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THE INFLUENCE OF FLAGSHIP SPECIES ON *IN SITU* AND *EX SITU* WILDLIFE TOURISTS' CONNECTION TO WILDLIFE AND PRO-CONSERVATION BEHAVIORS

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THE INFLUENCE OF FLAGSHIP SPECIES ON *IN SITU* AND *EX SITU* WILDLIFE TOURISTS' CONNECTION TO WILDLIFE AND PRO-CONSERVATION BEHAVIORS

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ABSTRACT

Annually, millions of tourists visit natural areas and zoos primarily to view flagship species such as lions and elephants. Venues rely on the inherent charisma of these species to increase visitation and anchor conservation efforts. Expected visitor outcomes from the use of flagships include raised levels of awareness and pro-conservation behaviors. However, the role of flagships in wildlife tourism has been criticized for not delivering conservation benefits for species of interest or biodiversity, and producing negative site impacts. Furthermore, little is known about how the connection to a species influences conservation behaviors. This dissertation addresses this gap in knowledge by extending previous work exploring flagship-based wildlife tourism to include the emotional connection formed with a species and pro-conservation behaviors for individual species and biodiversity.

This dissertation represents a substantial contribution to the field because (a) it incorporates the role of the experience in understanding how tourists connect with a species and how this connection influences pro-conservation behaviors; and (b) is the first attempt to operationalize Conservation Caring as a measure of tourists' connection with a species. Existing studies have investigated how specific elements, such as interpretation or species' morphology may influence programmatic goals or awareness. However, awareness is a poor measure of an emotional connection with an animal. Furthermore, there has not been work done to address the holistic nature of the wildlife viewing experience, and its subsequent influence on behaviors.

In situ study sites consisted of several national parks from the northern circuit in Tanzania. *Ex situ* sites consisted of two zoos and one aquarium in the U.S. Structural equation modeling was used to analyze data. Results support the validity of Conservation Caring as a factor; the ability of *in situ* and *ex situ* wildlife tourism to influence Conservation Caring; and that this connection is a strong predictor of pro-conservation behaviors. These findings suggest wildlife tourism can deliver conservation outcomes. The studies in this dissertation also provide a valuable framework for structuring wildlife tourism experiences to align with flagship related conservation outcomes, and exploring a wider assemblage of species as potential flagships.

DEDICATION

This work is dedicated to my wife Lucy and our three children, Faith, Ethan, and Zoe. This would not have been possible without your unending love, support, and patience.

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Soli Deo Gloria

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CHAPTER ONE

INTRODUCTION

Wildlife tourism may arguably be the world's most popular activity. Recent estimates place worldwide annual participation rates at more than 600 million (Higginbottom, 2004a). Supporters of wildlife tourism argue that exposing such massive numbers of the public to nature, and wildlife in particular, creates memorable experiences and stimulates a connection to nature (Curtin, 2010; Ryan, Hughes, & Chirgwin, 2000; Zaradic, Pergams, & Kareiva, 2009). Overall, this produces a net positive impact for conservation. Alternatively, several studies have documented negative impacts from wildlife tourism within species such as decreased fecundity and disease transmission (Berman, Li, Ogawa, Ionica, & Yin, 2007; Sandbrook & Semple, 2006). Moreover, the increased public demand for the rare and exotic have exposed previously untrammeled areas to tourism's heavy footprint (Markwell, 2001; Terborgh, 2004). The finality of such negative impacts, coupled with a lack of empirical support for the affect of the experience has called into question the conservation outcomes attributed to wildlife tourism.

Wildlife tourism is a recognized subset of activities within nature-based tourism. However, due to the wide range of activities and venues, there has been some difficulty in developing a consensus definition. For example, activities may be taxon specific such as whale or bird watching, or broadly based such as African safaris. Other activities may be categorized based on impacts, i.e. consumptive or non-consumptive. Furthermore, each type of activity may occur in a natural area, wildlife sanctuary, or zoo or aquarium.

Roe, Leader-Williams, and Dalal-Clayton (1997) provide a broad definition that includes uses, participation rates, sustainability, impacts, and duration as qualifiers to distinguish wildlife tourism from ecotourism. Higginbottom (2004a) has modified this definition to be more reflective of the experience. For the purposes of this research, wildlife tourism will be defined as tourism that provides encounters with non-domesticated animals in wild (*in situ*) or captive (*ex situ*) settings. This abbreviated version is supported by both definitions.

Regardless of definition, one consistent theme emerging from the literature is a focus on wildlife tourisms' ability to contribute to conservation outcomes (Buckley, 2009; Green & Higginbottom, 2000; Pennisi, Holland, & Stein, 2004; Reynolds & Braithwaite, 2001). When managed properly, wildlife tourism is purported to produce direct conservation and research for species of concern, increased funding, educational opportunities, political support, and socio-cultural sustainability initiatives (Higginbottom, Tribe, & Booth, 2003; Orams, 1997; Wilson & Tisdell, 2003). Additionally, encounters with animals during a tourism experience are claimed to stimulate a connection to nature, increase awareness, and create peak experiences (Miller, 2005; Russell, 1994; Russell & Ankenman, 1996). Such encounters are hypothesized to drive support for conservation action within the participants (Saunders, 2003; Saunders, Brook, & Myers Jr, 2006; Saunders & Myers, 2003).

To that end, certain animals are presumed to a have greater potential than others to create these experiences and foster a connection with the public. Such capabilities are attributed to an animal's charisma. Lorimer (2007) defines animal charisma thusly,

"Nonhuman charisma can best be defined as the distinguishing properties of a non-human entity or process that determine its perception by humans and its subsequent evaluation" (p. 915). Non-human charisma is subject to anthropogenic manipulation and consists of three dimensions: ecological, aesthetic, and corporeal. The aesthetic dimension incorporates appearance characteristics. These are the features often used to trigger emotional responses and support for conservation (Jacobs, 2009; Rolston, 1987).

Several studies have explored which particular aesthetic characteristics influence a species' charisma. Similarity to humans (Tisdell, Wilson, & Nantha, 2005), large body size (Fuhrman & Ladewig, 2008), activity level, carnivorousness, large eyes (Rolston, 1987), and intelligence (Kellert, 1996) have all been shown to positively influence the public's perception of an animal's charisma. Oftentimes, species embody several of these characteristics. Such species have been dubbed charismatic megafauna (CMF) (Leader-Williams & Dublin, 2000).

Examples of CMF include bears, the great apes, big cats, elephants, and giraffes. The desire to see CMF, in the wild and captivity, is a driving force behind the massive participation rates in wildlife tourism (Valentine & Birtles, 2004). Moreover, the presence of CMF at a particular site is a major determinant of visitation rates, particularly for zoos and aquariums (Zimmermann, 2010).

Historically, CMF have served simply as tourist attractions (Beardsworth & Bryman, 2001; Draper, 2005). Recently, wild and captive sites have embraced a more conservation based role for these species, that of 'animal ambassador' (Hutchins, Smith, & Allard, 2003). In this context, CMF still function as a tourist draw, in that sites rely on

their inherent appeal to bolster visitation rates. However, once on site, visitors are exposed to conservation campaigns structured around CMF.

One underlying premise of designing conservation campaigns around CMF is that visitors are more inclined to form a connection with these species because of their charisma. Furthermore, this connection will stimulate a greater awareness and/or concern for that species' conservation. This concern, in turn, will motivate visitors to engage in pro-conservation actions, which is often the goal of such campaigns (Ballantyne, Packer, Hughes, & Dierking, 2007).

Some studies have investigated how visitors form a connection to species. Norton 1996) found safari tourists expressed a desire to commune with untamed nature and viewing animals in their natural habitat provided this. Smith, Weiler and Ham (2008) found zoo visitors who attended shows featuring birds of prey experienced levels of emotional arousal. Moreover, Curtin (2006) found that dolphin encounters provided feelings of profound happiness and euphoria in participants.

However, for more experienced wildlife tourists, charisma and a connection may be less easily defined (Curtin, 2010). Additionally, more experienced tourists may enter experiences with higher levels of awareness, and thus not be influenced (Beaumont, 2001; Lee & Moscardo, 2005). Furthermore, experienced tourists may seek exposure to a wider numbers of species versus focusing on a few select species (Curtin, 2009).

Alternatively, visitors may only experience a connection through guided experience and not passive viewing (Swanagan, 2000). Interpretation has been influential in this regard and recognized as a useful tool to help facilitate a connection to species

(Ham & Weiler, 2002). Additionally, interpretation using CMF has been shown to influence awareness (Fuhrman & Ladewig, 2008) and behavior (L. Smith, Broad, & Weiler, 2008).

However, despite support for certain aesthetic characteristics and highly targeted interpretation to stimulate a connection in visitors, there remains a significant gap in our understanding of how the context of the wildlife viewing experience fosters a connection to a species and how that connection influences behaviors. For example, first-hand experiences are recognized for their importance, however there is a lack of research to substantiate their influence (Moscardo, 2008). Additionally, human-animal interactions may be so context specific as to prevent inclusion of non-charismatic animals or extrapolation to wider audiences (Myers, Saunders, & Birjulin, 2004).

Moreover, even if a connection is formed, there is little evidence to describe its role on behaviors. Ballantyne, Packer and Falk (2011) point out the lack of support for the role of the wildlife tourism experience to influence behaviors. Manfredo (2008) makes the call for a metric to assess emotion and its intensity on pro-wildlife behaviors. Saunders (2003) cites the lack of understanding between a connection to nature and its influence on behaviors as a principal factor in the development of conservation psychology. She goes on to state there is a need for better conceptual models to identify ways of caring about nature. Such models could also address the gap in the literature concerning the basis of human support for species conservation (Clayton, Fraser, & Burgess, 2011).

Problem Statement

Parks, protected areas, and zoos receive hundreds of millions of visitors annually. For many of these sites, the presence of charismatic megafauna is a principal draw. Recently, wildlife tourism venues have begun linking charismatic species to conservation campaigns in the hopes of raising visitors' pro-conservation awareness and action. The production of such outcomes is linked with flagship species status. However, there is often a disconnect between charisma and flagship outcomes, and using popular animals as *de facto* flagship species has met with criticism. Complicating this situation is a lack of studies investigating how the viewing experience influences visitors' connection to an animal. Furthermore, it is not known how the experience and an emotional connection influence pro-conservation behaviors. To address this gap in the literature, this dissertation explored how *in situ* and *ex situ* wildlife viewing influenced visitor-based conservation outcomes, and how this can inform flagship species selection. Specifically, the researcher investigated the following interrelated research questions.

Research Questions

In order to investigate the role of the CMF viewing experience on influencing tourists' emotional connection and willingness to engage in pro-conservation behaviors (hereafter pro-conservation behaviors), the following research questions were addressed.

Research question 1. (Chapter 2)

1.1 How do *in situ* and *ex situ* CMF viewing experiences influence tourists' connection to a species, and willingness to engage in pro-conservation behaviors for that species and biodiversity?

1.2 How do ‘existing connection to wildlife’, and species and trip characteristics interact to influence outcomes?

1.3 Do outcomes differ by type of experience?

Research question 2. (Chapter 3)

2.1 Which elements of the zoo experience influence a visitor’s connection to an animal and do these represent the factor, Conservation Caring?

2.2 Does Conservation Caring function as a representation of an emotional connection to an animal, and does this predict pro-conservation behavior?

Research question 3. (Chapter 4)

3.1 Do wildlife tourists form an emotional connection with members of the Tanzanian ‘Big 5’?

3.2 Does the ‘Big 5’ produce the expected flagship responses, in tourists, of increased care and action?

3.3 Are additional East African fauna capable of stimulating flagship responses, and do these differ from the ‘Big 5’?

Research Sites

In situ sites were selected based on their ability to provide an iconic African wildlife viewing experience. The northern circuit of Tanzanian parks and protected areas was selected because of the large amount of visitation, diversity, and abundance of wildlife, and high probability of wildlife encounters. These sites include Mt. Kilimanjaro, Arusha, Serengeti, Lake Manyara, Mkomazi, and Tarangire National Parks, and the Ngorongoro Conservation Area.

Ex situ sites were selected on the basis of high visitation levels, diversity of African wildlife present, and immersion exhibits designed to provide 'up-close' encounters with megafauna. Sites consisted of Brookfield Zoo (Brookfield, IL), Zoo Atlanta (Atlanta, GA) and Shedd Aquarium (Chicago, IL).

Document Structure

The remainder of this dissertation is comprised of four chapters, one chapter for each of the three research questions, a conclusion and synthesis chapter, followed by appendices and references. Chapters 2 – 4 (formatted as journal manuscripts) outline the specific foci, methods, results, and discussion used to address each research question. Chapter 2 addresses how *in situ* and *ex situ* wildlife tourism experiences influence conservation outcomes. The survey instruments for this study are found in Appendices A & B. Chapter 3 addresses operationalizing Conservation Caring and zoo visitors' willingness to engage in pro-conservation behaviors. The survey instruments for this study are found in Appendices B & C. Chapter 4 investigates the validity of Tanzania's 'Big 5' as flagship species and explores the potential of additional East African fauna to function as flagships. The survey instrument for this study is found in Appendix A. Chapter 5 summarizes each study and details limitations of the dissertation. The chapter also provides a discussion of the integration of results and broad-scale management implications.

CHAPTER TWO

CONTEXT, CHARISMA, AND CONSERVATION: THE INFLUENCE OF CHARISMATIC MEGAFAUNA ON *IN SITU* AND *EX SITU* WILDLIFE TOURISTS' PRO-CONSERVATION BEHAVIORS

Introduction

Does viewing wildlife, in wild or captive settings, stimulate tourists to care about species and actively support their conservation? Advocates for wildlife tourism suggest that viewing charismatic species can increase tourists' awareness and participation in pro-conservation behaviors, such as philanthropy, which support the sustainability of tourism activities. Additionally, these benefits are purported to outweigh the costs of potential disturbances to wild populations and the use of captive populations in zoos. However, few studies have investigated how the wildlife viewing experience is linked to enhancing visitors' connection to wildlife and pro-conservation behaviors.

Wildlife tourism is defined as tourism activities that provide encounters with non-domesticated animals in wild (*in situ*) or captive (*ex situ*) settings (Higginbottom, 2004a). Most education and conservation initiatives associated with wildlife tourism are designed to enhance visitors' attitudes and behaviors associated with species of interest. Research suggests that encounters with wildlife can facilitate a connection to nature (Clayton & Myers, 2009). To that end, both *in situ* and *ex situ* wildlife tourism venues have relied on charismatic megafauna (CMF) to anchor visitor supported conservation initiatives.

CMF are usually large vertebrates such as bears, great apes, big cats, elephants and rhinos. Such species are the backbone of the wildlife tourism industry and a rallying

point for conservationists. CMF based wildlife tourism has been shown to be financially viable, highly popular, and capable of raising awareness of threats to the species of concern (Kerley, Geach, & Vial, 2003; Lemelin, Fennell, & Smale, 2008; Lindsey, Alexander, Mills, Romañach, & Woodroffe, 2007; Lukas & Ross, 2005; Matt & Aumiller, 2002; Stoinski, Steklis, & Mehlman, 2008). Tourists have been shown to develop a strong connection to individual animals observed in wild and captive settings, and this connection has been shown to extend to the species as a whole (Curtin, 2006; Schanzel & McIntosh, 2000). Wildlife tourism sites that have CMF enjoy the added benefits of greater financial revenues; higher public profiles; and more volunteers than sites without CMF (Green & Higginbottom, 2000; Higginbottom, 2004 Higginbottom, et al., 2003; Preston & Fuggle, 1987).

Studies have linked visitor responses such as: satisfaction (Obua & Harding, 1996); understanding (Lukas & Ross, 2005); concern (Bruni, Fraser, & Schultz, 2008); and awareness (Peake, Innes, & Dyer, 2009) to *in situ* and *ex situ* CMF viewing experiences. Additionally, wildlife viewing experiences as a whole, i.e. independent of observed species, can increase a connection to nature (Beaumont, 2001; Lindsey et al., 2007). However few studies have investigated the relationship between the CMF viewing experience and visitors' willingness to engage in pro-conservation behaviors (Schultz & Tabanico, 2007). Furthermore, the links between attraction, awareness, and action purported by conservationists, have been challenged (Waylen, McGowan, Group, & Milner-Gulland, 2009).

This study explored the relationship between existing connections to wildlife, experience characteristics, caring, and pro-conservation behavioral intentions using interactional theory (Figure 2.1) and structural equation modeling (Figure 2.2) by examining *in situ* (Tanzanian parks and protected areas) and *ex situ* (U.S. zoos and aquariums, hereafter zoos) experiences. Interactional theory proposes that behavior is influenced by an interaction between the individual, and the social and physical environments (Altman & Rogoff, 1987; Archer & Wearing, 2003; Chan & Baum, 2007; Powell, Kellert, & Ham, 2009), and is particularly useful when the nature of proposed relationships is primarily exploratory. This study also investigated the differences between the *in situ* and *ex situ* experiences on conservation outcomes. Additionally, the pathways between experience characteristics, caring, and behaviors were analyzed to understand how different CMF might serve as flagship species.

Literature Review

Wildlife Tourism

Generalized concepts of sustainable nature-based tourism are recognized in the literature as early as 1965 and reference dimensions presented in the Brundtland Report (Blamey, 2001). In an early article proposing a "symbiotic relationship" between tourism and conservation, Budowski (1976) states, "Tourism helps by lending support to those conservation programmes which will develop educational, scientific, and recreational resources, with the objective that they in turn will attract more, and different kinds of, tourists" (p. 29).

Wildlife tourism, a distinct category of nature based tourism, is not by definition sustainable. In fact, the popularity of wildlife viewing can produce negative impacts due to poorly managed visitation (Sims-Castley, Kerley, Geach, & Langholz, 2005). Examples of tourist induced negative impacts include: disease transmission to mountain gorillas (*Gorilla beringei beringei*) (Sandbrook & Semple, 2006); increased habituation in brown bears (*Ursus arctos*) (Herrero, Smith, DeBruyn, Gunther, & Matt, 2005); and general food provisioning (Orams, 2002).

Poorly managed visitation may also compromise the effectiveness of on-site wildlife management plans. For example, to enhance viewing options, management strategies have been skewed to favor CMF populations at the expense of other species (Higginbottom, 2004b; Lindsey et al., 2007). This may diminish visitors' interest in other species within the park or zoo. CMF are also often the most difficult and expensive species to manage (Lindsey, et al., 2007), and the rush to capitalize on their presence may cause areas in greater need of conservation, or lacking CMF, to be overlooked, and financial resources to be diverted from underfinanced protected areas (Wilkie & Carpenter, 1999).

The rapid and continued growth of the wildlife tourism industry has brought tourists and tour operators to the table as de facto stakeholders in the management of parks and protected areas (Goodwin & Leader-Williams, 2000). Managers must balance the demands of visitor viewing preferences against impacts to the resource (Semeniuk, Haider, Beardmore, & Rothley, 2009; Wright, 1998). Overly restricting tourists can diminish viewing opportunities, which could decrease funding and public support for

conservation associated with CMF. Additionally, zoos that focus too heavily on CMF may do so at the expense of committing resources to *in situ* support. Managers also face the challenge of how to extend the wonder and respect for CMF to "biophilically challenged" taxa, such as snakes (Myers et al., 2004), and biodiversity as a whole (Czech, Krausman, & Borkhataria, 1998; Kerley et al., 2003).

Despite these challenges, CMF have been cited as a primary factor for conservation successes in wildlife tourism (Kruger, 2005). They can also positively enhance attitudes and awareness, which Waylen et al. (2009) point out is not a benefit derived from many other conservation programs. However, the role of the viewing experience in fostering pro-conservation behaviors has received little attention in the literature.

Charismatic Megafauna Characteristics

A consistent trend among wildlife tourists is the desire to see large, potentially deadly vertebrates in wild (Goodwin & Leader-Williams, 2000; Matt & Aumiller, 2002; Okello, Manka, & D'Amour, 2008) and captive (Balmford, Leader-Williams, & Green, 1995; Christie, 2007; Ryder, 1995) settings. Studies have shown which characteristics make species more appealing to humans (Curtin, 2005; Woods, 2000); contribute to viewers' emotional affinity for species (Ballantyne, Packer, & Sutherland, 2010); and contribute to the overall emotional appeal of species (Myers et al., 2004). Other research suggests charisma can be applied broadly (Lorimer, 2007) and can be found in species as divergent as the flightless dung beetle (*Circellium bacchus*) (Kerley et al., 2003) and kapok tree (*Ceiba pentandra*) (Bowen-Jones & Entwistle, 2002).

So, while there is research that investigates charismatic characteristics, there is little work that links those characteristics to visitors' caring and willingness to support pro-conservation behavior. Furthermore, the differences between *in situ* and *ex situ* CMF viewing, and their influence on conservation outcomes are poorly understood (Ballantyne et al., 2007).

Charismatic Megafauna as Flagship Species

A species' ability to stimulate pro-conservation awareness and behavior is the basis of the flagship surrogate species concept. Any species that raises awareness of conservation issues and stimulates pro-conservation behavior, via a purposeful campaign, may qualify as a flagship species (Simberloff, 1998). Ballantyne, Packer, Hughes, & Dierking (2007) found that observing species' natural behavior has the potential to increase visitors' understanding and foster a positive attitude toward conservation. Direct and indirect exposure to species used as flagships has also been shown to influence affective responses in viewers (A. Smith & Sutton, 2008; Waylen et al., 2009; Wright, 1998; Zinn, Manfredo, & Decker, 2008).

CMF based wildlife tourism provides fertile ground to investigate the flagship species concept. Myers et al., (2004) found that zoo visitors who observed gorillas and okapis (*Okapia johnstoni*) expressed increased levels of care and a strong desire to see them preserved in the wild. Ballantyne et al., (2010) found visitors expressed an emotional affinity for dolphins in captive and wild settings, and this affinity could transcend to biodiversity as a whole. These findings support the notion that any CMF

could be stimuli for pro-conservation behaviors, and thus be considered for flagship status.

One reason for the success of CMF based wildlife tourism is tourists' formation of a connection to nature that is derived from these encounters with wildlife (Saunders, 2003). Bentrupperbäumer (2005) recommends investigating species' attributes as one way of unraveling visitor preferences and conservation benefits. However, it is unknown if or what elements of a wildlife tourism experience may foster adoption of behaviors (Ballantyne et al., 2011).

