13), can help to ensure success, for example by:

- Incorporating interpretive program elements which may positively influence outcomes (Stern, Powell, & Hill, 2013);
- Specifying programmatic goals;
- Delivering consistent and directed persuasive messaging, and
- Offering opportunities to participate in natural park stewardship behaviors while on-site.

Stewardship behaviors, whether associated with national parks, our homes, or our communities, are strongly encouraged in society as a means of restoring and or

preserving important resources. This study has helped to broaden our understanding of these behaviors through the use of the NPSBS.

Additional research utilizing the SES will be needed to provide data on the factors that influence national park stewardship behaviors. The SES measures a program participant's elaboration through the use of sub-scales measuring interest and cognitive engagement on issues of national park stewardship. The SES was developed through the use of CFA, and structural regression modeling provided evidence that elaboration was able to explain 88% of the variance in national park stewardship behaviors/intentions. These findings provide support for the ELM, suggesting that the greater the degree of awareness, interest, and cognitive engagement, the more likely elaboration will occur.

As postulated by the ELM, if a communication effort leads to elaboration there is an increase in the potential to develop a lasting change in a person's salient beliefs and behaviors. Elaboration is thought to occur through the central route to persuasion. Beliefs developed as a result of elaboration through the central route to persuasion tend to be relatively accessible, persistent over time, resistant to change, and predictive of behavior (Kenrick, Neuberg, & Cialdini, 2002; Petty, McMichael, & Brannon, 1992).

The peripheral route to persuasion may also influence an immediate increase in any one of these variables through the use of peripheral cues such as the characteristics of the message, the messenger, or the context in which it was received (Petty & Cacioppo, 1981, 1986). In the case of the GRSM JR program, peripheral cues, both abundant and of great quality, included:

- Park context, GRSM is known for its exceptional natural and cultural resources;

- Messengers, JR program activities were led by NPS rangers who also swore participants in as Junior Rangers, and in many cases collected survey data for this research; and
- Messages, JR program messages presented in ranger-led activities and program booklets were primarily placed-based, pertaining to in-park behaviors, and were reinforced throughout the park in multiple modes of delivery (by signs, park newspapers, park rangers, and volunteers).

When messages are processed through the peripheral route to persuasion, any subsequent shift in behavioral intentions or behaviors would tend to be temporary.

Longitudinal data collected through the use of the NPSBS during the JR program evaluation revealed that participation in the JR program did not lead to a lasting change in participants' behavioral intentions and behaviors (with the exception of one in-park behavior, "storing food away from wildlife"). This leads to the conclusion that even though post-test results suggested that elaboration had occurred, program messages delivered through the GRSM JR program were processed by participants via the peripheral route to persuasion. As previously stated, additional research will be needed to determine longitudinal outcomes for items measuring interest and cognitive engagement, associated with elaboration, found to influence national park stewardship behaviors.

Improved stewardship behaviors are needed at all levels of society to help ameliorate the negative impacts human behaviors have had on our natural and cultural resources. It is hoped that the results of this research will be used to enhance the

planning and efficient functioning of future JR programs and other interpretive programming to increase the positive impacts interpretation can have on youth participants' stewardship behaviors.

Suggestions for Future Research

The NPSBS represents a new measure with potential to broaden our understanding of such behaviors and the factors that influence them, while the SES represents the only scale currently available for measuring interest and cognitive engagement associated with stewardship. The use of these scales in future research is encouraged to help researchers assess whether a communication strategy, or interpretive program, results in participants elaborating on the persuasive message, thereby increasing the likelihood that behavioral intentions and changes in stewardship behavior will occur. The utilization of these scales has the potential to provide researchers and managers a way of evaluating program outcomes, establishing a baseline for the future adaption of communication strategies and messaging. The scales can then be used to measure the relative effectiveness of subsequent program revisions to improve stewardship behaviors in all of its different guises.

Future research should reexamine the items associated with the factor of awareness which had limited variance and minimal item-scale correlations. Current items either need to be revised, or new items that are more controversial in nature developed. An individual's awareness of an issue is theoretically important to promoting elaboration and influencing changes to behaviors; revising existing items or developing new ones for this concept are suggested so that a wider range of responses may be

acquired in future studies. Awareness items, as well as all items in the NPSBS and SES, may benefit from using seven, rather than five, relevant, response options and it is recommended that future research be conducted to determine if such changes result in an increase in item variance, thereby improving scale sensitivity.

The NPSBS and SES were purposely designed to be highly transferable to other national park interpretive programs with the caveat that some items within the in-park behavior scale may need to be revised to coincide with individual park programmatic goals. Generalizability should also extend to environmental education and interpretation programs outside of the national parks, although further research is necessary to assess the scales' transferability. While the NPSBS and SES were designed with children (ages 8-13) in mind, future research is needed to assess the validity and reliability of these scales using samples of all ages, along with off-season visitors who may have very different attitudes, beliefs, and behaviors, related to stewardship. Research comparing and contrasting the effects of interpretation on the national park stewardship behaviors of adults versus children, or in-season versus off season visitors, may prove to be insightful.

Research Limitations

There are numerous limitations when conducting social science research and this study is no exception. The study sample was confined to visitors of GRSM, children (ages 8-13), and only those who voluntarily choose to participate in the JR program. Some participants may have biased their responses due to the Hawthorne Effect, an effect where people modify their behavior simply due to their selection to participate in a study

(Landsberger, 1958). Respondents may also have been influenced by participating in a study which, in their eyes, may have appeared to be sponsored, and administered, by the same organization (GRSM). Self-reporting, as was the case in this survey research, is in itself a limitation due to issues such as errors of omission, non-substantive responses, social-desirability, and break-off rates.

The complexity of the subject matter, and the subjects themselves, children (ages 8-13), were additional limitations. Some participants, especially children, may have had difficulty reading or comprehending the survey, which can affect responses. Children were only allowed to complete a survey if a legal guardian gave permission, and guardians therefore had the ability to influence participation and perhaps even to influence responses. Researcher interaction bias may have been a limitation too, especially due to the use of rangers and park volunteers affiliated with GRSM for data collection. There are ethical considerations involved in unduly influencing participants; something that all research assistants were trained to avoid, however, just their presence may have influenced responses.

Parents, schools, the media, churches, clubs, and communities all exert influence on children's attitudes and behaviors. It is impossible to separate all outside influences when measuring psychosocial constructs. The impacts of these types of influences have to be taken into consideration, however, since it is impossible to confine participants to a controlled, experimentally designed environment. Aside from the ethical and logistical problems such an experiment would entail, time and budget would not support such an endeavor. Time was still a limitation though, as the surveys were distributed during the

summer months when park visitation is at its highest level, leaving out those visitors that come during the off-season.