Interactional Theory

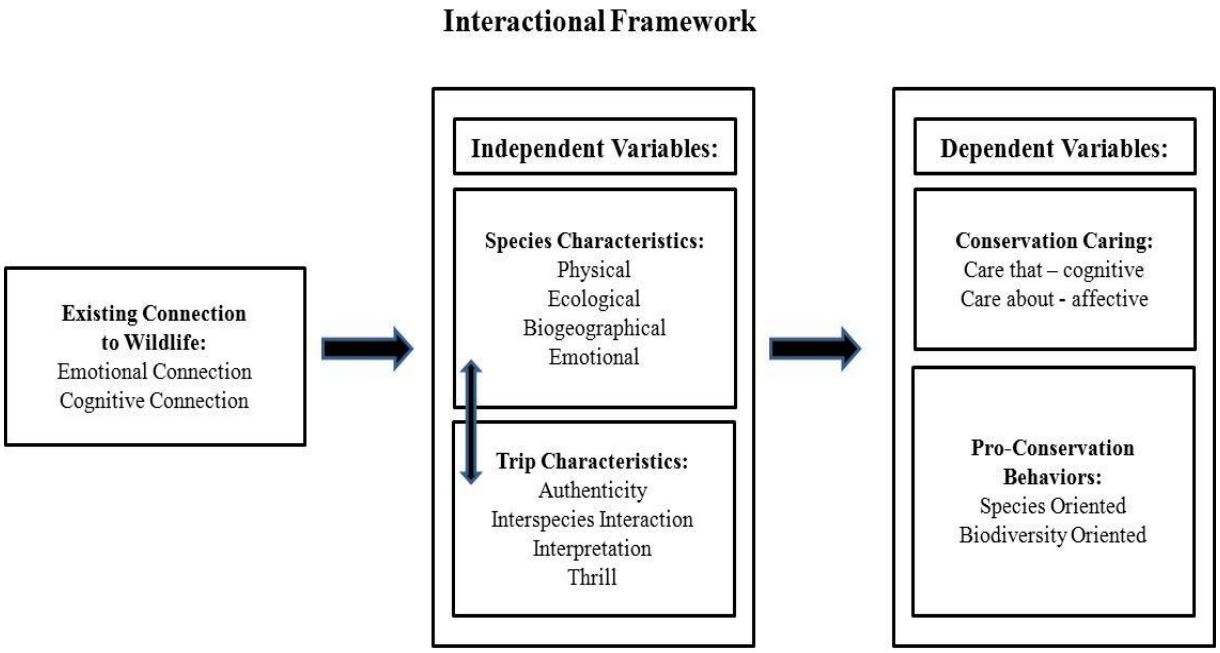
Interactional theory is a holistic framework intended to capture the complexity of phenomena by simultaneously considering psychological processes, environmental settings, and contextual factors (Altman & Rogoff, 1987; Archer & Wearing, 2003). This framework has been used to investigate the role of environmental and visitor characteristics, and education on behavior outcomes (Patterson, Watson, Williams, & Roggenbuck, 1998; Powell, Kellert, & Ham, 2009; Werner, Brown, & Altman, 2002).

Other behavior theories, such as the Theory of Planned Behavior (TPB) (Ajzen, 1991) and Value-Belief-Norm (VBN) Theory (Stern, 2000b), have recognized that people rarely exist in behavioral vacuums and that the context of the behavior matters. Therefore, it is recommended that models incorporate experience characteristics in order to clarify relationships and increase the accuracy of predicting behavioral modification (Stern, 2000b; Stern, Dietz, Abel, Guagnano, & Kalof, 1999). However, TPB and VBN

are not designed to account for the role of the experience. Schultz (2000) implies interactional frameworks are the preferred method to investigate a connection to nature.

Using interaction theory as a guiding framework, this study investigated the influence of the CMF viewing experience on Conservation Caring and pro-conservation behavior. Figure 2.1 represents how interaction theory was used to conceptualize the relationship between variables. This model is adapted from Powell et al., (2009) who found an interactional framework was successful for modeling the influence of nature based tourism characteristics on behavioral intentions.

In this study, the interaction between the individual and contextual factors is modeled by the interaction between Existing Connection to Wildlife, and Species and Trip Characteristics. These in turn are hypothesized to have a direct positive influence on Conservation Caring and pro-conservation behaviors. More specifically, Conservation Caring is hypothesized as an intermediate dependent variable to behaviors.



Adapted from Powell et al., (2009)

Figure 2.1. Interaction framework of CMF experience

Study Objectives

The purposes of this study were to a) investigate how *in situ* and *ex situ* CMF viewing experiences influenced tourist-based conservation outcomes, b) how individual elements of the viewing experience interacted to influence outcomes, and c) if outcomes differed by type of experience. Specifically, we sought to understand how *in situ* and *ex situ* experiences influenced tourists' connection to an animal, as operationalized by Conservation Caring, and how this connection influenced pro-conservation behaviors for that species and biodiversity. Additionally, we explored how Conservation Caring and pro-conservation behaviors could inform flagship species selection for *in situ* and *ex situ* sites.

Study Sites

The goals of this study were contingent on tourists forming a connection with an animal during the experience. Tourists were allowed to self-describe the animal they connected with rather than select from a predefined list. Therefore, study sites were selected on the basis of their diversity of wildlife and the presence of several recognized CMF. All three zoo sites are accredited members of the Association of Zoos & Aquariums. Additionally, Brookfield Zoo and Zoo Atlanta participate in several species survival plans, which has been recognized as an integral contribution by zoos to *in situ* conservation (Mallinson, 2003).

In Situ sites.

The northern circuit of Tanzania was chosen for the consistent diversity and density of wildlife found at each park and protected area. Furthermore, most tourists use guides and thus have the potential for a basic exposure to interpretation. The northern

circuit consists of the following national parks: Mt. Kilimanjaro, Arusha, Serengeti, Lake Manyara, Mkomazi, and Tarangire. Additionally, the Ngorongoro Crater is considered part of the northern circuit, although it is not a Tanzanian National Park.

Arguably, the most popular of these sites are Serengeti National Park (SNP) and the Ngorongoro Crater. Established as a game reserve in 1929 and a national park in 1951, SNP is the oldest and second largest (5700 mi^2/14,763 $km^{2)}$ national park in Tanzania. It is home to over one million wildebeest, 300,000 Thomson's gazelle, 200,000 zebra and 32 other plains species. All 'Big 5' species (elephant, rhino, Cape buffalo, lion, and leopard) are present, as well as other CMF such as hippo, giraffe, and cheetah. Additionally, there are several mesofauna present such as hyenas, jackals, aardwolf, and servals, and 500 bird species. SNP is also the site of one of the last remaining great biological phenomena, the wildebeest migration. Due to these and other features, SNP has been designated a world heritage site biosphere reserve (Tanzania National Parks, n.d.; Tanzania Tourist Board, n.d.).

The Ngorongoro Crater is located in the Ngorongoro Conservation Area (NCA) and is administered by the Ngorongoro Conservation Area Authority. NCA is adjacent to SNP. Established in 1959, the NCA is 3200 mi^2 (8292 km^2) and is a designated multiple use area. NCA is a Man and Biosphere Reserve and World Heritage Site. The Ngorongoro Crater is an unbroken caldera and is 100 mi^2/260 km^2. All visitors to the crater floor must be accompanied by a guide. The crater itself is home to 7000 wildebeests, 4000 zebra, 3000 eland and 3000 Grant's and Thomson's gazelles. All 'Big

5’ species are also present, as well as wild dogs, and 500 bird species including greater and lesser flamingo (Ngorongoro Crater, n.d.).

Brookfield Zoo.

Brookfield Zoo, located in Brookfield, Illinois – a suburb of Chicago – receives more than 2,000,000 visitors annually. Founded in 1934, the 216 acre zoo is home to 450 different species and eleven multi-species habitat recreation exhibits. It has taken a leadership role in advancing the field of conservation psychology and is home to the Conservation Leadership Center and Center for the Science of Animal Welfare. The zoo is involved in 35 *in situ* conservation projects and houses 44 species that are part of a species survival plan (Chicago Zoological Society, n.d.).

Shedd Aquarium.

The Shedd Aquarium is located on the shore of Lake Michigan in Chicago, Illinois. When the facility opened in 1930, it was the world’s largest aquarium, and today receives more than 2,000,000 visitors annually. The aquarium has expanded since its opening and now has four multi-species habitat recreation exhibits, and 32,500 animals representing 1500 species. Some of the more notable animals include whales, dolphins, otters, sharks, and rays. The Shedd is involved in eight large-scale local and global *in situ* conservation projects (Shedd Aquarium, n.d.).

Zoo Atlanta**.**

Zoo Atlanta was founded in 1889 and has become a nationally recognized leader in zoo-based conservation. The 40 acre site receives 700,000 annual visitors and is home to 900 animals, one of which is the giant panda. The zoo has the nation’s largest gorilla and orangutan collection and three multi-species habitat recreation exhibits. The zoo also

has several state-of-the-art interpretive exhibits linking *in situ* conservation to on-site exhibits. Additionally, Zoo Atlanta participates in 30 species survival plans and seventeen *in situ* projects around the world (Zoo Atlanta, n.d.).

Methods

Survey Instrument Development

Factors were developed and modified following DeVellis (2003). A pilot test (N = 178, 75% response rate) was conducted at Brookfield Zoo, in July 2011, to identify construct validity and item clarity issues. The final survey instrument contained six factors, and 56 items (Table 2.2). All construct items were measured using 9 point Likert scales; 1 = strongly disagree, 9 = strongly agree; 1 = extremely unlikely, 9 = extremely likely.

Existing connection to wildlife.

This factor was adapted from Nature Relatedness (NR) (Nisbet, Zelenski, & Murphy, 2009) and Emotional Affinity to Nature (EAN) (Kals, Schumacher, & Montada, 1999) scales. These scales were selected based on their ability to distinguish the emotional and cognitive components of an individual's connection to CMF. The NR scale has been shown to measure the link between an individual's connection to nature and environmentally responsible behavior. In this study, items were designed to represent the 'self', 'perspective', and 'experience' sub-dimensions of NR. The EAN scale has been used to examine the relationship between an individual's emotional affinity toward nature and nature-protective behavior. Items in this study were designed to represent the

cognitive and affective interest in nature, and emotional indignation over insufficient protection of nature sub-dimensions.

Species characteristics.

Species Characteristics items encompass physical, ecological, biogeographical, and emotional attributes which have been recognized to influence charisma (Bowen-Jones & Entwistle, 2002; Clucas, McHugh, & Caro, 2008; Jacobs, 2009; Kellert, Black, Rush, & Bath, 1996; Lorimer, 2007; Rolston, 1987; Sitas, Baillie, & Isaac, 2009; Woods, 2000). Physical attributes included general morphological features. Ecological attributes dealt with how the species behaved in its habitat. Biogeographical attributes consisted of symbolic roles of wildlife. Emotional attributes addressed the tourists' ability to understand and identify with emotional states of the animal.

Trip characteristics.

Trip Characteristics items were selected from experiential elements recognized for influencing awareness and behaviors. Those are, authenticity, interspecies interaction, interpretation, and thrill (Ballantyne et al., 2010; Beardsworth & Bryman, 2001; Cousins, Evans, & Sadler, 2009; Curtin, 2005, 2006; DeMares & Krycka, 1998; Kerley et al., 2003; Myers et al., 2004; Reynolds & Braithwaite, 2001; Russell & Ankenman, 1996; Ryan et al., 2000; Schanzel & McIntosh, 2000; Sims-Castley et al., 2005). Authenticity addressed the overall feel of the tour and included items such as proximity and diversity of wildlife. Interspecies interaction related to how wildlife responded to individual tourists. Interpretation dealt with the overall quality and quantity of interpretive

experiences. Lastly, thrill incorporated elements of species rarity and mystery, and perceived levels of risk.

Conservation caring.

An individual's connection to a species is represented by the factor Conservation Caring, adapted from Rabb and Saunders (2005), and includes the dimensions care '*that',* which are cognitive items and care '*about',* which are affective items. Using these dimensions makes this factor more in line with empathy rather than knowledge. Empathy has been shown to be a better predictor of helping behavior within the context of environmental issues (Ballantyne et al., 2010; Schultz, 2000), and is more aligned with understanding how individuals care for a species (Saunders, 2003; Vining, 2003). Conservation Caring was conceptualized as an intermediary dependent variable to both Species and Biodiversity Oriented Behaviors. Additionally, Conservation Caring is conceptualized as a continuum of the level of connection to a species.

Species & biodiversity oriented behaviors.

Behavioral intent was separated into two factors on the basis of how actions pertain to an individual species, or biodiversity as a whole (Table 2). Both factors were adapted from Stern (2000) and included the dimensions: non-activist public sphere, behavior in organizations, activism, and private sphere. These dimensions are supported in the literature as being well representative of pro-conservation behaviors (Kaiser, Hubner, & Bogner, 2005; Schultz, 2000; Stern et al., 1999). They also align well with conservation behaviors typically associated with individual species or species cohorts (Pennisi et al., 2004; Swanagan, 2000; Walpole & Leader-Williams, 2002; Waylen et al.,

2009). Items focused on highly site-specific behaviors. A criticism of some models is that items are too general. Making items relevant to a site has been shown to improve model explanatory capabilities (Powell & Ham, 2008; Stern, 2000b).

Survey Sites & Sampling Procedure

In situ surveys were administered at the Kilimanjaro International Airport, Moshi, Tanzania. This site was selected because it serves as the principal entry/exit point for tourists visiting parks and protected areas within the northern circuit of Tanzania. Surveys were collected daily from October 29 – November 3, 2011 using a census sampling approach. Tourists were intercepted upon their arrival in the international departure lounge of Kilimanjaro International Airport. Tourists were first asked if they spoke English, as the survey was only available in English. Those who spoke English were asked if they had participated in a wildlife viewing activity, in a natural area, while in Africa. Those who responded 'yes' were asked to complete a survey. A total of 416 surveys were collected, with a 98% response rate (Table 2.1).

Ex situ surveys were collected from visitors at two zoos and one aquarium. Brookfield Zoo (Chicago, Illinois, USA), Zoo Atlanta (Atlanta, Georgia, USA), and Shedd Aquarium (Chicago, Illinois, USA) were chosen for their high visitation rates, presence of African wildlife, immersive exhibits, and levels of interpretation.

Surveys were collected September 3 – November 27, 2011. Using a systematic sampling approach, visitors to Brookfield Zoo (n = 162) and Zoo Atlanta (n = 87) were intercepted by a survey team member at the central picnic grounds. Visitors to the Shedd Aquarium (n = 203) were intercepted at the Caribbean Reef exhibit. Surveys were only

available in English. Visitors who indicated they had been on site for three hours or more were asked to participate in the survey. A total of 452 visitors were surveyed, with an 89% response rate (Table 2.1).

Table 2.1. *Surveys collected by site*

Site	Surveys collected
Kilimanjaro International Airport	416
Brookfield Zoo	162
Shedd Aquarium	203
Zoo Atlanta	87

Analyses

Data cleaning & preliminary factor screening.

Data were screened for missing values. Cases exhibiting missing values for more than 50% of items per factor were removed. A total of 108 cases were removed. Data were screened for univariate and multivariate outliers following Tabachnick & Fidell (2007). No univariate outliers (+/- 3 S.D.) were detected. A total of 27 cases were removed for exceeding the criterion Mahalanobis Distance value (χ^2 (*43*) = 77.38, p < .001). The final sample size was N = 353 for safari tourists, and N = 360 for zoo tourists.

Test for metric invariance.

Establishing metric invariance provides a statistical benchmark for accepting differences between populations due to true score differences in the factors as opposed to inconsistent psychometric properties. Tests for metric invariance followed the hierarchical tests for configural, metric and structural invariance consistent with Byrne (2008). These tests were used to confirm both the fit and invariance of the measurement model of the CMF viewing experience. Metric invariance was assessed across zoo sites to provide statistical support for pooling the three independent sample sites. Next metric invariance was assessed across safari and zoo tourist populations.

Once the measurement model was confirmed for acceptable fit and invariance, the structural model was tested with the same set of hierarchical invariance tests. This was done in order to confirm fit and uncover causal pathway differences in the model between populations. The structural model varied from the measurement model in that it also included formative items for Trip Characteristics. A factor may contain both formative

and reflective items (Jarvis, MacKenzie, & Podsakoff, 2003). However, formative items should not be included for measurement metric invariance testing.

Table 2.2. *Initial factor loadings and item means*

Factor and items [a, b]	Safari tourists (*N* = 362) Mean (SD)	λ	Zoo tourists (*N* = 369) Mean (SD)	λ
Existing connection to wildlife				
I actively seek opportunities to view wildlife.	7.10 ± 1.95	.54	7.09 ± 1.83	.55
I feel a deep connection to wildlife.	6.69 ± 1.93	.76	6.54 ± 1.93	.76
I am highly motivated by the need to interact with wildlife.	6.26 ± 2.07	.73	6.13 ± 2.05	.76
I enjoy viewing all types of wildlife.*	7.98 ± 1.24	.30	7.98 ± 1.46	.36
I spend a lot of time learning about wildlife.	5.55 ± 2.11	.54	5.99 ± 2.02	.57
I have a responsibility to do all I can to protect wildlife.*	7.18 ± 1.86	.41	7.10 ± 1.82	.50
Species characteristics				
I understood this animal's behaviors.	6.09 ± 1.85	.50	6.15 ± 2.00	.56
I understood this animal's emotions.	5.36 ± 2.18	.93	5.50 ± 2.14	.81
I felt empathy for this animal because of its emotions.	5.47 ± 2.31	.64	5.74 ± 2.11	.76
This animal displayed human qualities.*	5.07 ± 2.40	.30	5.81 ± 2.31	.43
This animal was intelligent.*	6.79 ± 2.05	NS	6.90 ± 1.97	.41
Trip characteristics (reflective items only)				
I shared the experience with people who are important to me.*	7.10 ± 2.18	.24	7.44 ± 2.05	.11
Seeing this animal makes me think of its habitat.*	7.08 ± 1.90	.28	6.88 ± 2.09	.21
Information obtained from education materials/signs.*	4.95 ± 2.28	.16	6.27 ± 2.35	.50
Information obtained from Interpreters/Park Rangers.	6.45 ± 2.34	.85	4.92 ± 2.68	.64
The quality of interpretation was exceptionally high.	6.28 ± 2.29	.76	5.77 ± 2.34	.80
Conservation caring				
My level of compassion for this species has dramatically increased because of my visit.*	5.80 ± 2.00	.18	5.81 ± 1.96	.43
I am deeply concerned about the care and well-being of this animal at this site.*	6.33 ± 2.02	.37	6.25 ± 2.16	.36
This species has as much right to exist as any human being.*	7.35 ± 2.19	.23	7.52 ± 2.02	.31
Ensuring this species' survival is my highest priority.	5.15 ± 2.27	.68	5.51 ± 2.30	.70
My emotional sense of well-being will be severely diminished by the extinction of this species.	6.08 ± 2.27	.48	5.88 ± 2.38	.66
I need to learn everything I can about this species.	5.01 ± 2.22	.63	5.23 ± 2.16	.76
I would protest this site if I learned of the	6.27 ± 2.19	.48	6.45 ± 2.52	.46

mistreatment of this animal.				
I will alter my lifestyle to help protect this species.	4.78 ± 2.20	.58	5.18 ± 2.31	.62
My connection to this animal has increased my connection to the species as a whole.	5.82 ± 2.15	.53	5.66 ± 2.08	.72
Wildlife protection must be society's highest priority.	5.95 ± 2.42	.54	5.68 ± 2.42	.64
Behavior – species oriented				
I would support entrance fees at this site being $10 - $25 higher, if the extra money were used for the care and survival of this species.*	6.11 ± 2.32	.29	4.46 ± 2.48	.46
I will donate up to $75 to "adopt" this animal at this site.	4.34 ± 2.54	.63	3.95 ± 2.44	.78
I will make a charitable contribution up to $150 to help purchase habitat in the wild for this species.	4.11 ± 2.42	.70	3.57 ± 2.80	.75
I will become a member of an organization committed to protecting this species, within the next 6 months.	3.61 ± 2.23	.72	3.84 ± 2.40	.73
I will volunteer at an event designed to help the conservation of this species, within the next 6 months.	3.41 ± 2.29	.52	3.68 ± 2.36	.67
Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal.	3.20 ± 2.29	.51	3.74 ± 2.48	.64
I would write a letter/sign a petition to a government official supporting the protection of this species.*	4.51 ± 2.70	.38	4.76 ± 2.72	.45
Behavior – biodiversity oriented				
Even if I never return, I will provide on going financial support to this site.*	3.34 ± 2.17	.43	3.74 ± 2.35	.53
If asked, I would donate as much as $50 to help protect a species I've never heard of.*	3.49 ± 2.32	.43	3.36 ± 2.23	.53
I will endorse public policy that severely restricts future growth & development in order to protect wildlife.	5.42 ± 2.50	.68	5.03 ± 2.64	.76
Elected officials' views on wildlife will be a major factor in my voting.	5.08 ± 2.41	.73	4.81 ± 2.51	.73
Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation.	5.88 ± 2.23	.58	5.18 ± 2.49	.71

Notes. [a] Rated as agreement on 9 point Likert scale (1 = strongly disagree, 9 = completely agree); [b] robust statistics; λ = standardized factor loading; * item not retained

Results

Survey Sample Description

Following data cleaning, final sample sizes were safari tourists $n = 353$, and zoo tourists $n = 360$. The safari tourist sample was 47% male, 48% female (5% no response); mean age was 46; 87% reported completing at least four years of college; 22% listed the United States of America as their country of residence, 15% listed the United Kingdom, and 10% listed France. Demographics for the zoo tourist sample were as follows: 35% male, 56% female (9% no response); mean age was 38; 63% reported completing at least four years of college; 96% listed the United States of America as their country of residence.

Preliminary Measurement Model

Within structural equation modeling, measurement models are used to assess how well individual items reflect a factor. Ideally, items should only reflect one factor. A factor loading is the correlation coefficient between the factor and the item. Factor loadings range from 0 – 1, and the higher the value the stronger the relationship between the item and factor. Measurement models may also be used to assess the validity of items in factor or scale development. A baseline configural model was analyzed for *in situ* and *ex situ* samples to screen for low loading or cross loading items, and factor reliability and discriminant validity. No cross loadings were detected. Thirteen items were removed for poor performance (Little, Lindenberger, & Nesselroade, 1999) (Table 2.2). Two items were removed from Existing Connection to Wildlife, Species Characteristics, Trip Characteristics, Species Oriented Behavior, and Biodiversity Oriented Behavior. Three

items were removed from Conservation Caring. Fit indices supported the model as an acceptable representation of the data (Safari: Satorra-Bentler χ^2 449.89 (236) $p < .05$; CFI = .96; RMSEA = .051, Zoo: Satorra-Bentler χ^2 416.36 (236) $p < .05$; CFI = .97; RMSEA = .046) (Byrne, 2008).

Table 2.3. *Fit indices and testing outcomes for metric invariance of measurement model across zoo sampling site*s

Model	CFI [a]	NNFI [a]	SRMR	RMSEA [a]	SBχ^2 (*df*) [a]	Δ SBχ^2 (Δ *df*) [b]
Preliminary CFA measurement model						
Brookfield Zoo	.95	0.94	.057	.057	331.92* (236)	
Shedd Aquarium	.97	0.96	.043	.052	341.34* (236)	
Zoo Atlanta	.90	0.88	.066	.088	363.07* (236)	
Configural model	.94	0.94	.057	.065	1022.38* (708)	
Measurement invariance	.94	0.94	.064	.063	1060.53* (746)	34.58 (38) *p* > .05
Structural invariance	.95	0.94	.11	.061	1083.96* (774)	53.38 (77) *p* > .05

Notes. [a] robust statistics; [b] difference calculated using the Satorra-Bentler Scaled Chi-square adjusted difference test (Satorra & Bentler, 2001); CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardized Root Mean Squared Residual; RMSEA = Root Mean Square Error of Approximation; SBχ^2 = Satorra-Bentler Scaled Chi-Square; *df* = degrees of freedom; * $p < .05$

Test of Factorial Invariance across Zoo Samples

To support pooling data from the three zoo sites, the following tests were performed. The configural baseline model was tested on each zoo sample site to check for group invariance. Fit indices were acceptable for each sample site (Table 2.3) supporting the use of the configural model to test for group invariance. Based on the hierarchical models of constraints, zoo sample sites displayed measurement and structural invariance ($\Delta SB\chi^2$ $p > .05$, respectively). As factor loadings and parameter estimates were deemed equivalent across sample sites, zoo samples were pooled and treated as a single sample (Byrne, 2008).

Test of Factorial Invariance between Safari and Zoo Tourists

The following tests were performed to support using the same measurement model for safari and zoo samples. The baseline configural model was tested on safari and zoo tourists to check for group invariance of the measurement model (Table 2.4). The configural model fit the data well (CFI = .96; RMSEA = .049) and was deemed an acceptable representation of the factorial structure. The test for measurement invariance revealed a decrease in fit relative to the configural model ($\Delta SB\chi^2 = 37.68$ (*19*); $p < .01$). Two measurements were unequal across tourist populations. One was the error covariance between the species oriented behavior items 'donating $75 to adopt animal' and 'contribute $150 to purchase habitat'. The second was the factor loading for the biodiversity oriented behavior item, 'purchase products that support wildlife conservation'. These constraints were released and the model re-tested. The $\Delta SB\chi^2$ was acceptable ($p < .05$), no additional constraints were released.

The test for structural invariance revealed no harm in fit relative to the configural model ($\Delta SB\chi^2$ $p > .05$) (Table 2.4); parameter estimates were deemed equivalent across groups. These data support partial measurement invariance and factorial invariance across groups. The model is an acceptable representation of the data for each sample and analysis of the structural model is supported.

Test of Causal Invariance between Safari and Zoo Tourists

Within structural equation modeling, structural regression models are used to assess causal relationships between factors. Beta weights reflect the effect size of the predictor factor on the dependent factor. The following tests were performed to support using the same structural regression model in safari and zoo samples. A baseline structural model was generated to represent the proposed relations of the theoretical model in Figure 2.1. Fit indices indicated a reasonably well fitting model (CFI = .90; RMSEA = .070) (Byrne, 2008; Kline, 2005). The measurement invariance model did not differ significantly from the baseline model ($\Delta SB\chi^2$ $p > .05$) supporting measurement invariance between safari and zoo tourists (Table 2.4).

The test for structural invariance revealed that four constraints ($p < .05$) were not equal across groups. The first was the structural path between trip characteristics and conservation caring, the second is the factor loading of 'I understood this animal's behavior', the third is the error covariance between the species oriented behavior items 'donating $75 to adopt animal' and 'contribute $150 to purchase habitat', and the fourth is the factor loading of 'I was able to get very close to this animal'. These constraints were released and the model re-tested. The respecified structural model fit the data well

(CFI = .90; RMSEA = .068) and revealed no harm in fit relative to the configural model ($\Delta SB\chi^2$ $p > .05$) (Table 2.4). These data support measurement invariance and partial structural invariance across groups for the structural model. With the exception of the previous four constraints, the proposed model (Figure 2.2, Table 2.4) predicting wildlife tourists' willingness to engage in pro-conservation behavior is an acceptable representation of the data and is equivalent across safari and zoo tourists.

Table 2.4. *Fit indices and testing outcomes for metric invariance, structural invariance, and latent mean differences across safari and zoo tourists*

Model	CFI [a]	NNFI [a]	SRMR	RMSEA [a]	$SB\chi^2$ (*df*) [a]	$\Delta SB\chi^2$ (Δ *df*) [b]
Measurement model						
Configural model	.96	0.96	.043	.049	868.94* (472)	
Measurement invariance	.96	0.96	.046	.049	906.24* (491)	37.68 (19) $p < .01$
w/ 2 constraints released	.96	0.96	.045	.048	892.31* (489)	21.84 (17) $p > .05$
Structural invariance	.96	0.96	.058	.048	910.31* (504)	39.20 (32) $p > .05$
Structural model						
Configural model	.90	0.89	.10	.070	1834.21* (668)	
Measurement invariance	.90	0.89	.11	.069	1863.40* (686)	27.02 (18) $p > .05$
Structural invariance	.90	0.89	.11	.069	1897.07* (706)	62.07 (38) $p < .01$
w/ 4 constraints released	.90	0.89	.11	.068	1869.94* (702)	32.04 (34) $p > .05$
Latent means differences						
Measurement model w/ zoo as ref. group	.96	0.95	.047	.051	1102.64* (508)	

Notes. [a] robust statistics; [b] difference calculated using the Satorra-Bentler Scaled Chi-square adjusted difference test (Satorra & Bentler, 2001); CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardized Root Mean Squared Residual; RMSEA = Root Mean Square Error of Approximation; $SB\chi^2$ = Satorra-Bentler Scaled Chi-Square; *df* = degrees of freedom; * $p < .05$

Influence of the CMF Viewing Experience on Conservation Caring and Pro-Conservation Behaviors

The following results pertain to the first research question: does viewing CMF, *in situ* or *ex situ*, influence tourist-supported conservation outcomes. Fit indices for the model ($SB\chi^2$ = 1869.94 (*702*), $p < .05$; CFI = .90; NNFI = 0.89; SRMR = .11; RMSEA = .068) indicated the model is an acceptable representation of the relationships present in the data (Byrne, 2008; Kline, 2005; Marsh, Hau, & Wen, 2004). The model in Figure 2.2 (also see Table 2.4 & 2.5) represents how the factors of an Existing Connection to Wildlife, Species Characteristics, and Trip Characteristics predict a willingness to engage in pro-conservation behaviors.

Conservation Caring.

An Existing Connection to Wildlife (safari $\beta = .35$, $p < .05$; zoo $\beta = .33$, $p < .05$) and Species Characteristics (safari $\beta = .32$, $p < .05$; zoo $\beta = .29$, $p < .05$) were moderate predictors of Conservation Caring. Tests constraining both direct effects across samples revealed no significant differences in β values. The factor, Trip Characteristics, was a significant predictor of Conservation Caring only in the zoo sample ($\beta = .26$, $p < .05$). This corresponds with the significant difference in parameter estimates across samples revealed in the test of causal invariance. The model accounted for 32% (R^2 safari) and 42% (R^2 zoo) of the variance in Conservation Caring.

Pro-Conservation behaviors – Species Oriented Behavior.

Conservation Caring was the only significant predictor of Species Oriented Behavior, and was very strong (safari $\beta = .67$, $p < .05$; zoo $\beta = .65$, $p < .05$). The model

accounted for 42% (R^2 safari) and 41% (R^2 zoo) of the variance in Species Oriented Behavior.

Pro-Conservation behaviors – Biodiversity Oriented Behavior.

An Existing Connection to Wildlife was a weak predictor of Biodiversity Oriented Behaviors (safari $\beta = .18$, $p < .05$; zoo $\beta = .16$, $p < .05$). Conservation Caring was a weak predictor for Biodiversity Oriented Behavior (safari $\beta = .29$, $p < .05$; zoo $\beta = .29$, $p < .05$). Species Oriented Behavior is a moderate predictor of Biodiversity Oriented Behavior (safari $\beta = .46$, $p < .05$; zoo $\beta = .48$, $p < .05$). Tests constraining all direct effects across samples revealed no significant differences in β values. The model accounted for 58% (R^2 safari) and 55% (R^2 zoo) of the variance in Biodiversity Oriented Behavior.

Latent Mean Differences and Disturbances

These results relate to the second research question: are there differences between *in situ* and *ex situ* CMF viewing experiences. The test for latent mean differences was performed with the zoo tourist sample as the reference group. Analyses revealed only two factors had means that were significantly different between safari and zoo tourists. Safari tourists scored 0.93 points higher on the factor Species Characteristics ($p < .05$), and 0.36 points higher on the factor Biodiversity Oriented Behaviors ($p < .05$) than did zoo tourists. It is important to note these are relative differences and not absolute values (Byrne, 2008).

Tests constraining the disturbances of Conservation Caring, Species Oriented Behavior and Biodiversity Oriented Behavior across samples revealed R^2 values were not

significantly different. The R^2 values were relatively high, and provide support for the predictive validity of the model (Kline, 2005; Noar, 2003).

Table 2.5. *Item means, factor loadings and fit indices of final structural model predicting pro-conservation behavioral intent*

Factor and items [a]	Safari tourists (*N* = 353) Mean (SD)	λ	Zoo tourists (*N* = 360) Mean (SD)	λ
Existing connection to wildlife				
I actively seek opportunities to view wildlife.	7.08 (1.95)	.71	7.12 (1.80)	.74
I feel a deep connection to wildlife.	6.69 (1.90)	.88	6.56 (1.91)	.88
I am highly motivated by the need to interact with wildlife.	6.26 (2.06)	.87	6.16 (2.02)	.88
I spend a lot of time learning about wildlife.	5.55 (2.10)	.72	6.03 (2.00)	.74
Species characteristics				
I understood this animal's behaviors.	6.08 (1.80)	.70	6.16 (1.98)	.75
I understood this animal's emotions.	5.36 (2.11)	.95	5.52 (2.12)	.92
I felt empathy for this animal because of its emotions.	5.49 (2.29)	.79	5.77 (2.08)	.83
Trip characteristics (reflective and formative items)				
I was able to photograph this animal.	7.77 (1.92)	.11	6.86 (2.25)	.13
I was able to get very close to this animal.	7.40 (2.04)	.13	6.57 (1.98)	.022
I made eye contact with this animal.	5.21 (3.02)	.15	4.85 (2.63)	.14
I directly interacted with this animal.	3.43 (2.51)	.12	3.71 (2.48)	.12
Information obtained from Interpreters/Park Rangers.	6.44 (2.32)	.85	4.96 (2.66)	.76
The quality of interpretation was exceptionally high.	6.28 (2.28)	.96	5.78 (2.33)	.94
Conservation caring				
Ensuring this species' survival is my highest priority.	5.16 (2.28)	.79	5.55 (2.26)	.82
My emotional sense of well-being will be severely diminished by the extinction of this species.	6.08 (2.25)	.71	5.94 (2.32)	.78
I need to learn everything I can about this species.	5.00 (2.23)	.80	5.29 (2.11)	.86
I would protest this site if I learned of the mistreatment of this animal.	6.25 (2.20)	.70	6.44 (2.50)	.66
I will alter my lifestyle to help protect this species.	4.79 (2.20)	.77	5.21 (2.28)	.79
My connection to this animal has increased my connection to the species as a whole.	5.86 (2.14)	.75	5.64 (2.06)	.87
Wildlife protection must be society's highest priority.	5.91 (2.44)	.74	5.70 (2.40)	.79
Behavior – species oriented				
I will donate up to $75 to "adopt" this animal at this site.	4.33 (2.53)	.68	3.95 (2.41)	.80
I will make a charitable contribution up to $150 to help purchase habitat in the wild	4.10 (2.39)	.73	3.60 (2.39)	.80

for this species.				
I will become a member of an organization committed to protecting this species, within the next 6 months.	3.62 (2.24)	.89	3.87 (2.39)	.88
I will volunteer at an event designed to help the conservation of this species, within the next 6 months.	3.42 (2.28)	.82	3.72 (2.34)	.85
Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal.	3.21 (2.29)	.79	3.74 (2.45)	.82
Behavior – biodiversity oriented				
I will endorse public policy that severely restricts future growth &development in order to protect wildlife.	5.44 (2.47)	.85	5.05 (2.61)	.87
Elected officials' views on wildlife will be a major factor in my voting.	5.09 (2.39)	.89	4.83 (2.49)	.91
Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation.	5.85 (2.28)	.79	5.19 (2.47)	.83
Fit indices [b]				
$SB\chi^2$ (*df*)	1869.94* (702)			
CFI	.90			
NNFI	.89			
SRMR	.11			
RMSEA	.068			

Notes. [a] Rated as agreement on 9 point Likert scale (1 = strongly disagree, 9 = completely agree); [b] robust statistics; λ = standardized factor loading; $SB\chi^2$ = Satorra-Bentler Scaled Chi-Square; *df* = degrees of freedom; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardized Root Mean Squared Residual; RMSEA = Root Mean Square Error of Approximation; * $p < .05$

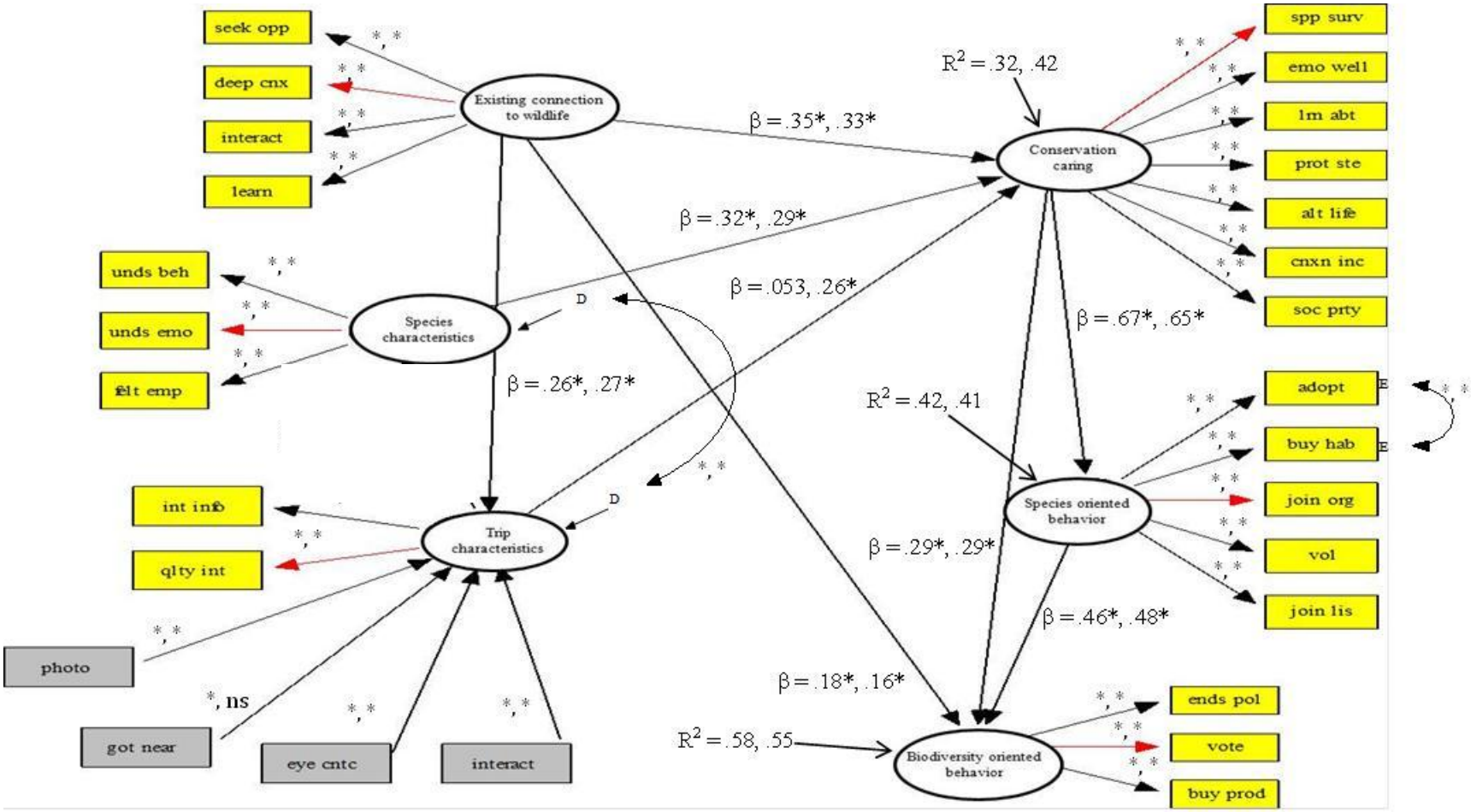


Figure 2.2. Final structural model predicting pro-conservation behavioral intent

Notes. Values reported for safari, zoo, respectively; all measurements robust; * $p < .05$; β = standardized parameter estimates; R^2 = explained variance. CFI = .90; NNFI = 0.89; SRMR = .11; RMSEA = .068; SBχ^2 (*df*) = 1869.94 (702), $p < .05$

Discussion

This study had two main goals. The first was to investigate how the CMF viewing experience influenced tourists' Conservation Caring and pro-conservation behaviors. The second goal was to explore how experiential elements interacted to influence outcomes, and if tourist-based conservation outcomes differed by type of experience. Survey responses were based on the animal with which tourists formed the strongest connection. According to Manfredo (2008) "…from an applied perspective, it is important to realize that emotional responses are at the heart of human attraction to, and conflict over, wildlife" (p. 51).

Influence of the CMF Viewing Experience on Tourist-based Conservation Outcomes

The model, as represented in Figure 2.2, demonstrates that *in situ* and *ex situ* wildlife viewing had a significant positive effect on the tourist-based conservation outcomes of Conservation Caring (i.e. a connection to a species) and pro-conservation behavioral intentions.

Conservation Caring.

This is one of the first attempts to measure Conservation Caring, and fills a widely recognized gap in the literature (Ballantyne et al., 2011; Cousins et al., 2009; Myers et al., 2004; Saunders, 2003). Data support this factor being a successful representation of the construct (Table 2.5), and corroborate its role as an intermediate step to behavior (Ballantyne et al., 2007; Peake, Innes, & Dyer, 2009; Stern, 2000b). Additional support comes from the significant direct paths from Conservation Caring to both behavior factors, as well as very high R^2 values (Figure 2.2).

The data from this study suggests that the CMF viewing experience significantly and positively impacts Conservation Caring. In this model, Conservation Caring was the only significant predictor of Species Oriented Behavior, and accounted for 42% of the explained variance. Additionally, the path from Conservation Caring to Biodiversity Oriented Behavior

was significant, although not as strong as the path to species behaviors. Wildlife tourism venues wishing to cultivate pro-conservation behaviors among visitors, should find ways to stimulate levels of Conservation Caring. One such way to increase Conservation Caring may be through developing experiences that help visitors understand the emotions and behaviors of species.

Pro-conservation behaviors.

In this model pro-conservation behavior is represented by the two factors Species Oriented Behavior and Biodiversity Oriented Behavior. Data supported both factors being successful representations of their respective constructs. Additional support for the validity of the factors comes from the large amount of variance explained (Table 2.5, Fig. 2.2). One reason for the strong performance of both factors is the specificity of the items. In previous studies, the poor performance of factors has often been attributed to the over-generalized nature of the behaviors, and inappropriate linkages between the behaviors investigated and those that are sought (Ballantyne et al., 2007; Bamberg, 2003; A. Smith & Sutton, 2008).

It is worth noting that although the model demonstrates a strong predictive ability for pro-conservation behavioral intent following a CMF viewing experience, individual item responses are still relatively low. This adds to the argument that although wildlife tourists may enter an experience with relatively high levels of a connection to wildlife (i.e. 'the choir'), venues still have many opportunities to stimulate pro-conservation behavior intentions and performance (Beaumont, 2001; Orams, 1997).

Wildlife tourism venues may also benefit from providing direct opportunities for behaviors throughout the experience. Providing tourists with immediate opportunities to participate in a pro-conservation behaviors has been shown to be successful in converting intent to action (Gwynne, 2007; Powell & Ham, 2008). Given the positive influence of the CMF viewing experience on Conservation Caring, and its subsequent strong correlations to behavioral

intent, it would seem advantageous to offer tourists such opportunities. This study found support for direct financial contributions on site and an interest in sustainable products. Both *in situ* and *ex situ* sites could improve conservation outcomes by providing more opportunities for tourists to make donations, while in the experience, as well as offering a wider array of wildlife friendly products and souvenirs. Furthermore, the model would suggest that behaviors be linked first to a specific species, then to biodiversity.

Role of Existing Connection to Wildlife on Conservation Outcomes

Tourists' Existing Connection to Wildlife was a moderate predictor of Conservation Caring. However, it was not a significant predictor of Species Oriented behaviors, and only a weak predictor of Biodiversity Oriented behaviors. This has interesting implications when addressing the argument of 'preaching to the choir' (Ballantyne et al., 2011). On the one hand, tourists' Existing Connection to Wildlife was as important a predictor of Conservation Caring as experiential elements (see below). This supports the argument that safari and zoo tourists' existing emotional attachment to wildlife was as important as the experience, and thus wildlife tourism is reinforcing and building tourists' caring.

However, Existing Connection to Wildlife was not a significant predictor of Species Oriented Behavior; and only weak at best in predicting Biodiversity Oriented Behavior. If wildlife tourists are 'the choir', one might reasonably expect a direct influence of an existing emotional attachment on willingness to engage in behaviors aimed at preserving a specific animal as well as biodiversity. However, this study found no direct support for Species Oriented Behavior and only weak support for biodiversity behaviors based on entering levels of Existing Connection to Wildlife. Thus, assuming wildlife tourists are 'the choir' and are pre-disposed to engage in pro-conservation behaviors appears unsupported.

Role of Experiential Factors on Conservation Outcomes

Trip Characteristics.

The factor Trip Characteristics was a significant predictor only for Conservation Caring, and only for zoo tourists. The lack of a significant path to any dependent variable for safari tourists may be explained, in part, by the myriad of features composing a safari experience which were not measured in this study.

Another difference between safari and zoo tourists was the importance of proximity to the animal, as demonstrated by structural invariance constraints. This was a significant item for safari tourists, but not zoo tourists. This stands to reason as zoo tourists assume the experience will contain more direct interactions. Most zoo exhibits are designed to facilitate this experience, thus meeting the expectation. As such, a close proximity to the animal is a 'normal' experience for zoo-goers. However, part of the thrill for safari tourists is the ability to be very close to the animals (Curtin, 2010) which is supported by the significance of this item.