Problems of measurement were another limitation, as stewardship behaviors within the context of the national parks had no pre-existing time-tested survey instruments for adults or children. Issues of measurement are common to semantic scales, such as Likert type scales, attempting to measure subjective human opinions and self-reported behavior. Although the SES and NPSBS were both found to be valid and reliable, the full five-point range of response options were not utilized in any of the items measured in this study, leaving room for improvement. Reliability and validity are largely determined by scale design and construction (Munshi, 2014; Thurstone, 1928) and this research employed numerous methods to test the reliability and validity of the final instrument to make sure that the indicators were actually measuring the constructs as intended.

For further information, the appendices to this document include copies of the surveys (Appendix A), all supporting documents (Appendix B), and a compilation of respondents' open ended comments (Appendix C).

APPENDICES

APPENDIX A: RESPONDENT COMMENTS

Version	Location	Age	Comments
Pre-Test	Clingman's Dome	13	I loved this park. It's the first time ive been here. But I still Loved it, it was beautiful
Pre-Test	Clingman's Dome	13	ballin.
Pre-Test	Sugarlands	13	Tame bears
Pre-Test	Oconaluftee	12	No
Pre-Test	Sugarlands	12	This is a Great as my last b-day party!
Pre-Test	Sugarlands	12	The park is a great place and a great oppritunity to show we need to protect wildlife and beauty of God's Nature. Thank you for having this park so we can see all the wonderful things of being outdoors. :)
Pre-Test	Sugarlands	12	Fun...
Pre-Test	Cades Cove	11	its cool
Pre-Test	Cades Cove	11	(childlike drawing of a tree)
Pre-Test	Clingman's Dome	11	What will we do?
Pre-Test	Clingman's Dome	11	I think it's a good idea.
Pre-Test	Clingman's Dome	11	:)
Pre-Test	Oconaluftee	11	none
Pre-Test	Oconaluftee	11	I cant wait sould like FUN
Pre-Test	Sugarlands	11	It's good
Pre-Test	Sugarlands	11	It is a very nice park. There are many awesome trails.
Pre-Test	Sugarlands	11	I thought it was a lot of fun.
Pre-Test	Sugarlands	11	I really like the Junior Ranger program. It is realy fun and active.
Pre-Test	Cades Cove	10	I think Junior Rangers are very important because they help the earth & let kids tell them about what they think you should do and not do.
Pre-Test	Clingman's Dome	10	I do not like litter.
Pre-Test	Clingman's Dome	10	I am ok! (heart drawing)
Pre-Test	Clingman's Dome	10	No - thank you :)
Pre-Test	Sugarlands	10	You should take away smoking in the park because it is nasty and bad for health around kids.
Pre-Test	Sugarlands	10	Observing wildlife
Pre-Test	Sugarlands	10	Learn more about the parks. I also love seeing the wildlife in the park.
Pre-Test	Sugarlands	10	I like the program.
Pre-Test	Cades Cove	9	This survey was too long for a 9 year old.
Pre-Test	Cades Cove	9	The Mountains (child's drawing of mountains)
Pre-Test	Clingman's Dome	9	People should not litter. This test was awsome :)
Pre-Test	Oconaluftee	9	Very very pretty
Pre-Test	Cades Cove	8	(child's drawing of mountains)

Pre-Test	Cades Cove	8	This survey was way too difficult for an 8 year old - it was too long. She frequently did not understand word meaning. The Mom.
Pre-Test	Cades Cove	8	I Love the Park!
Pre-Test	Sugarlands	8	Thank you for keeping the Park clean
Post-Test	Oconaluftee	13	Love the Junior Ranger & Not So Junior Ranger programs! :)
Post-Test	Oconaluftee	13	I think it would be better if there were restrooms @ the top of Clingman's Dome and Museum/gift shop kinda deal.
Post-Test	Oconaluftee	13	Perfect, but could use more trails.
Post-Test	Cades Cove	12	Other things for older kids.
Post-Test	Cades Cove	12	it was great
Post-Test	Oconaluftee	12	I liked the programs where it felt like it was come & go. I also liked the interactive programs, in the water.
Post-Test	Oconaluftee	12	Every National Park I've been to have been very fun and the activities in the booklets are fun too! I can't wait to see more of them!! :)
Post-Test	Sugarlands	12	I think it is really cool your doing this. Keep it up! Elise
Post-Test	Sugarlands	12	I liked the park and wildlife.
Post-Test	Sugarlands	12	I have fun doing these programs at all the National Parks I visit. :) Thank you!
Post-Test	Sugarlands	12	I am an official Junior Ranger now and I think that it is a great idea.
Post-Test	Sugarlands	12	Having to buy a Junior Ranger book was a downside. Also I suggest providing gloves to children picking up trash for badges or just in general. However, I do thing that the Junior Ranger program is a great, fun opportunity.
Post-Test	Sugarlands	12	This place is groovey and hip
Post-Test	Sugarlands	12	This was a great experience because you learn so much from the Smokey Mountains. You truly have a treasured land with great mountain views, waterfalls and fun hikes. We are from Canada Ontario and we are so happy to have visited this wonderful park.
Post-Test	Oconaluftee	11	The rangers were great and Nice People! ! :)
Post-Test	Oconaluftee	11	The Junior Ranger Program was a lot of fun for me and my brother. It really makes me feel important & reliable in the preservatin and care of this park.
Post-Test	Oconaluftee	11	the Batteries not included with Ranger Jay was really fun
Post-Test	Oconaluftee	11	It's Great!
Post-Test	Oconaluftee	11	It was great!
Post-Test	Oconaluftee	11	It is a great program I learned a lot.
Post-Test	Oconaluftee	11	It is a fun program but to complete the book you can't always get to all the locations needed to complete the book.
Post-Test	Oconaluftee	11	I will be BACK! Miki (heart)
Post-Test	Oconaluftee	11	I THINK You should probably tell people about most of your programs so they can join them!
Post-Test	Sugarlands	11	The Junior Ranger Program was tons of fun. The activities and booklet was fun and informative. I would do it again any time.
Post-Test	Sugarlands	11	loved it so Fun didn't Know I was learning!!! (heart)
Post-Test	Sugarlands	11	it was extremely fun
Post-Test	Sugarlands	11	I liked it!
Post-Test	Sugarlands	11	I wish they told you more/advertized it more. I also like personalized badges.