Species Characteristics.

The Species Characteristics factor also produced mixed results. The factor functioned as hypothesized in that it was a significant, albeit moderate, predictor of Conservation Caring. However, it was not a significant predictor of behavioral intent. The lack of a direct path to Biodiversity Oriented Behavior is understandable in that this factor was specific to one taxon. However, the lack of a significant path to Species Oriented Behavior is unexpected and runs contrary to previous studies (Myers et al., 2004). In this model, the factor only directly influences Conservation Caring, which in turn influences behavior. The implications of these findings for flagship species recognition are discussed below.

Comparison of Experiential Factors and Conservation Outcomes between *In Situ* and *Ex Situ* Tourists

From an applied perspective, there were no meaningful differences between factor latent mean scores for safari and zoo tourists. Differences that are statistically significant were minor, and provide more information relevant for future studies than managerial implications. For example, safari tourists scored slightly higher on the factor Species Characteristics. This may be due to the greater diversity of animals present in a zoo, thus diluting zoo visitor responses. Alternatively, it is possible that safari tourists are able to empathize with an animal more so than zoo tourists. However, this study was incapable of ascertaining why this occurred.

Safari tourists also scored slightly higher for willingness to engage in biodiversity oriented behaviors. This may be attributable to safari tourists being more sensitized to the interconnectedness of ecosystems after an immersive safari experience (Markwell, 2001; Ryan et al., 2000), and as such, are more prone to recognizing the value of biodiversity over one species. However, this explanation is speculative and not assessed by this study.

Implications for Designating Flagship Species

Both *in situ* and *ex situ* CMF viewing is shown to positively influence caring and behaviors, thus indirectly supporting the flagship concept. However, flagships are not only expected to raise awareness and action for their own species, but for biodiversity as a whole. To that end, this study supports the capabilities of several CMF to raise action for both the species and biodiversity.

As shown in Figure 2.2, a willingness to engage in species and biodiversity oriented behaviors are strongly supported by the high R^2 values. Additionally, Species Oriented Behavior is a strong predictor of Biodiversity Oriented Behavior. This supports the notion that the CMF observed in this study could be successfully employed as flagship species. Furthermore, these

results are not specific to any one species, as tourists were allowed to select the species to which they formed the strongest connection. This is highly encouraging for sites where traditional CMF are not present.

What emerged as important in forming a connection, regardless of taxon, were the emotional components of species characteristics (see Table 2.5 & Figure 2.2). This supports the ability to enlist a broad range of species as flagships, on the basis of emotional relatability and not traditional 'cute and cuddly' characteristics. This can benefit *in situ* sites without 'Big 5' species, and *ex situ* sites enhancing conservation efforts for lesser known species.

Several limitations temper the generalizability of the findings. First, tourists were asked which species they connected with during the experience. As such, responses were restricted to observed species. Viewing different species may alter results. Second, behavioral intentions and not actual behaviors were assessed. Therefore, results represent tourists' *willingness to engage in behaviors* and not actual behavior performance. Third, the experience was measured at a very coarse level. A more detailed comparison may reveal significant differences not detected by this survey instrument.

Conclusion

Direct exposure to wildlife, whether *in situ* or *ex situ*, appears to have the potential to be a powerful force to stimulate caring toward species of interest and pro-conservation behaviors for individual species and biodiversity as a whole. The emergence of Conservation Caring as a significant intermediate to behavioral intent provides managers and practitioners theoretical support for designing viewing experiences and interpretation to strengthen an emotional connection with an animal. Additionally, providing opportunities for tourists to perform specific behaviors during their visit can improve conservation outcomes. Results from this study imply

tourists may be inclined to financially support species care and habitat preservation, as well as purchase wildlife friendly products. Wildlife tourism is ideally positioned to capitalize on such behavioral intentions.

Furthermore, the lack of differences observed between safari and zoo tourists supports the strengthening of partnerships between *in situ* and *ex situ* locations to synergistically build on tourists' willingness to perform pro-conservation behaviors. In fact, a more appropriate phrasing may be, 'the high degree of similarity between safari and zoo tourists.'

Future research may include further refinement of factors, as well as specific attitudes, to pinpoint more accurate differences between *in situ* and *ex situ* wildlife tourists. As protected areas struggle to justify their existence, and *ex situ* sites wrestle with being relevant to conservation, treating tourists, at either site, as one population provides a powerful new framework to address conservation messaging and outcomes.

CHAPTER THREE

CARING AND CHARISMA IN CAPTIVITY: MEASURING THE INFLUENCE OF ZOO VISITORS' CONNECTION TO WILDLIFE ON PRO-CONSERVATION BEHAVIORS

Introduction

Can viewing animals in captivity foster a connection to wildlife and drive pro-conservation behaviors? For many of the 600 million annual visitors, zoo and aquarium (hereafter zoos) experiences provide an intimate and extensive encounter with wild animals (Tribe & Booth, 2003; Zimmermann, 2010). Certain animals (e.g. lions, giraffes, dolphins) are highly popular and attract visitation due to their power, grace, and beauty (Christie, 2007). However, this situation is at the heart of the controversy over a modern role of zoos, namely balancing visitors' desire for entertainment with contributions to *in situ* conservation (Rabb, 1995; Tribe, 2004). If the public is only interested in charismatic megafauna, how can zoos raise awareness of the global biodiversity crisis? Dickie, Bonner & West (2007) point out that few zoos link collection plans to biodiversity conservation. Furthermore, Balmford, Williams & Green (1995) found that for many charismatic megafauna, *in situ* conservation was more cost effective than captive breeding, and provided protection for sympatric species.

Despite these concerns, there is support for the role of the zoo experience on raising concern for biodiversity conservation. As Ryder (1995) states,

> the greatest impact that zoos may have on long-term conservation of biological diversity is through strengthening the concern of the zoo-going public for issues as complex as biological diversity through so simple an experience as seeing living animals on exhibit in naturalistic settings – especially adults and their offspring. As people tend to protect

what they value, zoo experiences can and do provide new generations of conservationists. (p. 117)

Though most zoo managers might take exception to Ryder's classification of the zoo experience as 'simple', he does raise a critical point regarding the potential influence direct exposure to an animal may have on visitor behaviors.

Given zoos' massive visitation rates, cultivating visitors' adoption of pro-conservation behaviors is a highly prized outcome. To that end, zoos have embraced a new role for charismatic megafauna; from that of tourist attraction to ambassadors for biodiversity conservation. This corresponds with visitors' expressed desire for zoos to be more conservation driven (Tribe, 2004). In response, zoos are developing conservation campaigns around select species in the hopes of raising public awareness and action for conservation. If such campaigns are successful, the animal may be designated a flagship.

By definition, a flagship is a species capable of raising public awareness and action for conservation (Simberloff, 1998). The use of flagships is based, in part, on the assumption that visitors' form an emotional connection with the animal. This connection is expected to translate into action or at least general support for conservation (Lindsey et al., 2007; Manfredo, 2008; Skibins, Hallo, Sharp, & Manning, 2012). Previous studies have explored how an emotional connection can be cultivated during a zoo visit (Bruni, Fraser, & Schultz, 2008; Myers et al., 2004; L. Smith, Weiler, & Ham, 2011). However, little work has been done to develop a factor to measure visitors' emotional connection. Furthermore, little is known concerning how a connection to a species influences pro-conservation behaviors.

This exploratory study used a modified model of Value Belief Norm (VBN) theory (Stern, 2000b; Stern et al., 1999) and structural equation modeling to develop a factor to measure

visitors' connection to an animal. This was accomplished by operationalizing the theoretical construct, Conservation Caring (Rabb & Saunders, 2005). Next, we examined the influence of Conservation Caring on pro-conservation behavior intentions by comparing independent samples of visitors before and after their experience to assess the strength of the connection and its subsequent influence on behaviors.

Literature Review

Zoos and Visitor Supported Conservation Outcomes

In supporting *in situ* conservation, zoos have long advocated their role as genetic repositories, captive breeding centers, and refugia when natural habitats are severely threatened (Dickie et al., 2007). However, these activities are usually restricted to larger institutions and limited to only a small number of the animals in a collection. Furthermore, these activities do not directly involve visitors, which severely underutilizes a strategic zoo asset (Mallinson, 2003). An emerging challenge for zoos is engaging their publics in supporting broad scale conservation efforts (Rabb, 1994). To better maximize visitor supported conservation outcomes, zoos have advanced their role in helping visitors form a connection to wildlife (Broad & Weiler, 1998).

According to Ryder (1995), zoo animals can instill a "sense of awe and wonder that forms the basis of the concern and caring that motivates conservation action" (p. 109). Dickie, et al., (2007) go so far as to suggest a key role for 21st century zoos is to parlay visitors' emotional connection with specific animals to support for wider conservation issues. Studies have shown visitors expect zoos to contribute to conservation, and rank zoo conservation efforts as very important (Tribe, 2004; Zimmermann, 2010).

One way zoos have attempted to meet such audience expectations is associating charismatic species with conservation campaigns. Charismatic megafauna may foster an emotional connection, raise awareness, and motivate action in zoo visitors. Such visitor

responses align with recommendations for linking *in situ* and *ex situ* conservation strategies (Ballantyne et al., 2007; Moscardo, 2008).

Flagship Species

If conservation campaigns built around a charismatic species are successful in raising awareness and action, that species may be considered a flagship (Caro & Girling, 2010; Simberloff, 1998). Most successful flagship species are traditional charismatic megafauna (e.g. elephants, tigers, pandas) (Goodwin & Leader-Williams, 2000; Okello et al., 2008). However, charisma does not guarantee awareness and action, and thus does not dictate flagship status. Additionally, recent studies have found invertebrates, birds, and even trees can serve as flagships (Bowen-Jones & Entwistle, 2002; Verissimo, Fraser, Groombridge, Bristol, & MacMillan, 2009). Thus, not all charismatic megafauna are flagships, and not all flagships are megafauna; which would imply a broader role for zoos' collections. However, to be effective, flagships do need to possess a level of charisma that resonates with its target audience.

For zoo audiences, most traditional megafauna possess hallmark characteristics of charisma. These characteristics can include a similarity to humans, large body size, being highly active, and having large eyes (Kellert, 1996; Rolston, 1987; Sitas et al., 2009). Additionally, many are endangered and hence rare, which is also a feature associated with charisma (Fuhrman & Ladewig, 2008; Tisdell et al., 2005). Thus many animals in a zoos' collection may foster a connection with visitors, and theoretically stimulate awareness and action.

While several studies have investigated how the zoo experience can facilitate a connection with an individual animal or species (Ballantyne et al., 2010; Myers et al., 2004; Orams, 1997), most stop short of empirically investigating how this connection influences pro-conservation behavior. Furthermore, there is evidence to suggest that the emotional connection is

short-lived and may not influence behavior (L. Smith, Broad, et al., 2008; L. Smith, Curtis, & van Dijk, 2010; Stern, 2000a).

Conservation Caring

Further complicating matters is a gap in the literature regarding constructs developed to measure visitors' connection to wildlife. To address this, Rabb & Saunders (2005) proposed Conservation Caring, which consists of three sub-dimensions: care that, care about, and care for. 'Care that' captures cognitive elements and marshals values of nature. 'Care about' are affective items and are based on experiences. 'Care for' are expressions of behavior and opportunities for action. These sub-dimensions parallel the expected flagship behaviors from visitors and align with the conservation psychology goal of understanding how humans care about and value nature (Clayton & Myers, 2009; Saunders, 2003).

Value Belief Norm (VBN) Theory

When attempting to understand what influences pro-conservation behaviors, such as flagship responses, VBN theory is useful because it incorporates environmental concern. This is an important aspect of the VBN model because as Stern (2000a) points out proenvironmental attitudes do not guarantee environmental protection.

VBN (Figure 3.1a) proposes that if an individual accepts a set of values (e.g. New Ecological Paradigm (Dunlap & Van Liere, 1978)), believes that valued objects are threatened, and believes they have the ability to act to reduce the threat, then the individual will experience an obligation (i.e. norm) for action (Stern et al., 1999). Thus, behaviors are at the end of a long causal chain and only weakly influenced by attitudes.

The more proximal influence of proenvironmental behavior is environmental concern. VBN often treats environmental concern as awareness of harm to a valued object, and the predictive precursor to behaviors (Schultz, 2002; Stern, 2000b; Stern et al., 1999). However, this

construct has been difficult to operationalize (Hansla, Gamble, Juliusson, & Gärling, 2008), and awareness is too often solely measured by knowledge gain. Studies have shown that knowledge is not a reliable predictor of pro-conservation behavior (Barua, Tamuly, & Ahmed, 2010; Beaumont, 2001; Shackley, 2001). Care has been advanced as a more robust form of awareness, as it can entail cognitive and affective dimensions (Perkins, 2010; Schultz, 2002). This also allows care to be a representation of visitors' connection with an animal.

Study Objectives

The purposes of this study are to address a gap in the literature by operationalizing Conservation Caring, and through a VBN framework investigate its influence on pro-conservation behavior intentions. By incorporating cognitive and affective components, Conservation Caring is hypothesized to be a more robust representation of awareness. Figure 3.1b represents the hypothesized relationships between visitors' Existing Connection to Wildlife and Conservation Caring, which in turn influences behaviors. This is a basic representation of the direct causal relationships hypothesized by VBN; in which values/beliefs have a direct effect on awareness (i.e. Conservation Caring), which in turn affects behaviors.

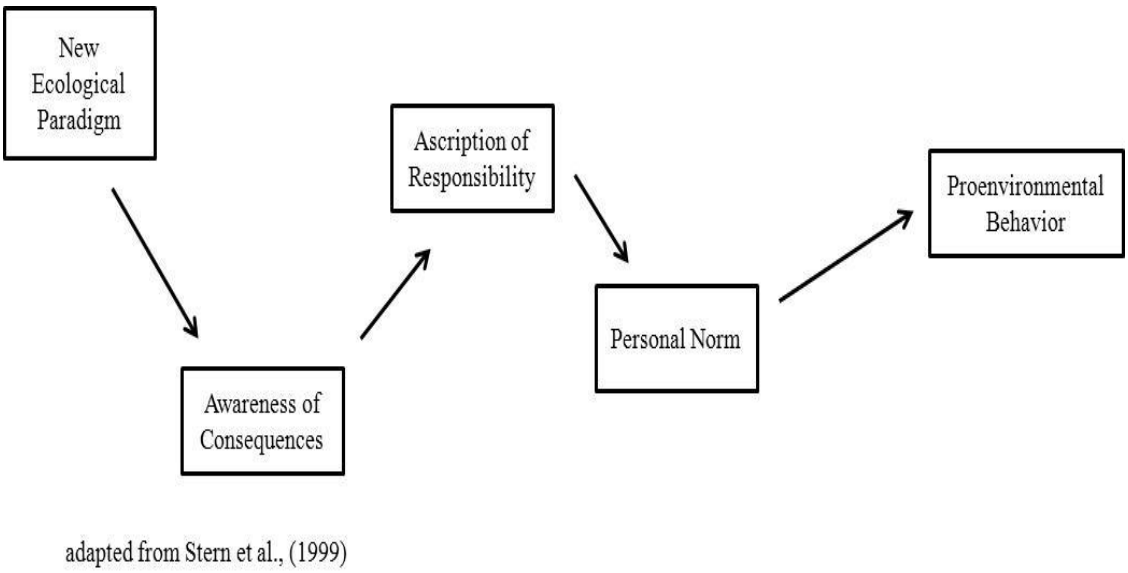


Figure 3.1a. Abbreviated VBN model

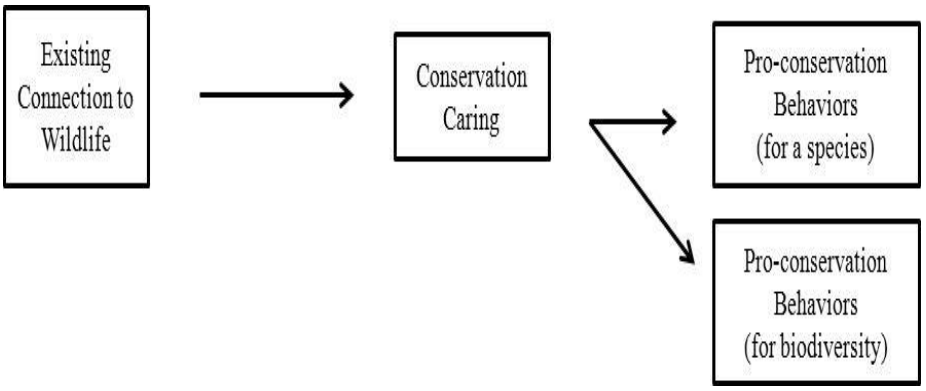


Figure 3.1b. Hypothesized model

Study Sites

One purpose of this study was to measure visitors' connection to an animal. To do so we did not test a predefined list of species. Rather, we allowed visitors to self-describe the species with which they connected. In order to capture as much variation as possible we selected zoos that have large, diverse collections of traditional charismatic megafauna as well as lesser known species. All three sites are accredited members of the Association for Zoos and Aquariums. Additionally, Brookfield Zoo and Zoo Atlanta participate in several species survival plans, which has been recognized as an integral contribution by zoos to *in situ* conservation (Mallinson, 2003).

Brookfield Zoo.

Brookfield Zoo, located in Brookfield, Illinois – a suburb of Chicago – receives more than 2,000,000 visitors annually. Founded in 1934, the 216 acre zoo is home to 450 different species and eleven multi-species habitat recreation exhibits. It has taken a leadership role in advancing the field of conservation psychology and is home to the Conservation Leadership Center and Center for the Science of Animal Welfare. The zoo is involved in 35 *in situ* conservation projects and houses 44 species that are part of a species survival plan (Chicago Zoological Society, n.d.).

Shedd Aquarium.

The Shedd Aquarium is located on the shore of Lake Michigan in Chicago, Illinois. When the facility opened in 1930, it was the world's largest aquarium, and today receives more than 2,000,000 visitors annually. The aquarium has expanded since its opening and now has four multi-species habitat recreation exhibits, and 32,500 animals representing 1500 species. Some of the more notable animals include whales, dolphins, otters, sharks, and rays. The Shedd is involved in eight large-scale local and global *in situ* conservation projects (Shedd Aquarium, n.d.).

Zoo Atlanta.

Zoo Atlanta was founded in 1889 and has become a nationally recognized leader in zoo-based conservation. The 40 acre site receives 700,000 annual visitors and is home to 900 animals, one of which is the giant panda. The zoo has the nation's largest gorilla and orangutan collection and three multi-species habitat recreation exhibits. The zoo also has several state-of-the-art interpretive exhibits linking *in situ* conservation to on-site exhibits. Additionally, Zoo Atlanta participates in 30 species survival plans and 17 *in situ* projects around the world (Zoo Atlanta, n.d.).

Methods

Survey Instrument Development

Factors were developed and modified following DeVellis (2003). A pilot test (N = 178, 75% response rate) was conducted at Brookfield Zoo, in July 2011, to identify construct validity and item clarity issues. The final survey instruments contained four factors and 37 items (Table 3.2). All items were measured using nine point Likert scales; 1 = strongly disagree, 9 = strongly agree; 1 = extremely unlikely, 9 = extremely likely).

Factors

Existing connection to wildlife.

This factor was adapted from the Relatedness to Nature (Nisbet et al., 2009) and Emotional Affinity to Nature (Kals et al., 1999) scales. These scales were selected on the basis of their ability to capture the cognitive and emotional components of an individual's relationship to charismatic megafauna.

Conservation Caring.

Visitors' connection to a species is represented by the factor Conservation Caring, and includes the dimensions care '*that',* and care '*about'* (see preceding section for dimension

definitions) (Rabb & Saunders, 2005). These dimensions make this factor a more robust operationalization of 'awareness', and places 'awareness' more in line with empathy rather than knowledge. Empathy has been shown to be a better predictor of helping behavior within the context of environmental issues (Ballantyne et al., 2010; Schultz, 2000), and is more aligned with understanding how individuals care for a species (Saunders, 2003; Vining, 2003). Conservation Caring was conceptualized as an intermediary dependent variable to both Species and Biodiversity Oriented Behaviors. Additionally, Conservation Caring is conceptualized as a continuum of the level of connection to a species.

Species & Biodiversity Oriented Behaviors.

Behavioral intent was separated into two factors on the basis of how actions pertain to an individual species, or biodiversity as a whole. Both factors were adapted from Stern (2000) and included the dimensions: non-activist public sphere, behavior in organizations, activism, and private sphere. These dimensions are supported in the literature as being well representative of pro-conservation behaviors (Kaiser et al., 2005; Schultz, 2000; Stern et al., 1999). They also align well with conservation behaviors typically associated with individual species or species cohorts (Pennisi et al., 2004; Swanagan, 2000; Walpole & Leader-Williams, 2002; Waylen et al., 2009). Additionally, items focused on highly site-specific behaviors. A criticism of some models is that items are too general. Aligning items to a site has been shown to improve model explanatory capabilities (Powell & Ham, 2008; Stern, 2000b).

Survey Instrument Administration

Zoos were sampled from September – November, 2011. Independent samples of pre-visit (n = 411, 83% response rate) and post-visit (n = 452, 89% response rate) visitors were asked to complete the respective survey instrument. A systematic sampling protocol with a random starting point was used to select respondents (Vaske, 2008). Pre-visit aquarium visitors were

approached in the entry queue, and zoo visitors were approached upon passing through entrance kiosks. At both zoos, post-visit intercept sites were central picnic areas. At the aquarium, the intercept site was the main seating area at the Caribbean Reef exhibit. Visitors who indicated they had been on site for at least three hours were asked to participate in the survey.

Analysis

Data cleaning.

Data were screened for missing values. Cases exhibiting missing values for more than 50% of items per factor were removed. A total of 105 cases were removed. Data were screened for univariate and multivariate outliers following Tabachnick & Fidell (2007). No univariate outliers (+/- 3 S.D.) were detected. A total of 33 cases were removed for exceeding the criterion Mahalanobis Distance value (χ^2 (*27*) = 55.48, $p < .001$). The final sample size was N = 354 for pre-visit visitors, and N = 368 for post-visit visitors. The software package EQS 6.1 was used for structural equation modeling analyses.

Test for metric invariance.

As one of the primary research questions was to uncover differences between pre- and post-visit sample, it was critical that we establish the measurement model as invariant across sites and samples. Establishing metric invariance provides a statistical benchmark for accepting differences between samples due to true score differences in the constructs as opposed to inconsistent psychometric properties. Tests for metric invariance followed the hierarchical tests for configural, metric and structural invariance consistent with Byrne (2008). The first assessment of metric invariance was performed across zoo sample sites. This was done in order to provide statistical support for pooling the samples from three sites. Next metric invariance was assessed across pre- and post-visit samples. These tests were used to confirm both the fit and

invariance of the measurement model of the CMF viewing experience. The test of latent mean differences was conducted on the final structurally invariant measurement model.