Post-Test	Cades Cove	10	"I really like it." "Its really fun." "Being able to be a ranger" (Is my favorite thing.)
Post-Test	Cades Cove	10	The rangers have been great with the Large number of children coming each day.
Post-Test	Cades Cove	10	It was very interesting.
Post-Test	Cades Cove	10	it is a great program for kids
Post-Test	Cades Cove	10	In Jr. Ranger book, 9-10, I think you need more about the waterfalls.
Post-Test	Cades Cove	10	I really liked the blacksmith program - it was fun making my own triangle. I had fun on the morning hayride seeing 60 deer and 3 bears. The pioneer toys (no batteries included) was fun too.
Post-Test	Cades Cove	10	Great Smoky Mountains National Park is very cool.
Post-Test	Cades Cove	10	Asum (Awesome)
Post-Test	Oconaluftee	10	Love Junior Ranger Program
Post-Test	Oconaluftee	10	I thought it was great!
Post-Test	Oconaluftee	10	I think Great Smoky Mountains National Park is beautiful
Post-Test	Oconaluftee	10	Becoming a Junior Ranger helps me get to know the park better.
Post-Test	Oconaluftee	10	Not sure if this is valid - I fill it out for child
Post-Test	Oconaluftee	10	I loved the park!!! I had lots of fun, and wish to come again! I just wish that they would put rangers or vollenters at each stop at places like Cades Cove.
Post-Test	Oconaluftee	10	I love the Great Smokey Mountains. They are amazing & I would like to thank all Park Rangers for letting us do all the activities! Thanks!
Post-Test	Oconaluftee	10	I have none
Post-Test	Oconaluftee	10	ASOME
Post-Test	Sugarlands	10	I love it very much and I would want to come here often because all your guides are very interesting & entertaining. I really feel bad about those trees that are dieing. I would really like to help. Bye
Post-Test	Sugarlands	10	I enjoyed the program very much. It gave me something to do.
Post-Test	Cades Cove	9	It is about learning new stuff.
Post-Test	Cades Cove	9	I really enjoyed the Ranger program.
Post-Test	Cades Cove	9	I had fun
Post-Test	Cades Cove	9	There good!
Post-Test	Cades Cove	9	My favorite thing was Stream Splashers.
Post-Test	Cades Cove	9	friendly rangers!
Post-Test	Oconaluftee	9	My dad came to the park when he was a kid. Now he brings me. I want the park to be here for my kids.
Post-Test	Oconaluftee	9	Mountains were pretty
Post-Test	Oconaluftee	9	Make more don't feed animal sighns
Post-Test	Oconaluftee	9	It was a lot of fun! I liked seeing all the new sights.
Post-Test	Oconaluftee	9	The Farm way very informative
Post-Test	Oconaluftee	9	This is a very fun, beautiful, awesome, and just a good national park. Thank you!!

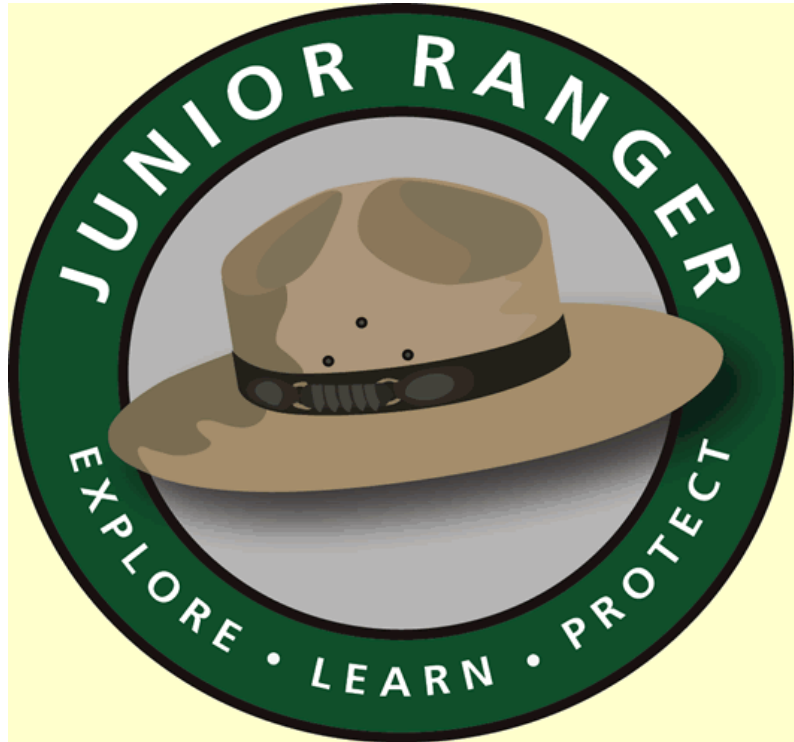
Post-Test	Oconaluftee	9	That I saw 3 bears. I like doing the Jr. Ranger Program. I also liked hiking to Grotto Falls and getting wet.
Post-Test	Oconaluftee	9	It is very helpful and great!
Post-Test	Oconaluftee	9	I enjoyed the blacksmithing & the old toys very much!
Post-Test	Oconaluftee	9	I liked the pottery because it was a real good experience. The Blacksmith, Ranger Mike, squeezed us in for an extra session. He was REALLY great!
Post-Test	Oconaluftee	9	I like The Junior Ranger program. Its made me want to Join other Junior Ranger programs.
Post-Test	Sugarlands	9	To help the people keep the parks clean and not litter.
Post-Test	Sugarlands	9	This is a great National Park to be with your family.
Post-Test	Sugarlands	9	The Splashing Streams was great - lots of time to see many different insects and crayfish.
Post-Test	Sugarlands	9	It was fun.
Post-Test	Sugarlands	9	It is fun
Post-Test	Sugarlands	9	I am a physically challenged 9 year old that loves the outdoors. I wish I could see the waterfalls here but I cannot walk the trails and none of them are wheelchair accessible. I loved the Junior Ranger Program. I really enjoyed the activities and learned a lot about the Smoky Mountains. I might grow up and become a park ranger. They are so cool and their uniforms are Awesome.
Post-Test	Sugarlands	9	As a mother I watched my children climb and explore the park with great enthusiasm! Both children had wonderful wildlife experiences and learned a great deal! The jr Ranger program was great! Dennison family
Post-Test	Sugarlands	9	I like Smokey!
Post-Test	Cades Cove	8	Dinr Bells Wrir fun to make. I like the ammol limpisc. (Dinner bells were fun to make. I like the animal olympics at Cades Cove).
Post-Test	Cades Cove	8	(drawings of a person smiling and an animal)
Post-Test	Cades Cove	8	Its great I love the park and want to keep it healthy and clean.
Post-Test	Cades Cove	8	It was a GREAT thing!
Post-Test	Cades Cove	8	I liked it.
Post-Test	Cades Cove	8	I like the park. I want to come again.
Post-Test	Cades Cove	8	I had a lot of fun and learned a lot in the Junior Ranger program. Thank you!
Post-Test	Cades Cove	8	(child's art work - a bear)
Post-Test	Oconaluftee	8	We had a great time & enjoyed the Junior Ranger program. Thank you!
Post-Test	Oconaluftee	8	pottery was cool & Batteries Not Included were my favorites
Post-Test	Oconaluftee	8	I loved the Great Smoky Mountains and I thought it was very fun too.
Post-Test	Oconaluftee	8	I love the Great Smokey Mountains! I love the experience
Post-Test	Oconaluftee	8	He enjoyed climbing Clingman's Dome.
Post-Test	Oconaluftee	8	Great Program. Our whole family enjoys it!
Post-Test	Oconaluftee	8	grate :) (art work of a stick figure clapping)
Post-Test	Oconaluftee	8	It's beautiful here and I love it here. I love everything, I love