Once the measurement model was confirmed for acceptable fit and invariance, the structural model was tested with the same set of hierarchical invariance tests. This was done in order to confirm fit and uncover causal pathway differences between samples. Causal pathway differences would indicate a significant difference in the predictive nature of the factor between pre- and post-visit samples. Modification indices (Lagrange Multiplier Test, Wald Test) were analyzed to improve parsimony. R^2 values were assessed in order to gauge the predictive validity of the structural model. It is recommended to assess R^2 values independently of fit indices, as the latter do not pertain to predictive validity (Kline, 2005).

Results

Survey Sample Description

The pre-visit sample had the following demographics: 44% male, 56% female; mean age 38; 60% reported completing at least four years of college; 67% reported their race/ethnicity as "white"; and 66% reported an annual income of $50,000 USD or greater. Demographics for the post-visit sample were as follows: 38% male, 62% female; mean age 38; 62% reported completing at least four years of college; 72% reported their race/ethnicity as "white"; and 74% reported an annual income of $50,000 USD or greater.

Test for Independence of Sample

Pre-visit and post-visit samples were treated as independent samples. Mann-Whitney U tests were selected due to the non-normal distribution of sample size within demographic category. Results support the validity of sample homogeneity. Gender ($p > .10$), race ($p > .51$), age ($p > .24$), education ($p > .97$), and income ($p > .065$) showed no significant difference across samples (see Table 3.1).

Table 3.1. *Test for validity of independent samples across zoo pre/post visitors*

Demographic variable	Mann-Whitney U
Gender	$p > .10$
Race	$p > .51$
Age	$p > .24$
Education	$p > .97$
Income	$p > .065$

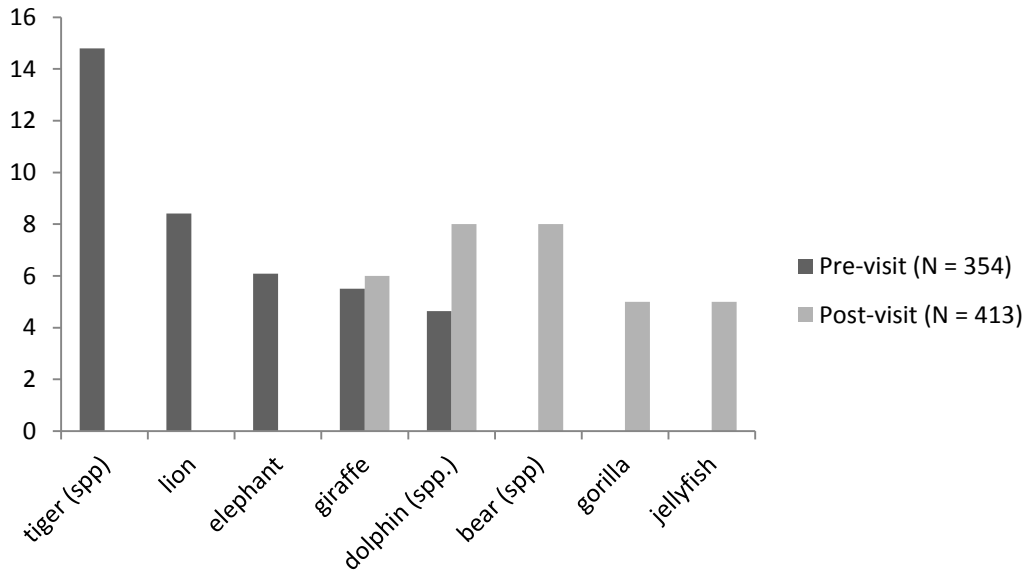


Figure 3.2. Percent response of five most commonly reported taxa of species preferences

Species Preferences

Pre-visit visitors were asked, ‘what is your favorite wild animal’. Post-visit visitors were asked, ‘what animal did you form the strongest connection with during your visit’. A total of 164 taxa were identified across the two samples. The five most commonly reported taxa are provided for each sample (see Figure 3.2). Pre-visit visitors (N = 354) reported their favorite species as tiger (all species) (15%), lion (8%), elephant (6%), giraffe (6%) and dolphin (all species) (5%). Post-visit visitors (N = 413) reported the species they formed the strongest connection with as bear (all species) (8%), dolphin (all species) (8%), giraffe (6%), gorilla (5%), and jellyfish (5%).

Development of Conservation Caring as a Factor

To develop and refine the factor to measure Conservation Caring, we used confirmatory factor analysis. Initially this factor consisted of nine items. Pre-visit factor loadings ranged from .52 - .86, and post-visit factor loadings ranged from .56 - .86 (Table 3.2). The item ‘I am deeply concerned about the care and well-being of this animal at this site’ had the lowest factor loading for the pre-visit sample (.52) and was removed from both samples (.59 post-visit). The item ‘This species has as much right to exist as any human being’ had the lowest factor loading for the post-visit sample (.56) and was removed from both samples (.68 pre-visit).

In the final structural model (Figure 3.3) the seven items displayed factor loadings ranging from .68 - .86 (pre-visit) and .69 - .87 (post-visit). The item, ‘I would protest this site if I learned of the mistreatment of this animal’ displayed the lowest loading in both samples (.68 pre-visit, .69 post-visit). All factor loadings were significant in both samples. Cronbach’s alphas for the revised factor with only seven items were .93 (pre-visit) and .93 (post-visit). The factor had an R^2 value of .40 pre-visit, and .34 post-visit.

Preliminary Measurement Model

Within structural equation modeling, measurement models are used to assess how well individual items reflect a factor. Ideally, items should only reflect one factor. A factor loading is the correlation coefficient between the factor and the item. Factor loadings range from 0 – 1, and the higher the value the stronger the relationship between the item and factor. Measurement models may also be used to assess the validity of items in factor or scale development. A baseline configural model was analyzed for each sample to screen for low or cross loading items, and factor reliability and discriminant validity. No cross loadings were detected. Five items were removed for poor performance (Little et al., 1999). Fit indices supported the model as an acceptable representation of the data (See Tables 3.2 & 3.3 for individual factor loadings and fit indices) (Pre-visit: CFI = .93; RMSEA = .080, Post-visit: CFI = .97; RMSEA = .055) (Byrne, 2008).

Test for Invariance across Zoo Sites

To identify site level configural, measurement, and structural invariance, the baseline configural model for pre-visit and post-visit samples was tested on each zoo site. The model displayed acceptable fit indices for each site (Table 3.4). The data was then pooled to identify configural, measurement, and structural invariance between sites. Fit indices and Satorra-Bentler scaled chi-square differences revealed sample sites were invariant for pre-visit and post-visit samples ($\Delta SB\chi^2$ $p > .05$) (Table 3.4). As factor loadings and parameter estimates were deemed equivalent across sites, data were pooled and treated as a single sample (Byrne, 2008).

Table 3.2.*Initial factor loadings and item means*

Factor and items [a, b]	Pre-visit (N = 354) Mean (SD)	λ	Post-visit (N = 369) Mean (SD)	λ
Existing connection to wildlife				
I actively seek opportunities to view wildlife.	6.99 ± 1.89	.80	7.09 ± 1.83	.74
I feel a deep connection to wildlife.	6.52 ± 1.99	.87	6.54 ± 1.93	.87
I am highly motivated by the need to interact with wildlife.	6.12 ± 2.05	.88	6.13 ± 2.05	.87
I enjoy viewing all types of wildlife.*	7.85 ± 1.50	.64	7.98 ± 1.46	.60
I spend a lot of time learning about wildlife.	5.98 ± 2.11	.78	5.99 ± 2.02	.76
I have a responsibility to do all I can to protect wildlife.*	7.12 ± 1.82	.68	7.10 ± 1.82	.71
Conservation caring				
I am deeply concerned about the care and well-being of this animal at this site.*	7.09 ± 1.92	.52	6.25 ± 2.16	.59
This species has as much right to exist as any human being.*	7.68 ± 1.89	.68	7.52 ± 2.02	.56
Ensuring this species' survival is my highest priority.	6.05 ± 2.20	.82	5.51 ± 2.30	.84
My emotional sense of well-being will be severely diminished by the extinction of this species.	6.20 ± 2.26	.85	5.88 ± 2.38	.82
I need to learn everything I can about this species.	5.93 ± 2.13	.86	5.23 ± 2.16	.86
I would protest this site if I learned of the mistreatment of this animal.	6.65 ± 2.45	.71	6.45 ± 2.52	.68
I will alter my lifestyle to help protect this species.	5.73 ± 2.31	.83	5.18 ± 2.31	.79
My connection to this animal has increased my connection to the species as a whole.	5.89 ± 2.11	.86	5.66 ± 2.08	.84
Wildlife protection must be society's highest priority.	6.00 ± 2.33	.83	5.68 ± 2.42	.81
Behavior – species oriented				
I would support entrance fees at this site being $10 - $25 higher, if the extra money were used for the care and survival of this species.*	5.04 ± 2.27	.59	4.46 ± 2.48	.68
I will donate up to $75 to "adopt" this animal at this site.	4.32 ± 2.41	.81	3.95 ± 2.44	.88
I will make a charitable contribution up to $150 to help purchase habitat in the wild for this species.	3.76 ± 2.24	.86	3.57 ± 2.80	.87
I will become a member of an organization committed to protecting this species, within the next 6 months.	3.96 ± 2.24	.90	3.84 ± 2.40	.86
I will volunteer at an event designed to help the conservation of this species,	4.14 ± 2.42	.86	3.68 ± 2.36	.82

within the next 6 months.				
Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal.	4.21 ± 2.57	.80	3.74 ± 2.48	.80
I would write a letter/sign a petition to a government official supporting the protection of this species.*	5.24 ± 2.80	.65	4.76 ± 2.72	.67
Behavior – biodiversity oriented				
Even if I never return, I will provide on going financial support to this site.	3.96 ± 2.40	.74	3.74 ± 2.35	.73
If asked, I would donate as much as $50 to help protect a species I've never heard of.	3.71 ± 2.37	.70	3.36 ± 2.23	.73
I will endorse public policy that severely restricts future growth & development in order to protect wildlife.	5.32 ± 2.57	.87	5.03 ± 2.64	.87
Elected officials' views on wildlife will be a major factor in my voting.	5.19 ± 2.57	.88	4.81 ± 2.51	.86
Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation.	5.36 ± 2.43	.87	5.18 ± 2.49	.84

Notes. [a] Rated as agreement on 9 point Likert scale (1 = strongly disagree, 9 = completely agree); [b] robust statistics; λ = standardized factor loading; * item not retained

Table 3.3. *Factor loadings and fit indices for preliminary measurement model of zoo visitors*

Factor and items [a]	Pre visit λ	Post visit λ
Existing connection to wildlife		
I actively seek opportunities to view wildlife.	.78	.73
I feel a deep connection to wildlife.	.87	.88
I am highly motivated by the need to interact with wildlife.	.90	.88
I spend a lot of time learning about wildlife.	.78	.75
Conservation caring		
Ensuring this species' survival is my highest priority.	.79	.83
My emotional sense of well-being will be severely diminished by the extinction of this species.	.84	.81
I need to learn everything I can about this species.	.86	.87
I would protest this site if I learned of the mistreatment of this animal.	.69	.68
I will alter my lifestyle to help protect this species.	.84	.80
My connection to this animal has increased my connection to the species as a whole.	.87	.86
Wildlife protection must be society's highest priority.	.80	.81
Behavior – species oriented		
I will donate up to $75 to "adopt" this animal at this site.	.75	.84
I will make a charitable contribution up to $150 to help purchase habitat in the wild for this species.	.82	.84
I will become a member of an organization committed to protecting this species, within the next 6 months.	.93	.87
I will volunteer at an event designed to help the conservation of this species, within the next 6 months.	.87	.83
Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal.	.82	.82
Behavior – biodiversity oriented		
Even if I never return, I will provide on-going financial support to this site.	.84	.89
If asked, I would donate as much as $50 to help protect a species I've never heard of.	.80	.88
I will endorse public policy that severely restricts future growth & development in order to protect wildlife.	.81	.67
Elected officials' views on wildlife will be a major factor in my voting.	.81	.66
Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation.	.82	.67
Fit indices [b]		
SBχ^2 (*df*)	592.17 (*182*)	375.11 (*179*)
CFI	.93	.97
NNFI	.92	.96
SRMR	.057	.054
RMSEA	.080	.055

Notes. [a] Rated as agreement on 9 point Likert scale (1 = strongly disagree, 9 = completely agree); [b] robust statistics; λ = standardized factor loading; SBχ^2 = Satorra-Bentler Scaled Chi-Square; *df* = degrees of freedom; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardized Root Mean Squared Residual; RMSEA = Root Mean Square Error of Approximation; * $p < .05$

Table 3.4. *Fit indices and testing outcomes for metric invariance of measurement model across zoo sampling sites and pooled data*

Model	CFI [a]	NNFI [a]	SRMR	RMSEA [a]	SBχ^2 (*df*) [a]	Δ SBχ^2 (Δ *df*) [b]
Preliminary CFA measurement model						
Pre-visit						
Brookfield Zoo	.94	.93	.071	.078	261.40 (*182*)	
Shedd Aquarium	.91	.90	.067	.089	391.65 (*182*)	
Zoo Atlanta	.90	.88	.064	.11	371.70 (*182*)	
Post-visit						
Brookfield Zoo	.95	.94	.073	.061	264.96 (*179*)	
Shedd Aquarium	.97	.97	.054	.055	267.94 (*179*)	
Zoo Atlanta	.94	.93	.075	.074	249.27 (*179*)	
Pre-visit Pooled Sites						
Configural model	.92	.90	.069	.091	1072.69 (*546*)	
Measurement invariance	.91	.91	.080	.090	1124.54 (*580*)	48.92 (*34*)
Structural invariance	.91	.91	.12	.089	1146.66 (*592*)	70.88 (*46*)
Post-visit Pooled Sites						
Configural model	.96	.95	.068	.061	783.17 (*537*)	
Measurement invariance	.96	.96	.078	.058	819.48 (*579*)	31.85 (*42*)
Structural invariance	.96	.96	.10	.058	832.92 (*591*)	43.43 (*54*)

Notes. [a] robust statistics; [b] difference calculated using the Satorra-Bentler Scaled Chi-square adjusted difference test (Satorra & Bentler, 2001); CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardized Root Mean Squared Residual; RMSEA = Root Mean Square Error of Approximation; SBχ^2 = Satorra-Bentler Scaled Chi-Square; *df* = degrees of freedom; * $p < .05$

Test for Invariance between Pre-visit and Post-visit Samples

The baseline configural model was tested across pre-visit and post-visit samples to check for group invariance of the measurement model (see Table 3.5). The configural model fit the data well (CFI = .95; RMSEA = .069) and was deemed an acceptable representation of the factorial structure (Byrne, 2008; Kline, 2005). Hierarchical testing revealed only minor partial invariance, and no overall harm in fit to the model. The baseline configural model was accepted as invariant across pre-visit and post-visit samples.

Results of hierarchical testing of the baseline structural model fit the data well (CFI = .95; RMSEA = .069) and maintained measurement invariance across samples (see Table 3.5). Imposing factor constraints revealed two inequalities. The first was the parameter estimate between Conservation Caring and Biodiversity Oriented Behavior. The second inequality between pre- and post-visit samples was the factor loading of volunteering on Species Oriented Behavior. With the exception of the previous two constraints, the proposed model (see Figure 3.3, Table 3.5) predicting zoo visitors' willingness to engage in pro-conservation behavior was an acceptable representation of the data and was invariant across pre-visit and post-visit samples.

Influencers of Conservation Caring and Willingness to Engage in Pro-Conservation Behaviors

Within structural equation modeling, structural regression models are used to assess causal relationships between factors. Beta weights reflect the effect size of the predictor factor on the dependent factor. Fit indices for the model ($SB\chi^2$ = 1016.35 (*383*), $p < .05$; CFI = .95; NNFI = 0.94; SRMR = .060; RMSEA = .068) indicated the model was an acceptable representation of the relationships present in the data (Byrne, 2008; Kline, 2005; Marsh et al., 2004). The model in Figure 3.3 (also see Table 3.6) represents how the factors predicted a willingness to engage in pro-conservation behaviors and how this varied between the pre- and post-visit zoo experience.

Existing Connection to Wildlife was a strong predictor of Conservation Caring (pre-visit $\beta = .63$, $p < .05$; post-visit $\beta = .60$, $p < .05$) and a weak predictor of biodiversity oriented behaviors (pre-visit $\beta = .068$, $p < .05$; post-visit $\beta = .070$, $p < .05$). It was not a significant predictor of Species Oriented Behavior. No β values were significantly different between pre- and post-visit samples.

Conservation Caring was a strong predictor for Species Oriented Behavior (pre-visit $\beta = .61$, $p < .05$; post-visit $\beta = .62$, $p < .05$) but a weak predictor for Biodiversity Oriented Behavior (pre-visit $\beta = .18$, $p < .05$; post-visit $\beta = .070$, NS). No β values were significantly different between pre- and post-visit samples.

Species Oriented Behavior was a very strong predictor of Biodiversity Oriented Behavior (pre-visit $\beta = .78$, $p < .05$; post-visit $\beta = .86$, $p < .05$). β values were not significantly different between pre- and post-visit samples.

The model accounted for 40% (R^2 pre-visit) and 34% (R^2 post-visit) of the variance in Conservation Caring; 41% (R^2 pre-visit) and 42% (R^2 post-visit) of the variance in Species Oriented Behavior; and 89% (R^2 pre-visit & post-visit) of the variance in Biodiversity Oriented Behavior. Only R^2 values for Conservation Caring ($p < .05$) were significantly different. All R^2 values were relatively high, and provided support for the predictive validity of the model (Kline, 2005; Noar, 2003).

Latent Mean Differences

The test for latent mean differences was performed with the pre-visit sample as the reference group. Conservation Caring was the only factor to have a significantly different mean between pre-visit and post-visit samples. Post-visit zoo visitors score 0.41 points lower on

Conservation Caring ($p < .05$) than pre-visit visitors. It is important to note these are relative differences and not absolute values (Byrne, 2008).

Table 3.5. *Fit indices, invariance testing outcomes, and latent mean differences across zoo pre-visit/post-visit tourist samples*

Model	CFI [a]	NNFI [a]	SRMR	RMSEA [a]	SBχ^2 (*df*) [a]	Δ SBχ^2 (Δ *df*) [b]
Measurement model						
Configural model	.95	.94	.056	.069	975.13 (*361*)	
Measurement invariance	.95	.94	.060	.068	1010.94 (*379*)	31.33 (*18*)
Structural invariance						
w/ 1 constraint released	.95	.94	.067	.068	1011.04 (*382*)	42.54 (*24*)
Structural model						
Configural model	.95	.94	.056	.069	975.30 (*361*)	
Measurement invariance	.95	.94	.060	.068	1010.97 (*379*)	31.21 (*18*)
Structural invariance						
w/ 2 constraints released	.95	.94	.060	.068	1016.35 (*383*)	35.36 (*22*)
Latent means differences						
Measurement model						
w/ pre visit as ref. group	.95	.94	.060	.069	1068.87 (*396*)	

Notes. [a] robust statistics; [b] difference calculated using the Satorra-Bentler Scaled Chi-square adjusted difference test (Satorra & Bentler, 2001); CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardized Root Mean Squared Residual; RMSEA = Root Mean Square Error of Approximation; SBχ^2 = Satorra-Bentler Scaled Chi-Square; *df* = degrees of freedom; * $p < .05$

Table 3.6. *Item means, factor loadings and fit indices of final structural model predicting zoo visitors' pro-conservation behavioral intent*

	Pre visit (N = 354)		Post visit (N = 368)	
Factor and items [a]	Mean (SD)	λ	Mean (SD)	λ
Existing connection to wildlife				
I actively seek opportunities to view wildlife.	6.96 (1.89)	.77	7.10 (1.83)	.74
I feel a deep connection to wildlife.	6.52 (1.97)	.88	6.54 (1.93)	.88
I am highly motivated by the need to interact with wildlife.	6.11 (2.04)	.90	6.14 (2.06)	.88
I spend a lot of time learning about wildlife.	5.96 (2.10)	.77	5.99 (2.02)	.76
Conservation caring				
Ensuring this species' survival is my highest priority.	6.04 (2.19)	.80	5.51 (2.30)	.82
My emotional sense of well-being will be severely diminished by the extinction of this species.	6.13 (2.27)	.83	5.89 (2.37)	.82
I need to learn everything I can about this species.	5.92 (2.12)	.86	5.24 (2.15)	.87
I would protest this site if I learned of the mistreatment of this animal.	6.62 (2.45)	.68	6.44 (2.52)	.69
I will alter my lifestyle to help protect this species.	5.73 (2.12)	.82	5.19 (2.30)	.82
My connection to this animal has increased my connection to the species as a whole.	5.84 (2.12)	.86	5.65 (2.08)	.87
Wildlife protection must be society's highest priority.	6.00 (2.32)	.80	5.68 (2.42)	.81
Behavior – species oriented				
I will donate up to $75 to "adopt" this animal at this site.	4.32 (2.41)	.78	3.94 (2.43)	.82
I will make a charitable contribution up to $150 to help purchase habitat in the wild for this species.	3.77 (2.24)	.84	3.58 (2.40)	.82
I will become a member of an organization committed to protecting this species, within the next 6 months.	3.97 (2.24)	.93	3.83 (2.41)	.88
I will volunteer at an event designed to help the conservation of this species, within the next 6 months.	4.15 (2.42)	.87	3.68 (2.36)	.84
Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal.	4.22 (2.56)	.81	3.72 (2.47)	.83
Behavior – biodiversity oriented				
Even if I never return, I will provide on-going financial support to this site.	3.96 (2.40)	.87	3.73 (2.34)	.88
If asked, I would donate as much as $50 to help protect a species I've never heard of.	3.71 (2.37)	.84	3.35 (2.31)	.87
I will endorse public policy that severely restricts future growth & development in order to protect wildlife.	5.32 (2.57)	.79	5.02 (2.64)	.70
Elected officials' views on wildlife will be a	5.19 (2.57)	.77	4.81 (2.51)	.69

major factor in my voting.				
Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation.	5.36 (2.42)	.79	5.18 (2.49)	.70
Fit indices [b]				
$SB\chi^2$ (*df*)		1016.35 (*383*)		
CFI		.95		
NNFI		.94		
SRMR		.060		
RMSEA		.068		

Notes. [a] Rated as agreement on 9 point Likert scale (1 = strongly disagree, 9 = completely agree); [b] robust statistics; λ = standardized factor loading; $SB\chi^2$ = Satorra-Bentler Scaled Chi-Square; *df* = degrees of freedom; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardized Root Mean Squared Residual; RMSEA = Root Mean Square Error of Approximation; * $p < .05$