Post-Test	Sugarlands	8	everything. I never want to leave. I like the caterpillar. I don't know if he's going to turn into a moth.
Post-Test	Sugarlands	8	Ranger Michael Smith was very kind and patient! He was so helpful and shared so much information with our children
Post-Test	Sugarlands	8	I brought my family to Gatlinburgh for vacation. Best vacation EVER. Enjoyed park activities instead of tourist activities.
Post-Test	Sugarlands	8	You Rock!
Post-Test	Sugarlands	8	It was fun, I learned a lot.
Post-Test	Sugarlands	8	Betle Finn (child's drawing of a bug)
Post-Test	Sugarlands	8	I liked the animals - want to see more
Follow-Up	Mail	13	It was very beautiful. We went horseback riding through it and we saw many pretty plants.
Follow-Up	Mail	13	I think there should be one for older kids to.
Follow-Up	Mail	13	I really enjoyed hiking in the Smoky Mountains. I hope to come back and see more of the park.
Follow-Up	Mail	13	I had fun at the classes. It gave me time to be with my family. I enjoy seeing the animals and learning about the parks history.
Follow-Up	Mail	13	A GREAT EXPERIENCE
Follow-Up	Mail	12	Your park es AWESOME! But et'd be cool et you had sheep along with your farm anemals because sheep are AWESOME! Oh yeah, and I really liked the blacksmithing, the catching fishy en the river, and the hiking and fending clues and stuff! YAAAY!!!
Follow-Up	Mail	12	You should do the creek walk on hot days, instead of rainy days. Because the creek was cold, and it rained before.
Follow-Up	Mail	12	The park was totally awesome! The only problem I had was that it rained on most of the trips. You should probably take care of the wasps and bees 2!
Follow-Up	Mail	12	IT WAS AWESOME!?
Follow-Up	Mail	12	It was amazeing, I want to work in the Great Smoky Mountains National Park now.
Follow-Up	Mail	12	I really liked the blacksmithing program. I still have my dinner bell today!
Follow-Up	Mail	12	I love the National Parks!
Follow-Up	Mail	11	You need to add how the kids should pick up 15 + pieces of litter in the park.
Follow-Up	Mail	11	I've had a lot of fun doing it. But I think you should advertise or make it more known because it took us 3 National Parks to figure out that it existed but once we started it we had a great time. I even completed the online one.
Follow-Up	Mail	11	I loved it and I had a lot of fun. I would do it again.
Follow-Up	Mail	11	I love the park. I think it is very supportive to nature habitats.
Follow-Up	Mail	11	I had a fun time, but our Guardin was not my favorite Chose. We did the blacksmithing Mamel Mania and animal oylimpis. More fun less "smell" in animal Oylimpis!
Follow-Up	Mail	11	Go Great Smoky Mountains National Park
Follow-Up	Mail	11	Great Smoky Mountain Nat. Park was one of my favorite national parks! Acadia Nat. Park in Maine is probably my favorite though.

Follow-Up	Mail	10	It's awesome. I have learned many different things and love going to the mountains to learn more about it's history. I now love to camp.
Follow-Up	Mail	10	The Junior Ranger Program is a great program.
Follow-Up	Mail	10	Thank you I had a lot of fun at the park. It was awesome. (drawing of a flower)
Follow-Up	Mail	10	Me and my little brothers enjoyed the junior ranger program a lot.
Follow-Up	Mail	10	I think The Great Smoky Mountains National Park to visit and I also think the Great Smoky Mountains National Park is one of the best National Parks ever and I think I would like to get here every day.
Follow-Up	Mail	10	I really liked going to the park I would want to come again. O! and we saw a bear and deer and turkeys and woodpecker.
Follow-Up	Mail	9	Very nice museum. Lots of interesting things like video. Gift shop fun too. You Rock.
Follow-Up	Mail	9	Thought it was Great
Follow-Up	Mail	9	It was very enjoyable. I think I've been a junior ranger 8 times. (This is every where I've been at a N.P.)
Follow-Up	Mail	9	It was cool.
Follow-Up	Mail	9	I think the Junior Ranger Program was fun! I hope to do it again someday!
Follow-Up	Mail	9	I think it is awesome. It is cool. You get to learn about things.
Follow-Up	Mail	9	I like that you get a prize at the end. It was also well run.
Follow-Up	Mail	9	I had an awesome time! :)
Follow-Up	Mail	8	I love the Junior Ranger Program and I love going to the Great Smoky Mountains National Park.

APPENDIX B: THE QUESTIONNAIRES

Pre-Test Version



Stewardship Survey

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TOYOTA



Developed in partnership by the Clemson University
Department of Parks, Recreation and Tourism Management
& the Virginia Tech Department of Forestry



S # GRSM-2009-SCI-0059 ~ 2009 ~ ~ Expiration Date: Dec. 31, 2009

Thank you for taking a few moments to help us with our survey. Your answers will be used to help improve future educational programs at the park. This is not a test; there are no right or wrong answers. Your answers will be kept completely confidential. Your participation is voluntary. The survey should take about 10 to 15 minutes. Once again, thank you for your help.

Directions: As in this example, please check one box for each question.