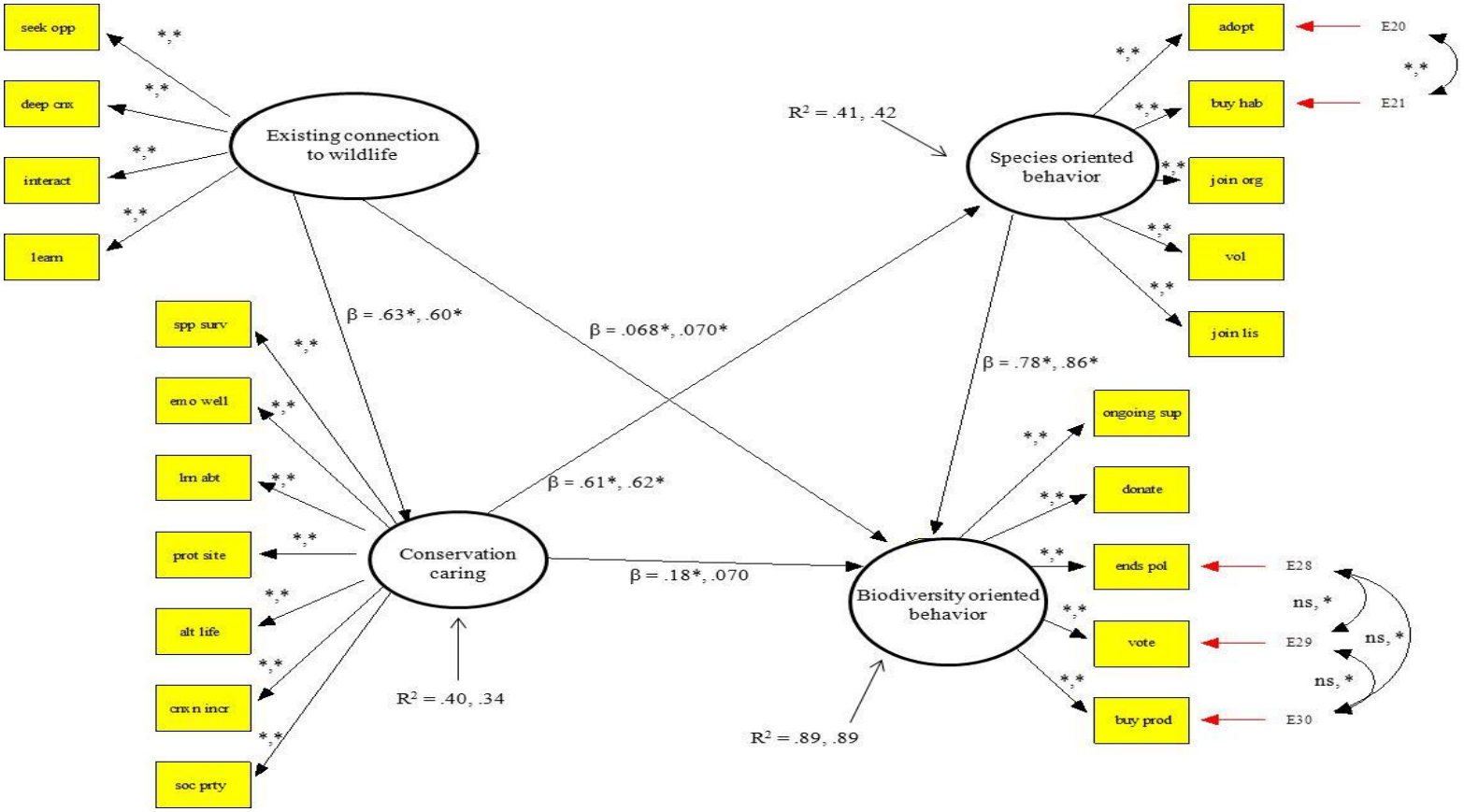


Figure 3.3. Final structural model predicting pro-conservation behavioral intent

Notes. Values reported for pre-visit, post-visit, respectively; all measurements robust; * $p < .05$; β = standardized parameter estimates; R^2 = explained variance. CFI = .95; NNFI = 0.94; SRMR = .060; RMSEA = .068; SBχ^2 (*df*) = 1016.35 (*383*), $p < .05$

DISCUSSION

This study had two primary objectives. The first was to develop Conservation Caring as a factor to measure zoo visitors' connection to an animal. The second was to investigate if Conservation Caring influenced visitors' willingness to engage in pro-conservation behavior following a zoo experience. Secondarily, this study explored how Conservation Caring can help zoos identify potential flagship species.

Conservation Caring's Ability to Measure Visitors' Connection to an Animal

As a factor, Conservation Caring performed very well. The high factor loadings (Table 3.6) and R^2 value of .40 support the factor's ability to capture a great deal of the variance of this latent construct. One interesting observation is that cognitive and affective items were not separate dimensions. This is interesting in light of Rabb & Saunders' (2005) proposal of three dimensions. Future research may seek to refine items to better understand if these dimensional aspects exist.

Additional support for the acceptability of Conservation Caring as a factor comes from the invariance tests (Tables 3.4 & 3.5). Metric invariance tests assess the equality of factor loadings (λ values) across samples. Factor loadings for all seven items of Conservation Caring were invariant (i.e. statistically equivalent) across zoo sites as well as between pre- and post- visit samples. Invariance across zoo sites supports visitors interpreting Conservation Caring items in a consistent manner.

Additionally, there was no item variance when the factor measured caring for a favorite species (pre-visit), or a connection developed during a zoo visit (post-visit). This invariance between pre- and post-visit samples supports the reliability of items in

different contexts. These invariance tests support factor reliability and validity (DeVellis, 2003). On the basis of statistical performance and applicability in different contexts, these items may serve as a preliminary framework for full scale development of Conservation Caring.

Differences in Conservation Caring between Pre- and Post- Visitors

Pre-visit visitors' responded to Conservation Caring items, on the basis of the strength of the connection they have with their 'favorite wild animal'. Post-visit visitors were presented with the same items, but responded on the basis of the strength of the connection formed with a zoo animal during their visit. While there were no differences between samples for factor loadings, Conservation Caring latent mean scores and R^2 values show a significant, albeit minor, decrease from pre- to post-visit samples. This is most likely reflective of the stronger emotional connection visitors have with their 'favorite' animal relative to the species with which they connected during their visit. It is important to note R^2 values are significant in both pre- and post-visit samples, and account for a large amount of the variance. Thus, while the experiential connection may be less than an existing 'favorite' connection, both are statistically significant and meaningful in the model.

Influencers of Conservation Caring & Pro-Conservation Behavioral Intent Following a Zoo Experience

To address our second research question, we investigated what influenced Conservation Caring and pro-conservation behaviors. As a baseline, the factor Existing Connection to Wildlife (Table 3.6 & Figure 3.3) was used to gauge zoo visitors' connection to wildlife in general. The factor is strongly predictive of Conservation

Caring, but plays little direct role in predicting pro-conservation behavioral intent. This is promising as it provides evidence contrary to the notion zoos are 'preaching to the choir'. Zoos are called upon to widen, and stimulate action from their audience base. However, there is concern that the zoo audience, no matter how wide, is still a self-selected audience that is highly attuned to pro-conservation calls to action, i.e. 'the choir'. While this may be true, data from this study indicate pre-existing levels of a connection to wildlife were not a predictor of behaviors. So, while zoos audiences may be predisposed to conservation messages, this predisposition is not leading to action.

More important was the large influence of Conservation Caring on Species Oriented Behavior, but not on Biodiversity Oriented Behaviors. The large influence on Species Oriented Behavior is encouraging as it supports visitors' connection to a species is predictive of their intent to perform actions to conserve that species. Interestingly, following a zoo experience, Conservation Caring was not predictive of Biodiversity Oriented Behavior. This may indicate the connection to a specific species overshadows general concern. However, finding Conservation Caring as a predictor of behavior provides more clarity to its theoretical role envisioned by Rabb & Saunders (2005); wherein its relationship to behavior was unknown.

Visitors' Species Preferences

A secondary goal of this study was to understand how Conservation Caring could be used to identify species visitors connect with and thus serve as flagships. Following a zoo experience, visitors connected to a wider array of species than that identified by pre-visit visitors (Figure 3.2). When asked what their favorite species was, or what species

they felt the strongest connection with, visitors could select any animal. A benefit to this approach is that results were not linked to any one species.

Results imply that during a zoo visit, visitors do not necessarily form an emotional connection with their favorite wild animal. However, as this study was conducted using independent samples, individual changes were not tracked. While this study did not investigate if the experiential connection replaced a visitor's favorite animal, it does show the strength of short-term direct exposure to zoo animals. This may be explained, in part, by the nature of an implicit connection to nature (Schultz & Tabanico, 2007).

Additionally, post-visitors' greater diversity of responses suggests the ability to connect with a much wider array of species than previously thought (Beh & Bruyere, 2007; Kerley et al., 2003; Okello et al., 2008). Visitors' responses to a greater diversity of charismatic features may be reflective of the influence of Existing Connection to Wildlife. If zoo goers display a high level of Existing Connection to Wildlife, zoos could broaden the marketing of additional species. Future research may investigate this relationship in greater detail.

Recommendations for Flagship-Based Conservation Campaigns

Getting visitors to adopt pro-conservation behaviors following a zoo visit generally meets with little success (L. Smith et al., 2011). Differences between pre- and post-visit responses provide zoos two specific strategies to address flagship-based conservation campaigns. The first strategy is to cultivate the link between 'favorite' animals and behaviors which benefit that species and biodiversity in general. Such a

campaign would draw on the strength of the connection to stimulate both specific and generalized behaviors. This approach could target behaviors that are primarily performed outside the zoo. Creating messaging and programming which seeks to influence an existing connection to wildlife and a favorite animal may provide a framework to build joint participation in species specific and general biodiversity behaviors.

The second strategy zoos can adopt to stimulate greater participation in pro-conservation behaviors is to link on-site, species specific behaviors with animals prone to stimulating a connection with visitors. This is supported by the extremely strong influence of Conservation Caring on Species Oriented Behaviors. Additionally, providing explicit opportunities for visitors to engage in on-site behaviors generally meets with higher levels of success than that for off-site behaviors (e.g. Powell & Ham, 2008). Thus, opportunities for on-site participation in pro-conservation behaviors, which focus on animals of interest rather than biodiversity, may meet with greater success (Gwynne, 2007). Zoos that develop an integrated campaign linking on-site and off-site, and species specific and biodiversity oriented behaviors may create greater synergies by being more aligned with visitors' expressed levels of behavioral intent.

Several limitations temper the generalizability of these findings. First, visitors were asked which species they connected with during their visit. As such, responses were restricted to observed species. Viewing different species may alter results. Second, items for Conservation Caring may be further refined to provide a more detailed analysis of the factor. This could alter the strength of the connection and/or its influence on behavior. Third, behavioral intentions and not actual behaviors were assessed. Therefore, results

represent visitors' *willingness to engage in behaviors* and not actual behavior performance.

Conclusion

Zoo visitors' connection to an animal can be measured and is a strong predictor of pro-conservation behavioral intent for that species. Although this study did not investigate the longevity of intentions, they are widely recognized as being ephemeral. One method to overcome this obstacle is to provide opportunities on-site that are clearly linked to specific animals. In this way, zoos may be able to capitalize on the experiential condition and provide immediate opportunities for behavior adoption.

The successful operationalization of Conservation Caring also provides zoos a starting point to understand visitors' emotional connections to their collections. In putting these findings into practice, zoos may be able to stimulate greater levels of Conservation Caring through more targeted interpretation and exhibit design. While this study did not attempt to isolate the role of interpretation and exhibits in facilitating a connection, it is important to note they are widely acknowledged to do so (Bruni et al., 2008; Gwynne, 2007; A. Smith & Sutton, 2008).

Additionally, the diversity of species visitors connected with would suggest that zoos have greater flexibility in selecting flagships for conservation campaigns than previously thought. It also provides tantalizing evidence for zoo visitors' growing appreciation for biodiversity. On the basis of these findings, zoos may be better

positioned to support a wider role for their collections and promote biophilically challenged species (Myers et al., 2004) as potential flagship candidates.

CHAPTER FOUR

LUCKY 13: CONSERVATION IMPLICATIONS OF BROADENING 'BIG 5' FLAGSHIP SPECIES RECOGNITION IN EAST AFRICA.

Introduction

Can certain species motivate tourists to participate in conservation actions? Proponents of the flagship species concept argue that some species are particularly well suited to fostering a connection with the public, and this connection can be cultivated as an impetus to action. Thus, using a single species or small cohort can be justified to rally public support. However, few studies have investigated if direct exposure to wildlife generates specific flagship species outcomes.

Charisma and Flagship Species

Several species have long been recognized for their ability to resonate with the public. Often these species are large, rare, deadly mammals with large eyes and similarities to humans (Leader-Williams & Dublin, 2000; Sitas et al., 2009; Woods, 2000). These and other features (c.f. Fuhrman & Ladewig, 2008; Jacobs, 2009) have been shown to contribute to an animal's charisma. Recently, several authors have investigated charisma in other non-mammalian species (Bride, Griffiths, Melendez-Herrada, & McKay, 2008; Lemelin, 2007; Walpole & Leader-Williams, 2002). Whether mammalian or not, the majority of these species are large relative to their taxon. This combination of size and charisma has led to such species being referred to as charismatic megafauna. One of the most recognizable examples of a charismatic megafauna species being used for conservation messaging is World Wildlife Fund's use of the giant panda as a logo.

Conservationists often rely on charismatic megafauna to anchor conservation campaigns. The objective is to utilize the inherent charisma of a species to rally public awareness and support. If such campaigns generate the desired conservation outcomes, the species may be designated a flagship species. By definition a flagship is a species capable of raising concern and conservation actions for itself, and ultimately, biodiversity (Caro & O'Doherty, 1999; Simberloff, 1998; Walpole & Leader-Williams, 2002). Like other surrogate concepts, flagship species are used for their ability to generate specific outcomes. Unlike other surrogate concepts, flagship status is linked exclusively to socially based conservation outcomes; primarily raising issue awareness and increasing philanthropy (Dalerum, Somers, Kunkel, & Cameron, 2008). While flagships may deliver ecologically based conservation outcomes, their failure to do so does not invalidate their status.

Flagship Species and Ecotourism

According to Weaver (2005), ecotourism is nature-based tourism that provides educational opportunities, and is managed in such a way as to maximize the likelihood of sustainable environmental outcomes and sociocultural benefits to the local community. Within ecotourism, a common role for flagships is improving public recognition of a site. Early examples of calls for flagships to promote ecotourism-based conservation include the mountain tapir (*Tapirus pinchaque*) (Downer, 1996) and Asian Elephant (*Elephas maximus*) (Johnsingh & Joshua, 1994). One early success story is using lion tamarins (*Leontopithecus spp*.) to raise public awareness of their conservation threats in Brazil (Dietz, Dietz, & Nagagata, 1994).

Because of their socially based conservation outcomes, flagships are often used to support sustainability goals of ecotourism. The most common result being the generation of funds from direct contributions and increased visitation (Higginbottom, 2004b; Weaver, 2005). Other examples of conservation outcomes associated with flagship-based ecotourism include increases in volunteering (Cousins et al., 2009), funding (Tisdell, Nantha, & Wilson, 2007), and participation in conservation initiatives (Dickie et al., 2007). Such responses align well with expected flagship outcomes.

However, attributing the increases in such outcomes to flagships may be problematic. In many instances, charismatic species serve only as marketing attractions and are not linked with specific conservation outcomes (Kruger, 2005). Moreover, because of increased visitation, these species are misunderstood to be flagships. This is an example of how the flagship term can be misused and lead to concern about its validity (Caro & Girling, 2010; Leader-Williams & Dublin, 2000).

Another challenge related to conflating flagship status with popularity is the altering of management outcomes, in response to increased visitation, to favor perceived flagship species (Goodwin & Leader-Williams, 2000). For example, flagships are often the most difficult and expensive species to manage (Lindsey et al., 2007). However, to enhance viewing options, management strategies have been skewed to favor flagship populations at the expense of other species (Higginbottom, 2004b; Lindsey et al., 2007). Some sites have even introduced charismatic species to stimulate tourism (Sims-Castley et al., 2005). Walpole & Leader-Williams (2002) note flagship-based tourism is not a panacea for biodiversity conservation. Additionally, reliance on popularity, and not actual

flagship outcomes, may cause areas in greater need of conservation to be overlooked, and financial resources to be diverted from underfinanced protected areas (Wilkie & Carpenter, 1999).

Influencing Flagship Responses in Tourists

Even when ecotourism and flagship responses are appropriately linked, little is known about what influences tourists' behaviors (Schultz & Tabanico, 2007). Several authors have recommended investigating species' and experience attributes, and tourists' connection to a species, for their influences on conservation outcomes (Ballantyne et al., 2010; Bentrupperbaumer, 2005; Catibog-Sinha, 2008; Curtin, 2005; Kerley et al., 2003; Shani & Pizam, 2010; Valentine & Birtles, 2004).

The influences of the experience and a connection to a species have been shown to be highly contextual and capable of producing divergent outcomes. For example, Smith & Sutton (2008) found direct exposure to the platypus (*Ornithorhynchus anatinus*) was not a predictor of conservation intentions. Cousins, Evans, & Sadler (2009) found conservation volunteers working with lions (*Panthera leo*) reluctant to engage with a wider variety of species. Alternatively, Myers, Saunders, & Birjulin (2004) found direct exposure to gorillas (*Gorilla spp*.) and okapis (*Okapia johnstoni*) produced increased levels of care. And Ballantyne et al., (2010) found visitors expressed an emotional affinity for dolphins that could transcend to biodiversity in general.

This transference of emotional affinity from one species to many aligns with Tremblay's (2002) call for key species to act as conduits to broaden connections between ecological richness and local human culture. However, he warns that flagships should

maintain their role as unique representations of tourist experiences, and not become commercialized to the point of ubiquitousness. This closely echoes Bowen-Jones & Entwistle's (2002) caveat of 'flagship fatigue;' a condition where flagship images become so routine the public is oversaturated with them and loses a personal connection. One approach to off-set flagship fatigue and maintain unique tourist experiences is to promote non-traditional or lesser-known species.

Tourists' Wildlife Viewing Preferences

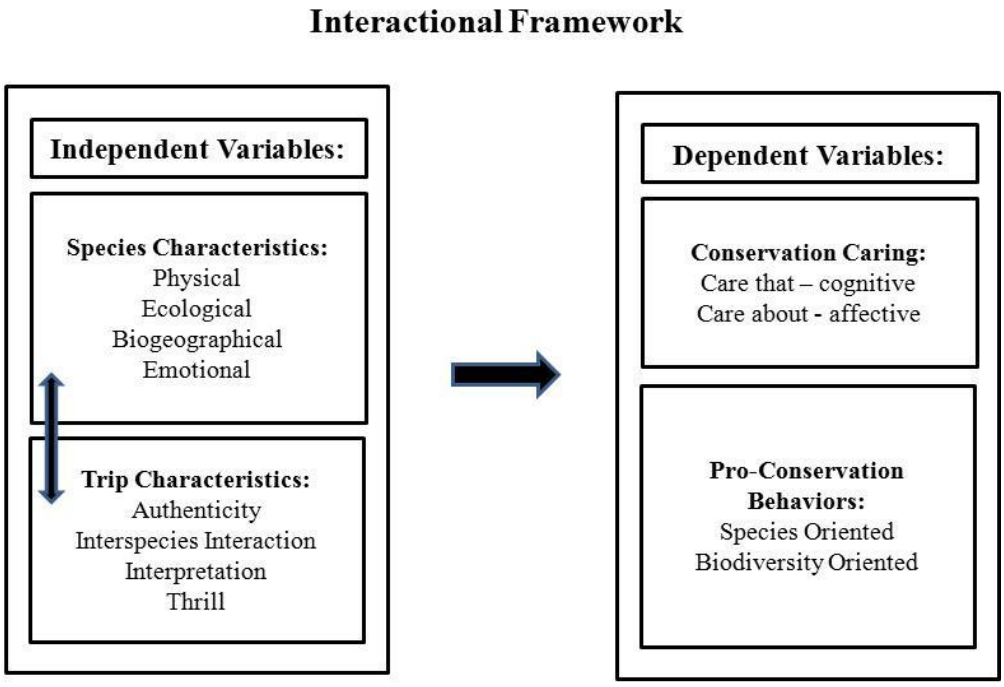
Some studies have found tourists are interested in viewing a broader array of species. For example, Czech, Krausman and Borkhataria (1998) state their results support the notion the public appreciation of biodiversity is at an all-time high. Beh and Bruyere (2007) found Kenyan tourists reported general nature viewing as more important than viewing a specific species. They state these findings run contrary to the current marketing of the 'Big 5' (lion, leopard, elephant, rhino and buffalo). Additionally, Okello, Manka and D'Amour (2008) found Kenyan tourists more interested in "all and everything" relative to the 'Big 5'.

Alternatively, tourists may be unaware or disinterested in lesser known species; Kerley et al., (2003) point out ecotourists are rarely conservation experts and unlikely to appreciate biodiversity. For example, Lemelin, Fennell, and Smale (2008) found that novice tourists did not have the same level of appreciation for diversity or share the same level of wildlife orientations as did more specialized tourists. Additionally, Lindsey, et al., (2007) found that first time visitors to South African parks showed a greater attraction to charismatic megafauna than to birds and plants.

Interactional Theory & Study Model

Interactional theory is a holistic framework intended to capture the complexity of phenomena by simultaneously considering psychological processes, environmental settings, and contextual factors (Altman & Rogoff, 1987; Archer & Wearing, 2003). The theory posits that the interactive exchange between the individual, the environment, and the experience can influence behaviors. Incorporating elements of the experience is recommended to clarify relationships and increase the accuracy of predicting behavioral modification (Stern, 2000a; Stern et al., 1999).

Several authors have used interactional theory to investigate influences of pro-environmental behaviors during a tourism experience (Chan & Baum, 2007; Patterson et al., 1998; Powell et al., 2009). Schultz (2000) implies interactional frameworks are the preferred method to investigate a connection to nature. This study used an interactional framework to investigate the influences of experiential characteristics on a connection to wildlife and pro-conservation behaviors. Specifically we hypothesized that species and trip characteristics would influence flagship outcomes (awareness and action) (Figure 4.1).



Adapted from Powell et al., (2009)

Figure 4.1. Interactional Framework of Wildlife Viewing Experience and Flagship Responses

Study Objectives

These divergent results suggest there is still a challenge to disentangling popularity from flagship status, rallying tourists around a wider array of species, and creating experiences that stimulate flagship responses. The purpose of this study was to investigate if the East African 'Big 5' (elephant (*Loxodonta africana*), lion (*Panthera leo*), leopard (*Panthera pardus*), rhino (*Diceros bicornis*), and buffalo (*Synerus caffer*)) are simply charismatic tourist attractions or species capable of generating flagship responses in tourists. Additionally, alternative 'Big 5' species (giraffe (*Giraffa* spp.), hippo (*Hippopotamus amphibius*), hyena (*Crocuta crocuta*), warthog (*Phacochoerus aethiopicus*), wildebeest (*Connochaetes* spp.), zebra (*Equus burchelli*), baboon (*Papio cynocephalus*), and cheetah (*Acinonyx jubatus*)) were tested for their ability to deliver flagship responses and compared to responses for the traditional 'Big 5.' Structural equation modeling was used to understand the influence of species and experience attributes on the connection formed with a species, and how this connection influenced pro-conservation behavioral intent for the species and biodiversity.

Study Sites

As the goals of this study were contingent on tourists forming a connection with an animal during their trip, study sites were selected on the basis of their diversity of wildlife and the presence of the thirteen species of interest. Tourists were allowed to self-describe the animal they connected with rather than chose from a predefined list.

The northern circuit of Tanzania was chosen for the consistent diversity and density of wildlife found at each park and protected area. The northern circuit consists of

the following national parks: Mt. Kilimanjaro, Arusha, Serengeti, Lake Manyara, Mkomazi, and Tarangire. Additionally, the Ngorongoro Crater is considered part of the northern circuit, although it is not a Tanzanian National Park.

Arguably, the most popular of these sites are Serengeti National Park (SNP) and the Ngorongoro Crater. Established as a game reserve in 1929 and a national park in 1951, SNP is the oldest and second largest (5700 mi^2/14,763 $km^{2)}$ national park in Tanzania. It is home to over one million wildebeest, 300,000 Thomson's gazelle, 200,000 zebra and 32 other plains species. All 'Big 5' species (elephant, rhino, Cape buffalo, lion, and leopard) are present, as well as other CMF such as hippo, giraffe, and cheetah. Additionally, there are several mesofauna present such as hyenas, jackals, aardwolf, and servals, and 500 bird species. SNP is also the site of one of the last remaining great biological phenomena, the wildebeest migration. Due to these and other features, SNP has been designated a world heritage site biosphere reserve (Tanzania National Parks, n.d.; Tanzania Tourist Board, n.d.).

The Ngorongoro Crater is located in the Ngorongoro Conservation Area (NCA) and is administered by the Ngorongoro Conservation Area Authority. NCA is adjacent to SNP. Established in 1959, the NCA is 3200 mi^2 (8292 km^2) and is a designated multiple use area. NCA is a Man and Biosphere Reserve and World Heritage Site. The Ngorongoro Crater is an unbroken caldera and is 100 mi^2 (260 km^2). All visitors to the crater floor must be accompanied by a guide. The crater itself is home to 7000 wildebeests, 4000 zebra, 3000 eland and 3000 Grant's and Thomson's gazelles. All 'Big

5’ species are also present, as well as wild dogs, and 500 bird species including greater and lesser flamingo (Ngorongoro Crater, n.d.).

Methods

Sampling Procedure

Surveys were collected daily from October 29 – November 3, 2011 at Kilimanjaro International Airport (KIA), Moshi, Tanzania. KIA is as a central tourist hub for the northern circuit of Tanzanian national parks. On collection days, we attempted a census of all tourists who met the following criteria: English speaking and participated in a wildlife viewing activity, in an African natural area. A total of 416 surveys were collected, with a 98% response rate.

Survey Development

Factors were developed and modified following DeVellis (2003). All items were measured using 9 point Likert scales; 1 = strongly disagree, 9 = strongly agree; 1 = extremely unlikely, 9 = extremely likely. Tourists were asked to identify the species with which they formed the strongest connection during their trip. Responses to all of the items were based on that species.

Variables

Wildlife cohort.

Wildlife cohorts were defined as ‘Big 5’, ‘Safari 8’, and ‘Big 13’. The ‘Big 5’ was the traditional Tanzanian composition of buffalo, elephant, lion, leopard, and rhinoceros (Lindsey et al., 2007). The ‘Safari 8’ included baboon, cheetah, giraffe, hippopotamus, hyena, warthog, wildebeest, and zebra (Okello et al., 2008). The ‘Big 13’ aggregated ‘Big

5' and the 'Safari 8' cohorts. Tourists were assigned to the 'Big 5' or 'Safari 8' category on the basis of the species to which they formed the strongest connection.

Species & trip characteristics.

Species attributes included physical (Woods, 2000), ecological (Lorimer, 2007), biogeographical (Bowen-Jones & Entwistle, 2002), and emotional (Jacobs, 2009) features which have been recognized to influence charisma. The composite variable was formed from five items (Table 4.1). Trip attributes items were selected from experiential elements recognized for influencing pro-conservation behaviors. Those were, authenticity (Curtin, 2005), interspecies interaction (Curtin, 2006), interpretation (Ballantyne et al., 2010), and thrill (DeMares & Krycka, 1998). The composite variable was formed from five items (Table 4.1).

Conservation Caring.

An individual's connection to a species is represented by the factor Conservation Caring, adapted from Rabb and Saunders (2005), and includes the dimensions care '*that',* which are cognitive items and care '*about',* which are affective items. Using these dimensions makes this factor more in line with empathy rather than knowledge. Empathy has been shown to be a better predictor of helping behavior within the context of environmental issues (Ballantyne et al., 2010; Schultz, 2000), and is more aligned with understanding how individuals care for a species (Saunders, 2003; Vining, 2003). The composite variable was formed from eight items (Table 4.1). Additionally, Conservation Caring is conceptualized as a continuum of the level of connection to a species.

Pro-conservation behaviors.

Behavioral intent was separated into two factors on the basis of how actions pertain to an individual species, or biodiversity as a whole. Both factors were adapted from Stern (2000) and included the dimensions: non-activist public sphere, behavior in organizations, activism, and private sphere. These dimensions are supported in the literature as being well representative of pro-conservation behaviors (Kaiser et al., 2005; Schultz, 2000; Stern et al., 1999). They also align well with conservation behaviors typically associated with individual species or species cohorts (Pennisi et al., 2004; Swanagan, 2000; Walpole & Leader-Williams, 2002; Waylen et al., 2009). Composite variables were formed from six items (species oriented behaviors) and five items (biodiversity oriented behaviors) (Table 4.1).

Analyses

Data cleaning.

For all multivariate analyses data were screened for missing values. Cases exhibiting missing values for more than 50% of items per factor were removed. A total of 105 cases were removed. Data were screened for univariate and multivariate outliers following Tabachnick & Fidell (2007). No univariate outliers (+/- 3 S.D.) were detected. A total of 27 cases were removed for exceeding the criterion Mahalanobis Distance value (χ^2 (*29*) = 58.30, $p < .001$). The final sample size for multivariate analyses was $N = 284$.

Univariate analyses.

All univariate analyses were performed using SPSS v20. Chi-square tests were performed to assess differences in species preference responses. ANOVA's with

Bonferroni adjust post-hoc tests were performed to assess differences in item and composite variable means.

Test for metric invariance.

As one of the primary research questions was to uncover differences between wildlife cohorts, it was critical that we established the baseline model was invariant across groups. Establishing metric invariance provides a statistical benchmark for accepting differences between populations due to true score differences in the constructs as opposed to inconsistent psychometric properties. Tests for invariance followed the hierarchical tests for invariance consistent with Byrne (2008). These tests were used to confirm both the fit and invariance of the path model.

Once metric invariance was established for the baseline model, the structural model was tested for invariance. This was done in order to confirm fit and uncover model causal pathway differences between cohorts. A challenge in interpreting structural models is that fit indices do not pertain to predictive validity. R^2 values should be assessed independently of fit indices in order to understand the predictive validity of a causal model (Kline, 2005).

Results

Survey Sample Description

The population was 47% male, 48% female (5% no response); mean age was 46; 87% reported completing at least four years of college; 22% listed the United States of America as their country of residence, 15% listed the United Kingdom, and 10% listed France. All other reported countries were less than 10% each.

Species Preferences

Tourists were asked to identify the species they formed the strongest connection with during their wildlife viewing experience. Chi-square results showed significant variation in tourist responses ($\chi^2 = 110.76$, df = 2, $p < .001$). 'Big 5' species ($n = 214$) were more commonly identified than 'Safari 8' species ($n = 97$). The 'Big 13' cohort aggregated these responses ($n = 311$).

'Big 5'.

Tourists ($n = 214$) identified elephant ($n = 94$, 44%) and lion ($n = 77$, 36%), more often than the remaining three species: leopard ($n = 37$, 17%), rhino ($n = 4$, 2%), and buffalo ($n = 2$, 1%) ($\chi^2 = 162.68$, df = 4, $p < .001$) (Figure 4.2a).

'Safari 8'.

Tourists ($n = 97$) selected giraffe ($n = 48$, 50%) more often than the remaining twelve species: 13 (13%) identified cheetah, 13 (13%) identified zebra, 7 (7%) identified warthog, 6 (6%) identified wildebeest, 4 (4%) identified baboon, 4 (4%) identified hippo, and 2 (3%) identified hyena ($\chi^2 = 129.23$, df = 7, $p < .001$) (Figure 4.2b).

'Big 13'.

When the 'Big 5' and 'Safari 8' cohorts were aggregated to create the 'Big 13' ($n = 311$) (Figure 4.2c), the following response rates were observed: elephant 93 (30%), lion 78 (25%), giraffe 50 (16%), leopard 37 (12%), cheetah 13 (4%), zebra 13 (4%), warthog 6 (2%), wildebeest 6 (2%), baboon 3(1%), buffalo 3 (1%), hippo 3 (1%), hyena 3 (1%), and rhino 3 (1%) ($\chi^2 = 477.57$, df = 12, $p < .001$) (Figure 4.2c).

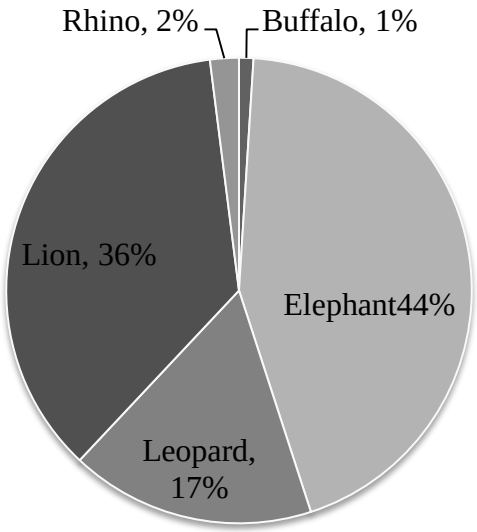


Figure 4.2. Percent of species within wildlife cohort identified by tourists as one with which they connected
Figure 4.2a. 'Big 5' (*N* = 214)

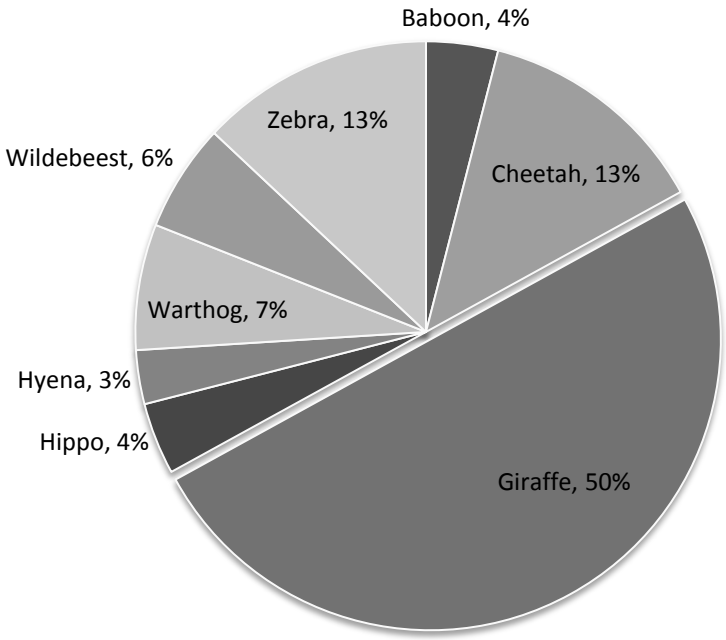


Figure 4.2b. 'Safari 8' (*N* = 97)

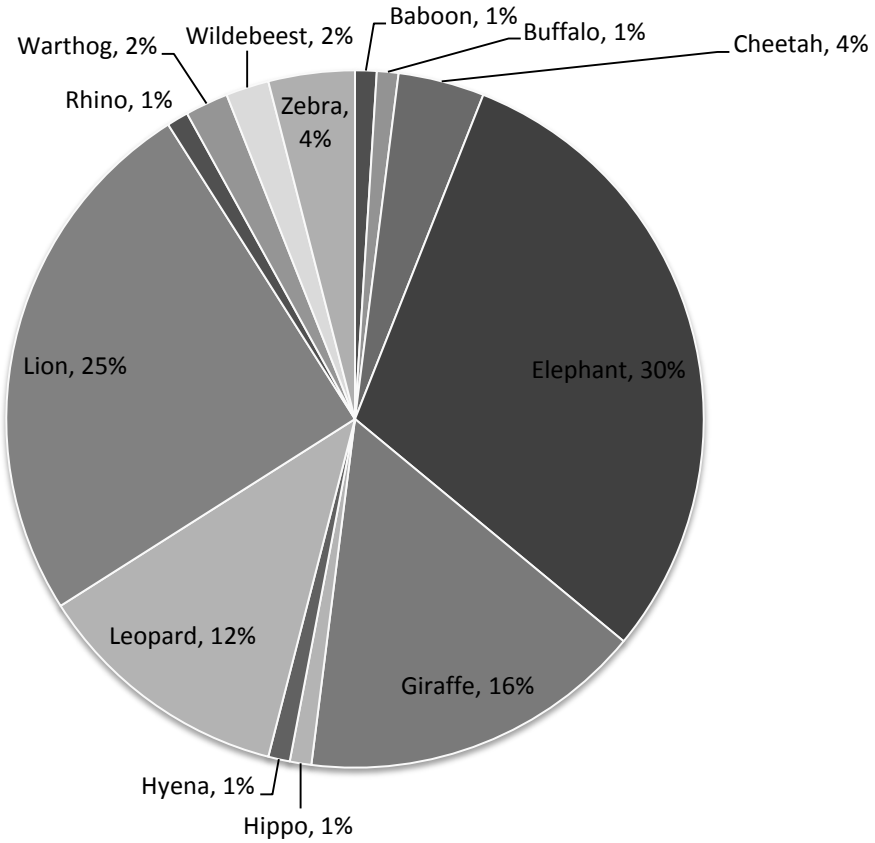


Figure 4.2c. 'Big 13' (*N* = 311)

Composite Variable Scores

Composite variables were generated to assess if wildlife cohorts were capable of generating flagship responses. Additional composite variables were created to measure the influence of the viewing experience on flagship responses. Responses were on a 9-point Likert scale.

'Big 5'.

Mean scores for viewing experience composite variables: species characteristics (α = .78) 6.14 $\pm$ 1.48; trip characteristics (α = .80) 5.88 $\pm$ 1.83. Mean scores for flagship response composite variables: Conservation Caring (α = .89) 6.04 $\pm$ 1.63; species oriented behaviors (α = .88) 3.83 $\pm$ 1.96; biodiversity oriented behaviors (α = .86) 4.64 $\pm$ 1.88 (Table 4.1).

'Safari 8'.

Mean scores for viewing experience composite variables: species characteristics (α = .86) 4.91 $\pm$ 1.80; trip characteristics (α = .74) 5.41 $\pm$ 1.81. Mean scores for flagship response composite variables: Conservation Caring (α = .89) 5.60 $\pm$ 1.74; species oriented behaviors (α = .91) 3.99 $\pm$ 1.92; biodiversity oriented behaviors (α = .86) 4.74 $\pm$ 1.81 (Table 4.1).

'Big 13'.

Mean scores for viewing experience composite variables: species characteristics (α = .83) 5.76 $\pm$ 1.66; trip characteristics (α = .79) 5.73 $\pm$ 1.84. Mean scores for flagship response composite variables: Conservation Caring (α = .89) 5.90 $\pm$ 1.68; species oriented behaviors (α = .89) 3.88 $\pm$ 1.94; biodiversity oriented behaviors (α = .86) 4.67 $\pm$ 1.86 (Table 4.1).

Table 4.1. *Composite variable and item means by wildlife cohort*

Composite variable and items [a]	'Big 5' (*N* = 214) Mean (SD)	'Safari 8' (*N* = 97) Mean (SD)	'Big 13' (*N* = 311) Mean (SD)
Species attributes	**6.14 ± 1.44[a]**	**4.91 ± 1.80[b]**	**5.76 ± 1.66[c]**
I understood this animal's behaviors.	6.34 ± 1.74[a]	5.52 ± 1.96[b]	6.09 ± 1.84[a]
I understood this animal's emotions.	5.73 ± 1.90[a]	4.47 ± 2.34[b]	5.34 ± 2.13[a]
I felt empathy for this animal because of its emotions.	5.70 ± 2.21[a]	4.79 ± 2.48[b]	5.41 ± 2.33[a,b]
This animal displayed human qualities.	5.61 ± 2.25[a]	4.13 ± 2.36[b]	5.15 ± 2.38[a]
This animal was intelligent.	7.33 ± 1.66[a]	5.61 ± 2.12[b]	6.79 ± 1.98[c]
Trip attributes	**5.88 ± 1.83 [a]**	**5.41 ± 1.81 [a]**	**5.73 ± 1.44[a]**
I was able to photograph this animal.	7.98 ± 1.83[a]	7.59 ± 2.0 [a]	7.86 ± 1.90[a]
I was able to get very close to this animal.	7.58 ± 2.01[a]	7.11 ± 2.14[a]	7.43 ± 2.06[a]
This animal paid attention to me.	5.06 ± 2.79[a]	4.72 ± 2.97[a]	4.96 ± 2.85[a]
I made eye contact with this animal.	5.45 ± 3.02[a]	4.46 ± 3.04[b]	5.14 ± 3.06[a,b]
I directly interacted with this animal.	3.32 ± 2.42[a]	3.18 ± 2.54[a]	3.28 ± 2.45[a]
Conservation caring	**6.04 ± 1.63 [a]**	**5.60 ± 1.74 [a]**	**5.90 ± 1.68 [a]**
This species has as much right to exist as any human being.	7.65 ± 2.05[a]	7.10 ± 2.16[a]	7.48 ± 2.10[a]
Ensuring this species' survival is my highest priority.	5.39 ± 2.32[a]	4.94 ± 2.19[a]	5.25 ± 2.28[a]
My emotional sense of well-being will be severely diminished by the extinction of this species.	6.25 ± 2.16[a]	6.04 ± 2.34[a]	6.18 ± 2.22[a]
I need to learn everything I can about this species.	5.31 ± 2.14[a]	4.84 ± 2.38[a]	5.16 ± 2.22[a]
I would protest this site if I learned of the mistreatment of this animal.	6.60 ± 2.01[a]	5.97 ± 2.29[a]	6.40 ± 2.12[a]
I will alter my lifestyle to help protect this species.	5.00 ± 2.09[a]	4.45 ± 2.42[a]	4.83 ± 2.21[a]
My connection to this animal has increased my connection to the species as a whole.	6.05 ± 2.08[a]	5.49 ± 2.32[a]	5.88 ± 2.17[a]
Wildlife protection must be society's highest priority.	6.05 ± 2.40[a]	5.96 ± 2.57[a]	6.02 ± 2.44[a]

Species oriented behaviors	**3.83 ± 1.96[a]**	**3.99 ± 1.92[a]**	**3.88 ± 1.94[a]**
I will donate up to $75 to "adopt" this animal at this site.	4.34 ± 2.62[a]	4.36 ± 2.40[a]	4.345 2.55[a]
I will make a charitable contribution up to $150 to help purchase habitat in the wild for this species.	4.16 ± 2.50[a]	4.11 ± 2.30[a]	4.14 ± 2.43[a]
I will become a member of an organization committed to protecting this species, within the next 6 months.	3.62 ± 2.29[a]	3.70 ± 2.16[a]	3.65 ± 2.25[a]
I will volunteer at an event designed to help the conservation of this species, within the next 6 months.	3.32 ± 2.33[a]	3.73 ± 2.28[a]	3.45 ± 2.32[a]
Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal.	3.14 ± 2.34[a]	3.54 ± 2.20[a]	3.26 ± 2.30[a]
I would write a letter/sign a petition to a government official supporting the protection of this species.	4.43 ± 2.72[a]	4.52 ± 2.4 [a]	4.46 ± 2.64[a]
Biodiversity oriented behaviors	**4.64 ± 1.88[a]**	**4.74 ± 1.81[a]**	**4.67 ± 1.86[a]**
Even if I never return, I will provide on-going financial support to this site.	3.36 ± 2.21[a]	3.43 ± 2.18[a]	3.38 ± 2.20[a]
If asked, I would donate as much as $50 to help protect a species I've never heard of.	3.34 ± 2.31[a]	3.74 ± 2.31[a]	3.47 ± 2.32[a]
I will endorse public policy that severely restricts future growth & development in order to protect wildlife.	5.42 ± 2.56[a]	5.44 ± 2.30[a]	5.43 ± 2.48[a]
Elected officials' views on wildlife will be a major factor in my voting.	5.11 ± 2.36[a]	5.18 ± 2.47[a]	5.13 ± 2.39[a]
Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation.	5.96 ± 2.20[a]	5.89 ± 2.03[a]	5.94 ± 2.14[a]

Notes. [a] Rated as agreement on 9 point Likert scale (1 = strongly disagree, 9 = completely agree). Means in the same row that do not share superscripts differ at $p < .05$. Post-hoc tests performed using Bonferroni adjustment.

Differences in Composite Variable & Item Means across Wildlife Cohorts

The only composite variable to display a significant difference between wildlife cohorts was species attributes ($F(2, 619) = 19.70$, $p < 0.01$) (Tables 4.1 & 4.2). Bonferroni adjusted post-hoc tests reveal that all three cohorts differ at the $p < .05$ level. The 'Big 5' cohort has the highest species attribute score (6.14 ± 1.44), followed by 'Big 13' (5.76 ± 1.66), then 'Safari 8' (4.91 ± 1.80).

ANOVAs with Bonferroni adjusted post-hoc tests were also performed for each item across wildlife cohorts (denoted by superscripts in Table 4.1). Significant differences were observed for each item in species characteristics ($p < .05$). Additionally, the item, 'I made eye contact with this animal', in trip characteristics, differed across cohorts ($p < .05$). All remaining items for all composite variables did not differ across cohorts.