	Extremely Interested	Very Interested	Somewhat Interested	Slightly Interested	Not at all Interested
a) Answering survey questions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section A

Directions: How interested are you in learning about the following things? (Check one box for each question.)

	Extremely Interested	Very Interested	Somewhat Interested	Slightly Interested	Not at all Interested
1) The plants in Great Smoky Mountains National Park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) How to keep the park's rivers and streams clean.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) How to preserve cultural sites in the park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) The history of Great Smoky Mountains National Park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) How to protect animals in the park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Other national parks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section B

Directions: Do you agree or disagree with the following statements? (Check one box for each question.)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1) My friends think it's great that I visit national parks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Climate change can harm Great Smoky Mountains National Park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) How much I learn about this park is really up to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 4) Protecting a lot of different kinds of animals will help keep our planet healthy.
- 5) My family wants me to help protect the environment.
- 6) I can change the amount of electricity my family uses at home.

Section C

Directions: How often do you plan on doing the following things within the next three months? (Check one box for each question.)

- | | Always | Often | Sometimes | Rarely | Never |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) Volunteer to help the environment. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Make places for wildlife in my neighborhood. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) Talk to others about protecting nature. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Ask my family to use less electricity at home. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) Suggest visiting national parks to other people. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) Help clean up a local park when asked. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section D

Directions: How much have you thought about the following things? (Check one box for each question.)

- | | A Great Deal | Much | Somewhat | Little | Never |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Start: I have thought (your answer) about... | | | | | |
| 1) the benefits of being in the outdoors. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) how I should behave when visiting the park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) the harm some people do to the park by \their actions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) the ways I can help protect our national parks. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) how important parks are to the planet. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) the history of Great Smoky Mountains National Park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section E

Directions: Do you agree or disagree with the following statements? (Check one box for each question.)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1) In general, I try to do what my family wants me to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Having healthy trees in the park helps clean the air we breathe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) I have the power to help protect the environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) My family wants me to stay a safe distance from wild animals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) The National Park Service takes care of historic places so people can enjoy them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) It is up to me to make sure I don't cause harm when I am outside in nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section F

Directions: How often did you do the following things while visiting Great Smoky Mountains National Park? (Check one box for each question.)

	Always	Often	Sometimes	Rarely	Never
1) Feed wild animals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Pick wildflowers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Take artifacts found in the park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Clean up litter left by others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Learn more about the park's natural environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Dispose of trash properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Store food out of reach of wildlife.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section G

Directions: Do you agree or disagree with the following statements? (Check one box for each question.)

- | | Strongly
Agree | Agree | Neutral | Disagree | Strongly
Disagree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) It is up to me to limit the amount of water I use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) My family would be proud of me if I donated some money to the park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) My friends would approve of me volunteering at a park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Leaving garbage out in the park can make wild animals sick. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) My family will benefit because the National Park Service protects parks for the future. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section H

Directions: How often do you plan on doing the following things within the next three months? (Check one box for each question.)

- | | Always | Often | Sometimes | Rarely | Never |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) Turning off the water when brushing my teeth. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Recycling. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) Riding public transportation when available. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Reusing things like plastic bottles or bags. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) Walking or biking instead of riding in the car. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) Turning off lights when not being used. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section I

Directions: What do you think about people doing the following things in Great Smoky Mountains National Park? (Check one box for each question.)

- | | Strongly
Support | Support | Neutral | Against | Strongly
Against |
|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) Cleaning up trash left by others. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Feeding wild animals like bears. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) Littering in the park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- 4) Leaving food out where wild animals can eat it.
- 5) Picking wildflowers in the park.
- 6) Writing on trees or buildings.
- 7) Keeping things like arrowheads that are found in Great Smoky Mountains National Park.

Section J

- 1) Do you plan on participating in the Junior Ranger program during your visit to the park? Yes No Maybe
- 2) What is your age? _____ 3) Are you a male or female ?
- 4) What is the highest grade level you have completed in school? _____
- 5) Are you interested in learning more about the Junior Ranger activity books offered here at Great Smoky Mountains National Park? Yes No
- 6) How many other National Park Junior Ranger programs have you taken part in? _____
- 7) How many trips have you made to Great Smoky Mountains National Park in the last 5 years? 1 2-3 4-6 7-9 10 or more
- 8) Which of the following best describes your racial or ethnic background?
(Check all that apply)
- | | |
|---|--|
| <input type="checkbox"/> White, not of Hispanic descent | <input type="checkbox"/> Mixed (two or more races) |
| <input type="checkbox"/> Black, not of Hispanic descent | <input type="checkbox"/> Native Hawaiian or other Pacific Islander |
| <input type="checkbox"/> Hispanic | <input type="checkbox"/> American Indian or Alaskan Native |
| <input type="checkbox"/> Asian | <input type="checkbox"/> Other _____ |
- 9) How many other national parks have you visited? _____
- 10) Do you plan to visit other national parks in the future?
Yes No Maybe

Comments

Ranger program at Great Smoky Mountains National Park, please use the following space.

The End

Thank you for your time. Your answers are very important to us at the National Park Service, Virginia Tech and Clemson University. If you have any questions or comments, feel free to contact: Dr. Robert Powell by phone at 864-656-0787 or by email to rbp@clemson.edu. You may also contact the Clemson University Office of Research Compliance by email at irb@clemson.edu or toll-free at 866-297-3071 if you have any questions regarding your rights as a research participant.

Please return to your National Park Service Ranger or Volunteer.

If for some reason you must return the survey by mail, completed surveys should be mailed to:

Dr. Robert Powell
281 Lehotsky Hall
P.O. Box 340735
Clemson University
Clemson, SC 29634-0735

Please return your completed questionnaire as soon as possible.

Response to this survey is voluntary. No action may be taken against you for refusing to supply the information requested. Your name is requested for follow-up mailing purposes only. When analysis of the questionnaire is completed, all name and address files will be destroyed. Thus permanent data will be anonymous. Direct comments regarding this form to:

Robert Powell, Clemson University 281 Lehotsky Hall, P.O. Box 340735 Clemson, SC 29634-0735; rbp@clemson.edu
If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at (864) 656-6460.

FOR ADMINISTRATIVE PURPOSES ONLY

Date Entered _____

Entered By _____

Post-Test Version



Stewardship Survey

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Developed in partnership by the Clemson University
Department of Parks, Recreation and Tourism
Management
& the Virginia Tech Department of Forestry



NPS # GRSM-2009-SCI-0059 ~ ~ 2009 ~ ~ Expiration Date: Dec. 31, 2009

Thank you for taking a few moments to help us with our survey. Your answers will be used to help improve future educational programs at the park. This is not a test; there are no right or wrong answers. Your answers will be kept completely confidential. Your participation is voluntary. The survey should take about 10 to 15 minutes. Once again, thank you for your help.

Directions: As in this example, please check one box for each question.

	<i>Extremely Interested</i>	<i>Very Interested</i>	<i>Somewhat Interested</i>	<i>Slightly Interested</i>	<i>Not at all Interested</i>
a) Answering survey questions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section A

Directions: How interested are you in learning about the following things? (Check one box for each question.)

	<i>Extremely Interested</i>	<i>Very Interested</i>	<i>Somewhat Interested</i>	<i>Slightly Interested</i>	<i>Not at all Interested</i>
1) The plants in Great Smoky Mountains National Park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) How to keep the park’s rivers and streams clean.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) How to preserve cultural sites in the park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) The history of Great Smoky Mountains National Park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) How to protect animals in the park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Other national parks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section B

Directions: Do you agree or disagree with the following statements? (Check one box for each question.)

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
1) My friends think it’s great that I visit national parks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Climate change can harm Great Smoky Mountains National Park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) How much I learn about this park is really up to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 4) Protecting a lot of different kinds of animals will help keep our planet healthy.
- 5) My family wants me to help protect the environment.
- 6) I can change the amount of electricity my family uses at home.

Section C

Directions: Due to your participation in the Junior Ranger program how often do you plan on doing the following things within the next three months? (Check one box for each question.)

- | | Always | Often | Sometimes | Rarely | Never |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) Volunteer to help the environment. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Make places for wildlife in my neighborhood. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) Talk to others about protecting nature. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Ask my family to use less electricity at home. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) Suggest visiting national parks to other people. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) Help clean up a local park when asked. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section D

Directions: How much have you thought about the following things? (Check one box for each question.)

- | | A Great | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Start: I have thought (your answer) about... | Deal | Much | Somewhat | Little | Never |
| 1) the benefits of being in the outdoors. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) how I should behave when visiting the park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) the harm some people do to the park by their actions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) the ways I can help protect our national parks. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) how important parks are to the planet. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) the history of Great Smoky Mountains National Park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section E

Directions: Do you agree or disagree with the following statements? (Check one box for each question.)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1) In general, I try to do what my family wants me to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Having healthy trees in the park helps clean the air we breathe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) I have the power to help protect the environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) My family wants me to stay a safe distance from wild animals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) The National Park Service takes care of historic places so people can enjoy them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) It is up to me to make sure I don't cause harm when I am outside in nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section F

Directions: After starting the Jr. Ranger program, how often did you do the following things while visiting Great Smoky Mountains National Park? (Check one box for each question.)

	Always	Often	Sometimes	Rarely	Never
1) Feed wild animals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Pick wildflowers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Take artifacts found in the park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Clean up litter left by others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Learn more about the park's natural environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Dispose of trash properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Store food out of reach of wildlife.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section G

Directions: Do you agree or disagree with the following statements? (Check one box for each question.)

- | | Strongly
Agree | Agree | Neutral | Disagree | Strongly
Disagree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) It is up to me to limit the amount of water I use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) My family would be proud of me if I donated some money to the park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) My friends would approve of me volunteering at a park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Leaving garbage out in the park can make wild animals sick. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) My family will benefit because the National Park Service protects parks for the future. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section H

Directions: How often do you plan on doing the following things within the next three months? (Check one box for each question.)

- | | Always | Often | Sometimes | Rarely | Never |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) Turning off the water when brushing my teeth. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Recycling. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) Riding public transportation when available. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Reusing things like plastic bottles or bags. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) Walking or biking instead of riding in the car. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) Turning off lights when not being used. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section I

Directions: What do you think about people doing the following things in Great Smoky Mountains National Park? (Check one box for each question.)

- | | Strongly
Support | Support | Neutral | Against | Strongly
Against |
|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) Cleaning up trash left by others. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Feeding wild animals like bears. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- 3) Littering in the park.
- 4) Leaving food out where wild animals can eat it.
- 5) Picking wildflowers in the park.
- 6) Writing on trees or buildings.
- 7) Keeping things like arrowheads that are found in Great Smoky Mountains National Park.

Section J

1) Please provide your name and address if you are willing to complete a follow-up survey three months from now.

Name	
Street Address	
City and State	
Zip code or Country if not	
Email	

- 2) What is your age? _____ 3) Are you a male or female ?
- 4) What is the highest grade level you have completed in school? _____
- 5) Did you (or your child) complete a Junior Ranger activity book while taking part in the Junior Ranger program at Great Smoky Mountains National Park? Yes No
- 6) How many other National Park Junior Ranger programs have you taken part in? _____
- 7) How many trips have you made to Great Smoky Mountains National Park in the last 5 years? 1 2-3 4-6 7-9 10 or more
- 8) Which of the following best describes your racial or ethnic background?
(Check all that apply)
- | | |
|---|--|
| <input type="checkbox"/> White, not of Hispanic descent | <input type="checkbox"/> Mixed (two or more races) |
| <input type="checkbox"/> Black, not of Hispanic descent | <input type="checkbox"/> Native Hawaiian or other Pacific Islander |
| <input type="checkbox"/> Hispanic | <input type="checkbox"/> American Indian or Alaskan Native |
| <input type="checkbox"/> Asian | <input type="checkbox"/> Other _____ |

Comments

If you have any comments you would like to share about your experience with the Junior Ranger program at Great Smoky Mountains National Park, please use the following space.

The End

Thank you for your time. Your answers are very important to us at the National Park Service, Virginia Tech and Clemson University. If you have any questions or comments, feel free to contact: Dr. Robert Powell by phone at 864-656-0787 or by email to rbp@clemson.edu. You may also contact the Clemson University Office of Research Compliance by email at irb@clemson.edu or toll-free at 866-297-3071 if you have any questions regarding your rights as a research participant.

Please return to your National Park Service Ranger or Volunteer.

If for some reason you must return the survey by mail, completed surveys should be mailed to:

Dr. Robert Powell
281 Lehotsky Hall
P.O. Box 340735
Clemson University
Clemson, SC 29634-0735

Please return your completed questionnaire as soon as possible.

Response to this survey is voluntary. No action may be taken against you for refusing to supply the information requested. Your name is requested for follow-up mailing purposes only. When analysis of the questionnaire is completed, all name and address files will be destroyed. Thus permanent data will be anonymous. Direct comments regarding this form to:

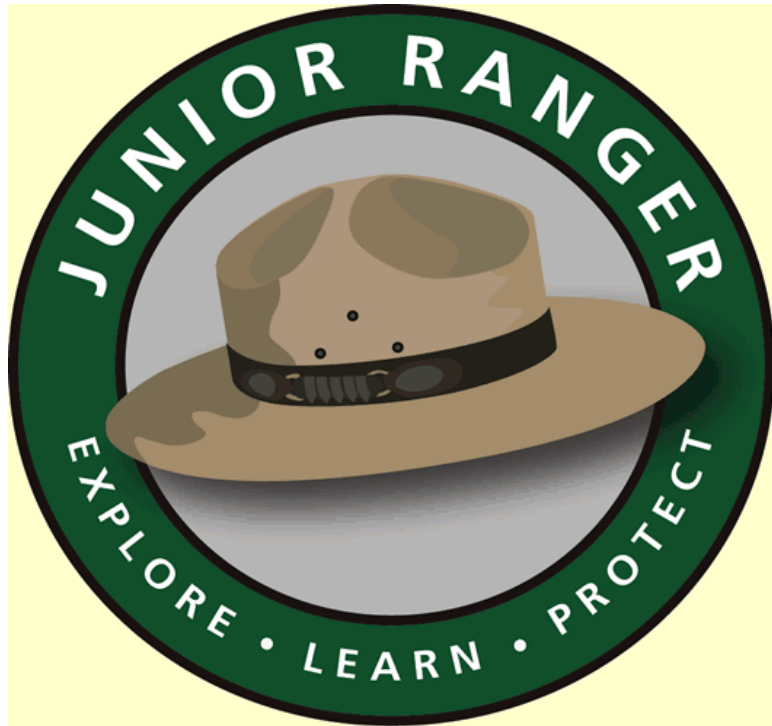
Robert Powell, Clemson University 281 Lehotsky Hall, P.O. Box 340735 Clemson, SC 29634-0735; rbp@clemson.edu
If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at (864) 656-6460.

FOR ADMINISTRATIVE PURPOSES ONLY

Date Entered _____

Entered By _____

Follow-Up Version



Stewardship Survey

Sponsored by

TOYOTA



Developed in partnership by the Clemson University
Department of Parks, Recreation and Tourism Management
& the Virginia Tech Department of Forestry



NPS # GRSM-2009-SCI-0059 ~~~ 2009 ~~~ Expiration Date: Dec. 31, 2009

Thank you for taking a few moments to help us with our survey. Your answers will be used to help improve future educational programs at the park. This is not a test; there are no right or wrong answers. Your answers will be kept completely confidential. Your participation is voluntary. The survey should take about 10 to 15 minutes. Once again, thank you for your help.

Directions: As in this example, please check one box for each question.

	Extremely Interested	Very Interested	Somewhat Interested	Slightly Interested	Not at all Interested
a) Answering survey questions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section A

Directions: How interested are you in learning about the following things? (Check one box for each question.)

	Extremely Interested	Very Interested	Somewhat Interested	Slightly Interested	Not at all Interested
1) The plants in Great Smoky Mountains National Park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) How to keep the park's rivers and streams clean.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) How to preserve cultural sites in the park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) The history of Great Smoky Mountains National Park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) How to protect animals in the park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Other national parks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section B

Directions: Do you agree or disagree with the following statements? (Check one box for each question.)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1) My friends think it's great that I visit national parks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Climate change can harm Great Smoky Mountains National Park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) How much I learn about this park is really up to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 4) Protecting a lot of different kinds of animals will help keep our planet healthy.
- 5) My family wants me to help protect the environment.
- 6) I can change the amount of electricity my family uses at home.

Section C

Directions: How often do you do the following things since participating in the Junior Ranger program? (Check one box for each question.)

- | | Always | Often | Sometimes | Rarely | Never |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) Volunteer to help the environment. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Make places for wildlife in my neighborhood. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) Talk to others about protecting nature. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Ask my family to use less electricity at home. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) Suggest visiting national parks to other people. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) Help clean up a local park when asked. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section D

Directions: How much have you thought about the following things since participating in the Junior Ranger program? (Check one box for each question.)

- | | A Great | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Start: I have thought (your answer) about... | Deal | Much | Somewhat | Little | Never |
| 1) the benefits of being in the outdoors. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) how I should behave when visiting the park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) the harm some people do to the park by their actions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) the ways I can help protect our national parks. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) how important parks are to the planet. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) the history of Great Smoky Mountains National Park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section E

Directions: Do you agree or disagree with the following statements? (Check one box for each question.)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1) In general, I try to do what my family wants me to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Having healthy trees in the park helps clean the air we breathe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) I have the power to help protect the environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) My family wants me to stay a safe distance from wild animals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) The National Park Service takes care of historic places so people can enjoy them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) It is up to me to make sure I don't cause harm when I am outside in nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section F

Directions: How often do you do the following things while visiting parks or natural areas since participating in the Junior Ranger program? (Check one box for each question. If you have not visited any parks you may skip this section.)

	Always	Often	Sometimes	Rarely	Never
1) Feed wild animals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Pick wildflowers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Take artifacts found in the park.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Clean up litter left by others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Learn more about the park's natural environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Dispose of trash properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Store food out of reach of wildlife.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section G

Directions: Do you agree or disagree with the following statements? (Check one box for each question.)

- | | Strongly
Agree | Agree | Neutral | Disagree | Strongly
Disagree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) It is up to me to limit the amount of water I use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) My family would be proud of me if I donated some money to the park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) My friends would approve of me volunteering at a park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Leaving garbage out in the park can make wild animals sick. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) My family will benefit because the National Park Service protects parks for the future. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section H

Directions: How often do you do the following things since participating in the Junior Ranger program? (Check one box for each question.)

- | | Always | Often | Sometimes | Rarely | Never |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) Turning off the water when brushing my teeth. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Recycling. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) Riding public transportation when available. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Reusing things like plastic bottles or bags. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) Walking or biking instead of riding in the car. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) Turning off lights when not being used. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Directions: Pick a person that attended the Junior Ranger Program with you and tell us how often you think that person has done the following things since your visit to the park last summer. If you are a child, pick an adult. If you are an adult, pick a child. (Check one box for each question.)

- | | Always | Often | Sometimes | Rarely | Never |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 7) Turning off the water when brushing their teeth. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8) Recycling. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9) Riding public transportation when available. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- 10) Reusing things like plastic bottles or bags.
- 11) Walking or biking instead of riding in the car.
- 12) Turning off lights when not being used.
- 13) How old is this person? (Example: 3, 12, 22) _____

Section I

Directions: What do you think about people doing the following things in Great Smoky Mountains National Park? (Check one box for each question.)

- | | Strongly
Support | Support | Neutral | Against | Strongly
Against |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1) Cleaning up trash left by others. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2) Feeding wild animals like bears. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3) Littering in the park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4) Leaving food out where wild animals can eat it. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5) Picking wildflowers in the park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6) Writing on trees or buildings. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7) Keeping things like arrowheads that are found in Great Smoky Mountains National Park. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section J

- 1) Do you plan on participating in a Junior Ranger program during your next visit to a national park? Yes No Maybe
- 2) What is your age? _____ 3) Are you a male or female ?
- 4) What is the highest grade level you have completed in school? (Example: 3, 12,) _____
- 5) How many other national parks have you visited? _____
- 6) Do you plan to visit other national parks in the future? Yes No Maybe
- 7) How many days did you spend in Great Smoky Mountains National Park during your visit last summer? _____
- 8) How many ranger-led programs did you go to during that visit? _____

9) If you are an adult, did you participate in the “Not-So-Junior Ranger” program during your visit to Great Smoky Mountains National Park? Yes No

10) If you are an adult, what is your relationship to the children (ages 8-13) you brought to the Junior Ranger program?

Child’s First Name _____ Parent/Guardian

Other

Child’s First Name _____ Parent/Guardian

Other

Child’s First Name _____ Parent/Guardian

Other

Comments

If you have any comments you would like to share about your experience with the Junior Ranger program at Great Smoky Mountains National Park, please use the following space.

The End

Thank you for your time, your answers are very important to us. If you have any questions, feel free to contact Dr. Robert Powell at Clemson University by phone at 864-656-0787, or send an email to rbp@clemson.edu. You may also contact the Clemson University Office of Research Compliance, toll-free at 866-297-3071 or by sending an email to irb@clemson.edu, if you have any questions regarding your rights as a research participant.

Please use the enclosed postage paid envelope to return your completed questionnaire as soon as possible.

If for some reason you must return the survey in a different envelope, address it to:

**Dr. Robert Powell
281 Lehotsky Hall, Clemson University
P.O. Box 340735
Clemson, SC 29634-0735**

Response to this survey is voluntary. No action may be taken against you for refusing to supply the information requested. Your name is requested for follow-up mailing purposes only. When analysis of the questionnaire is completed, all name and address files will be destroyed. Thus permanent data will be anonymous. Direct comments regarding this form to: Robert Powell, Clemson University 281 Lehotsky Hall, P.O. Box 340735 Clemson, SC 29634-0735; rbp@clemson.edu If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at (864) 656-6460.

FOR ADMINISTRATIVE USE ONLY

Date Entered _____

Entered By _____

APPENDIX C: SUPPORTING MATERIALS

Initial Follow-Up Survey Mailing

January 2010



Dear Great Smoky Mountains National Park Visitor:

We would like to thank you and your child (ages 8-13) for volunteering to help with this important study. Many people enjoy the educational programs at the park, especially the Junior Ranger programs, and the National Park Service would like these to remain of the highest quality. For this reason, the National Park Service and researchers from Clemson University are interested in finding out more about you.

This questionnaire is being distributed to only a select number of park visitors so your participation is essential! The information collected is anonymous and will be reported only in aggregate form to assist us in improving the provision of education at Great Smoky Mountains National Park. The questionnaires should take only about 10 minutes to complete. When you are finished, please place them in the enclosed postage-paid envelope and drop in any mailbox. After we receive your questionnaires, we will remove your names from our list.

Your response is very important to the National Park Service. We ask each adult and child (ages 8-13) that completed a survey while visiting the park last summer, to complete one of the enclosed follow-up surveys. Please complete the surveys independently, without input from others. If you have any questions about this study, or need a replacement questionnaire, please contact me, Dr. Robert B. Powell, at (864) 656-0787, email: rbp@clermson.edu, or Sue Vezeau, at (864) 353-4190, email: vezeau@clermson.edu.

Thank you in advance for your participation.

Sincerely,

Robert B. Powell

Dr. Robert B. Powell
Department of Parks, Recreation and Tourism Management
263 Lehotsky Hall
Clemson University,
Clemson, SC 29634

Reminder Postcards (front & back views)

February 2010

Dear Great Smoky Mountains National Park Visitor,
Recently we sent you a questionnaire. If you filled it out, **thank you.** If not, this card is a friendly reminder, and an appeal to ask that you please fill out and return the Great Smoky Mountains National Park Junior Ranger Program survey as soon as possible.

Since you are one of only a select number of park visitors receiving the survey, your response is very valuable to the success of this study and we hope you will take the time to participate. If you misplaced the survey and would like another copy, please email us at rbp@clermson.edu. I hope to hear from you soon.

All the best,

Robert B. Powell
Robert Powell
Clemson University

Clemson University
Parks, Recreation, & Tourism Management
263 Lehotsky Hall
Clemson, SC 29634



Second Follow-Up Survey Mailing



Dear Great Smoky Mountains National Park Visitor,

Several weeks ago we sent you a Junior Ranger questionnaire. To the best of our knowledge, you have not yet responded. If you completed and mailed your questionnaire within the last few days, thank you. Otherwise, this letter is an appeal to ask that you please fill out and return the enclosed questionnaire, which will provide useful information to Great Smoky Mountains National Park for improving visitor education.

Your response is very important to the National Park Service because you are a part of a select group of people who were chosen to represent the attitudes and opinions of Great Smoky Mountains National Park visitors. We ask each adult and child (ages 8-13) that completed a survey while visiting the park last summer, to complete one of the enclosed follow-up surveys. We recognize that your time is valuable, but we hope that you will agree to take part in this voluntary survey. Your responses will be only reported in broad statistical terms. We are very interested in your answers, so please try to answer every question.

Finally, we hope you find the enclosed survey interesting to fill out. When you have completed the survey, please place it in the postage paid envelope and drop it in any mailbox. If you have any questions regarding the survey or would like information on the studies' results, please contact me at rbp@clermson.edu or Sue Vezeau at vezeau@clermson.edu. Thank you very much for your help with this valuable study.

Sincerely,
Robert B. Powell

Dr. Robert B. Powell
Department of Parks, Recreation and Tourism Management
263 Lehotsky Hall
Clemson University,
Clemson, SC 29634

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