Table 4.2. *ANOVA and post-hoc results across wildlife cohorts for composite variables*

Composite variable	*df*	*F*	*p*	Wildlife cohort	Mean (SD)
Species attributes	2,619	19.70	p < .01	'Big 5'	6.14 ± 1.44 [a]
				'Safari 8'	4.91 ± 1.80 [b]
				'Big 13'	5.76 ± 1.66 [c]
Trip attributes	2,619	2.16	NS		
Conservation Caring	2,619	2.30	NS		
Species oriented behaviors	2,619	0.22	NS		
Biodiversity oriented behaviors	2,619	0.097	NS		

Notes. Means in the same column that do not share superscripts differ at $p < .05$. Post-hoc tests performed using Bonferroni adjustment.

Test of Model Fit and Invariance

Structural equation modeling was used to assess the influence of the viewing experience composite variables on flagship responses, as well as the role of Conservation Caring on pro-conservation behaviors. Models were tested on each cohort as well as across all three cohorts.

Individual cohort models.

A preliminary path model was generated for each wildlife cohort. Fit indices for each model are acceptable representations of the data (Table 4.3) (Byrne, 2008). As the path model was acceptable for each cohort, a baseline configural model was generated, and found to produce acceptable fit indices (Table 4.3). Lastly, a baseline structural model was generated and tested against the baseline configural model to check for metric and structural invariance across the three cohorts. The structural model shows an acceptable fit (CFI = .93; SRMR = .058; RMSEA = .12). The test for metric and structural invariance revealed no harm in fit relative to the configural model ($\Delta SB\chi^2$ $p > .05$) (Table 4.3); and measurement and parameter estimates are deemed equivalent across cohorts (Table 4.3). These data support metric and structural invariance across flagship cohorts.

Ability of Wildlife Cohorts to Generate Flagship Responses

Fit indices for the model ($SB\chi^2 = 115.69$ (*29*), $p < .05$; CFI = .93; NNFI = 0.91; SRMR = .058; RMSEA = .12) indicate the model is an acceptable representation of the relationships present in the data (Kline, 2005; Marsh et al., 2004). The model in Figure 4.3 represents how the factors species and trip attributes influence Conservation Caring, which in turn predicts a willingness to engage in pro-conservation behaviors.

The factor 'Species attributes' ('Big 5' $\beta = .42$, $p < .05$; 'Safari 8' $\beta = .52$, $p < .05$; 'Big 13' $\beta = .57$, $p < .05$) is a moderate predictor of Conservation Caring. 'Trip attributes' ('Big 5' $\beta = .14$, $p < .05$; 'Safari 8' $\beta = .060$, $p > .05$; 'Big 13' $\beta = .16$, $p < .05$) is a weak predictor of Conservation Caring. Conservation Caring is a strong predictor of species oriented behaviors ('Big 5' $\beta = .59$, $p < .05$; 'Safari 8' $\beta = .70$, $p < .05$; 'Big 13' $\beta = .69$, $p < .05$). Species oriented behaviors is a very strong predictor of biodiversity oriented behaviors ('Big 5' $\beta = .79$, $p < .05$; 'Safari 8' $\beta = .81$, $p < .05$; 'Big 13' $\beta = .72$, $p < .05$). Tests constraining all direct effects across cohorts reveal no significant differences in β values.

The model accounts for 26% (R^2 'Big 5'), 31% (R^2 'Safari 8'), and 44% (R^2 'Big 13') of the variance in Conservation Caring; 34% (R^2 'Big 5'), 49% (R^2 'Safari 8'), and 48% (R^2 'Big 13') of the variance in species oriented behavior; and 63% (R^2 'Big 5'), 66% (R^2 'Safari 8'), and 52% (R^2 'Big 13') of the variance in biodiversity oriented behavior. Tests constraining the disturbances of Conservation Caring, species oriented behavior and biodiversity oriented behavior across populations reveal R^2 values are not significantly different. The R^2 values are relatively high, and provide support for the predictive validity of the model (Kline, 2005; Noar, 2003).

Table 4.3. *Path model fit indices and metric invariance testing outcomes across wildlife cohorts*

Model	CFI [a]	NNFI [a]	SRMR	RMSEA [a]	SBχ^2 (*df*) [a]	Δ SBχ^2 (Δ *df*) [b]
Path model for wildlife cohorts						
'Big 5'	.92	.83	.053	.17	36.67* (5)	
'Safari 8'	.92	.84	.047	.19	23.10* (5)	
'Big 13'	.92	.84	.047	.19	23.10* (5)	
Metric invariance models						
Configural model	.92	.84	.050	.18	109.84* (15)	
Structural invariance	.93	.91	.058	.12	115.69* (29)	5.90 (14) $p > .05$

Notes. [a] robust statistics; [b] difference calculated using the Satorra-Bentler Scaled Chi-square adjusted difference test (Satorra & Bentler, 2001); CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardized Root Mean Squared Residual; RMSEA = Root Mean Square Error of Approximation; SBχ^2 = Satorra-Bentler Scaled Chi-Square; *df* = degrees of freedom; * $p < .05$

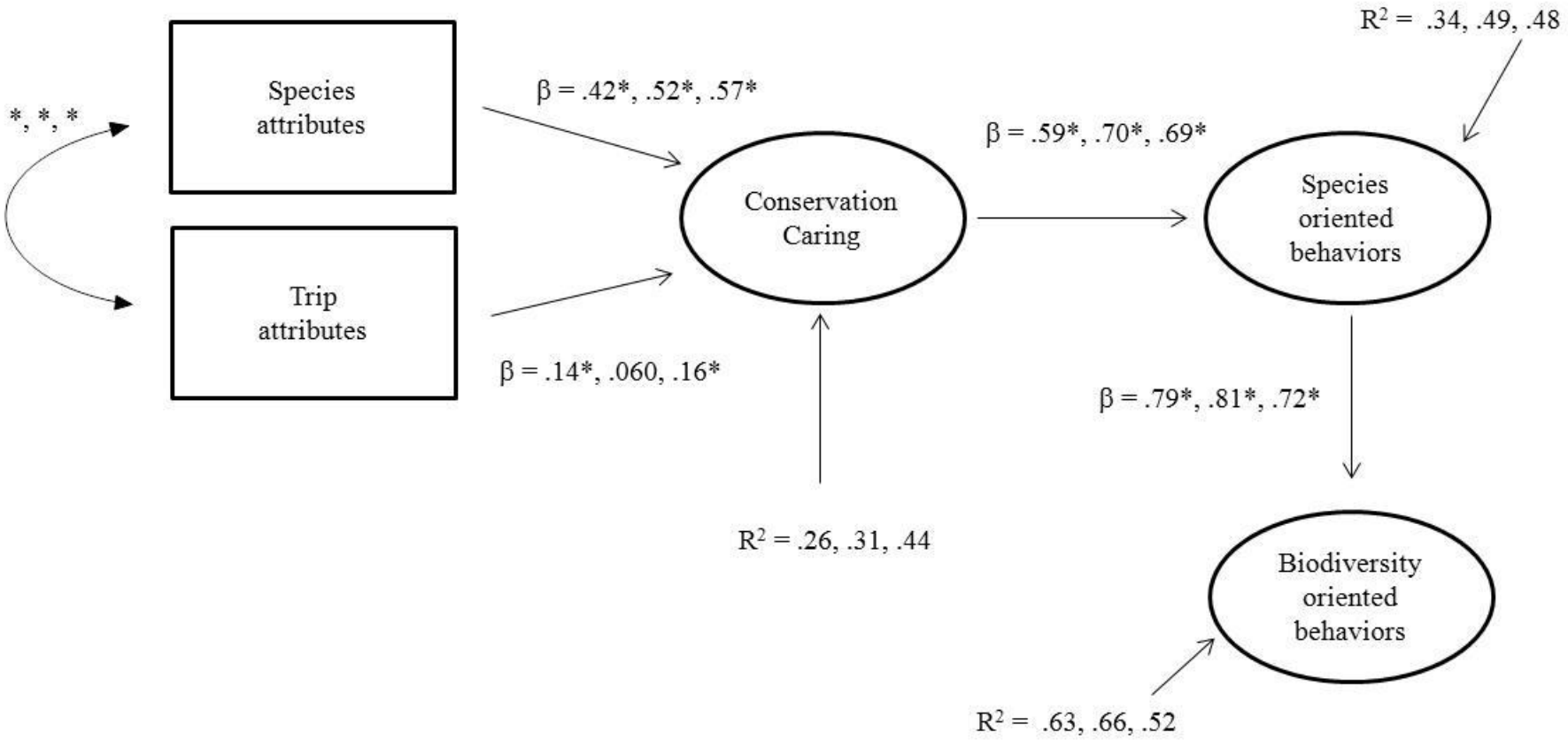


Figure 4.3. Path model predicting pro-conservation behavioral intent
Notes. Values reported for 'Big5', 'Safari 8', and 'Big 13', respectively; all measurements robust; * $p < .05$; β = standardized parameter estimates; R^2 = explained variance. CFI = .93; NNFI = 0.91; SRMR = .058; RMSEA = .12; SBχ^2 (*df*) = 115.69 (29), $p < .05$

Discussion

The goals of this study were to determine a) if tourists formed an emotional connection with any of the 'Big 5' species, b) if the 'Big 5' cohort is capable of producing flagship responses, and c) if other wildlife cohorts can produce flagship responses, and if these responses are different from the 'Big 5'. By addressing these objectives conservation outcomes from ecotourism could be improved.

Tourists' Connection to 'Big 5' Species

When asked to identify the species they formed a connection with, 69% of tourists identified a 'Big 5' species. This is contrary to findings from Boshoff, Landman, Kerley, and Bradfield (2007) who found tourists were not interested in 'Big 5' species. Examination of Figure 4.2a shows that 80% of responses were for elephant and lion. Furthermore, rhino and buffalo account for extremely few responses. The implication of a hierarchy within the 'Big 5' bears further investigation. This may suggest a certain level of over commercialization (Tremblay, 2002) and potential flagship fatigue (Bowen-Jones & Entwistle, 2002) for 'Big 5' species.

One possible explanation for the dominance of elephant and lion, and the scarcity of rhino and buffalo, may be found by examining the β values for species and trip attributes. Elephants and lions contain many of the attributes recognized for contributing to charisma, whereas rhinos and buffalo do not. Thus the strength of the influence of species attributes (i.e. charisma) could account for the dominance and scarcity of responses for these species.

The influence of trip attributes (i.e. nature of the experience) may also provide a parallel explanation for these responses. For sites included in this study, rhino sightings are less common, and often at great distances. Conversely buffalo sightings are extremely common. Such aspects of the viewing experience run counter to stimulating a connection to a species. On the other hand, encounters with lions and elephants tend to include experiences known to stimulate a connection. So, as with species attributes, trip attributes can account for the observed responses.

Ability of the 'Big 5' to Generate Flagship Responses

The model in Figure 4.3 shows that direct exposure to the 'Big 5' cohort strongly predicts all three requirements for flagship status. Viewing these species in the wild has a strong influence on tourists' levels of Conservation Caring. As this represents cognitive and affective components of empathy, 'Big 5' species are capable of raising concern. However, concern is only an intermediate dependent variable. Stimulating pro-conservation behaviors is the goal of flagship species.

To that end, the 'Big 5' performs extremely well. The model accounts for 34% of the variance in species oriented behaviors and shows Conservation Caring is a strong predictor. Thus, the desire to perform behaviors specific to the conservation of 'Big 5' species can be positively influenced by viewing these animals in the wild. However, the gold standard for a flagship species is its ability to drive action for biodiversity in general.

Once again, the 'Big 5' shows a strong ability to deliver this flagship response. A tourists' willingness to engage in biodiversity oriented behaviors is extremely well predicted from their willingness to perform species oriented behaviors. One criticism of flagships is the lack of conservation outcomes delivered for biodiversity in general (Caro,

Engilis, Fitzherbert, & Gardner, 2004). This study shows that a connection to 'Big 5' species (primarily elephants and lions) is a strong predictor of tourists' willingness to engage in pro-conservation behaviors that extend beyond the species of interest. However, a certain amount of caution is necessary when interpreting the exceptionally high beta and R^2 values.

First, as seen in Table 4.1, the overall score for the individual items and the composite variable are moderate. Second, tourists may have an increased perceived ease of execution relative to species oriented behavior items. This could increase the willingness to perform the behavior on the basis of ease versus conservation intent. Lastly, this factor is the terminus of the model. As such, it has the most predictors and is capable of capturing a greater amount of variance relative to other factors.

Thus, in addressing the second objective of this study, direct exposure to the traditional East African 'Big 5' can produce the requisite flagship responses in tourists. The connection formed with a species accounts for a moderate amount of the variance and is a strong predictor of species oriented behaviors, which in turn strongly predicts biodiversity oriented behaviors. Data supporting the ability of these species to drive biodiversity oriented behaviors are some of the more encouraging results and add to the qualitative findings of Ballantyne et al. (2010).

Species Preferences & Flagship Responses from Additional Wildlife Cohorts

Unlike the 'Big 5', species preference responses for the 'Safari 8' are more evenly distributed. Seven species account for 50% of responses, and giraffe accounts for 50%. When these responses are aggregated to the 'Big 13' elephant (30%), lion (25%), giraffe

(16%), and leopard (12%) emerge as the most dominant species (Figures 4.2b & c). Future research could investigate implications of replacing buffalo with giraffe as part of the traditional 'Big 5'.

Both cohorts were capable of producing all flagship responses. Conservation Caring and willingness to engage in species and biodiversity oriented behaviors were all predicted by the model (Figure 4.3). As with 'Big 5', the ability of theses cohorts to stimulate action beyond themselves to biodiversity in general is an extremely promising result. The results from all three cohorts support the continued use of flagships to elicit tourist-based conservation outcomes. The success of these additional eight species in generating flagship responses also supports exploring a wider recruitment of East African species as potential flagships.

Comparisons of Flagship Outcomes across Wildlife Cohorts

All three wildlife cohorts produced equivalent levels of responses for Conservation Caring, and species and biodiversity oriented behaviors (Tables 4.1 & 4.2, Figure 4.3). The lack of differences between flagship cohorts suggests any of the thirteen species can produce the three flagship responses. These findings extend the work of Lindsey et al. (2007) and have implications for broadening specialized tours, educational offerings, and conservation initiatives. Additionally, the high degree of similarity between these cohorts offers provocative inferences for even more species to be assessed for flagship status and contradicts Kerley et al. (2003).

Increasing the number of species serving as flagships could also extend the conservation benefits to a greater diversity of habitats. One criticism of flagships is the

lack of broad habitat protection (Andelman & Fagan, 2000). As this study has shown, tourists have positive intentions to engage in pro-conservation behaviors that benefit the species and biodiversity. Increasing the diversity of species eligible for flagship status would, by default, encompass more niches thereby extending the conservation benefits to more habitats.

The only difference observed between cohorts was for species characteristics. Responses for the 'Safari 8' cohort were significantly lower than those for 'Big 5' and 'Big 13' (Tables 4.1 & 4.2). However, for all cohorts, 'species characteristics' was a significant predictor of Conservation Caring, and there was no difference in the strength of the predictive ability (β values) between cohorts (Figure 4.3).

While these differences did not affect flagship outcomes, they do suggest further research is needed before new species are recruited to serve as flagships. Specifically, the lower responses for the 'Safari 8' may suggest tourists are not relating to traditional elements of charisma. Investigating alternative facets of charisma would be advised to help solidify the role of a species as a flagship.

Conclusion

This study provides support for the continued role of flagship species as a conservation tool, particularly associated with tourism. Data show the positive influence a connection to a species plays in driving pro-conservation behavior for a species and biodiversity in general. This addresses a concern well-articulated by Vining (2003)

> We do not know whether caring for individual animals translates to caring about species, any more than we know that caring for an individual human leads to caring for humanity. We cannot assume that caring for species leads to caring for ecosystems. And perhaps more problematic, we have made little progress

> understanding how caring for ecosystems might lead to conservation behavior. (p. 96)

The equivalent success of 'Big 5' and 'Safari 8' species suggests ecotourism related conservation initiatives could also be applied to a wider assemblage of East African wildlife. Conservationists could work more closely with tour operators to develop specialized offerings that appeal to more experienced tourists. Additionally, tourists' willingness to engage in biodiversity oriented behaviors could strengthen conservation efforts for lesser visited sites.

Although the data from this study support the potential positive contributions of ecotourism to conservation, it should be noted that behavior intentions were measured and not behaviors themselves. Several studies have shown that ecotourists' intentions and/or behaviors do not persist after three months (Powell & Ham, 2008; Powell, Kellert, & Ham, 2008; L. Smith et al., 2011). One solution to overcoming this challenge is to provide direct opportunities for action on-site. In so doing, protected areas may be able to capitalize on the strong connection tourists express for a species and their willingness to support conservation actions.

CHAPTER 5

SYNTHESIS AND CONCLUSION

The overarching purpose of this dissertation was to investigate if flagship-based wildlife tourism could deliver conservation outcomes. Three studies were designed to assess (a) how viewing charismatic megafauna influenced tourists' connection to a species and pro-conservation behaviors, and (b) how to operationalize tourists' emotional connection to a species via the factor of Conservation Caring. These studies fill a recognized gap in the literature concerning conservation outcomes from wildlife tourism, and extend the understanding of how tourists connect with species by analyzing the viewing experience from a holistic perspective.(Durrell & Mallinson, 1998; Saunders et al., 2006; Valentine & Birtles, 2004; Wright, 1998). Additionally, this dissertation provides the first empirical evidence of the influence of Conservation Caring on pro-conservation behaviors. Findings also provide a framework to guide the selection of species to serve as potential flagships.

Study Summaries

Comparison of safari and zoo tourists: Influence of experiential elements on conservation outcomes, and comparisons between types of experiences (Chapter 2).

Although several studies have investigated wildlife tourists' attitudes and preferences (Boshoff, Landman, Kerley, & Bradfield, 2008; Duffus & Dearden, 1990; Hammitt, Dulin, & Wells, 1993), as well as the uses of interpretation (Ham & Weiler, 2002; Orams, 1996), few have examined how the wildlife viewing experience, as a whole, influences conservation outcomes. This study extended the literature by exploring

how the experiential elements of Existing Connection to Wildlife, and Species and Trip Attributes affected Conservation Caring and pro-conservation behaviors. Additionally, this study explored if the type of experience (*in situ* vs. *ex situ*) produced different levels of conservation outcomes.

Results indicated that experiential elements of the charismatic wildlife viewing experience significantly predicted Conservation Caring, but had little direct effect on pro-conservation behaviors. Conservation Caring was found to be a significant predictor of species and biodiversity oriented behaviors, and Species Oriented Behaviors was a strong predictor of Biodiversity Oriented Behaviors. These finding suggest that viewing charismatic wildlife can positively influence tourists' connection to a species. Furthermore, it is only through an increased connection to a species that tourists expressed a willingness to engage in pro-conservation behaviors. Moreover, this connection is a strong predictor of both behavior types and provides managers a previously unknown step to elicit behavior change.

Recognizing the role of Conservation Caring as an intermediary to behavior may better inform conservation campaigns seeking to elicit specific behaviors in tourists. In that, rather than seeking to influence participation in a behavior directly, managers could seek to build tourists' emotional connections with species of concern. By raising levels of this predictor of behavior, managers may achieve higher levels of behavior adoption. Additionally, data suggest that biodiversity oriented behaviors, i.e. behaviors not linked to any one species, are at the end of the causal chain of the viewing experience. Again, this would suggest that managers seeking to advocate adoption of this type of behavior,

in tourists, first raise levels of Conservation Caring. Moreover, as species oriented behaviors are significant predictors of biodiversity behaviors, linking such behaviors to biodiversity action may provide synergistic support with Conservation Caring to improve behavior uptake.

One of the broader implications for wildlife tourism is found in the comparison of the *in situ* and *ex situ* viewing experiences. Levels for Conservation Caring and pro-conservation behaviors did not differ between settings. This suggests that viewing species in the wild or captivity produces an equivalent response in tourists. This is very encouraging because it provides empirical support for the equivalency of the role zoos and natural areas can play in delivering tourist-based conservation outcomes. These findings contradict Moscardo (2008), and provide a preliminary framework to integrate tourist-based conservation outcomes between zoos and natural areas more fully.

Developing Conservation Caring as a factor: Zoo visitors' emotional connection to wildlife and the influence of the zoo experience (Chapter 3).

Recently, zoos have begun using charismatic species, such as gorillas and polar bears, as 'animal ambassadors,' in hopes of creating a connection with visitors, which ultimately leads to a better understanding of conservation issues (Shani & Pizam, 2010). This is reflective, in part, of 21st century zoos' role as conservation centers (Rabb, 1995). In this role, zoos serve as portals for the public to understand the meaning of conservation by incorporating their own behaviors into the framework of conservation (Dickie et al., 2007). However, there is little work addressing if viewing zoo animals influences visitors' emotional connection with wildlife. Additionally there is little evidence to suggest a connection to wildlife could influence a willingness to engage in pro-

conservation behaviors. This study filled a gap in the literature by (a) operationalizing Conservation Caring to measure zoo visitors' connection to wildlife, and (b) assessing its influence on behaviors.

Conservation Caring consisted of affective and cognitive items, which aligned it more with empathy than cognitive awareness. Results supported the validity of Conservation Caring as a robust measure of visitors' connection to a species. The factor performed equally well across multiple settings and in different contexts. Although this study was not designed as a scale development initiative, data do support the current operationalization as a foundational framework for full scale development. The benefits to such a scale draw initial support from the influence of Conservation Caring on pro-conservation behaviors.

Conservation Caring was shown to be a strong predictor of species oriented behaviors. This is encouraging news for zoos because whereas other studies have shown that interpretation or exhibit design can influence visitors' connection to nature, few have investigated links to behavior (Fraser, Gruber, & Condon, 2007; Gwynne, 2007; Woods, 2002). The results from this study extend the literature and provide the first empirical support for the positive influence of a connection to wildlife on pro-conservation behavioral intent, following a zoo visit. Zoos advocating visitors adopt specific behaviors, designed to benefit a particular species, may improve success rates by stimulating an emotional connection to that species.

Interestingly, Conservation Caring was not found to be a major influence on biodiversity oriented behaviors. However, species oriented behaviors were a significant

predictor of biodiversity behaviors. In identifying this gap between an emotional connection with a species, and visitors' willingness to support generalized biodiversity enhancing behaviors, zoos may be better equipped to tailor messages. Specifically, linking biodiversity oriented actions back to species with which visitors have formed a connection may improve the likelihood of adoption.

East African flagships: Assessing ability of thirteen species to generate flagship responses in tourists (Chapter 4).

Several studies have investigated the role of African charismatic megafauna (often the 'Big 5') on visitor motivations, attitudes, and preferences (Beh & Bruyere, 2007; Okello & Yerian, 2009; Preston & Fuggle, 1987). Additionally, numerous authors have examined ecologically-based conservation outcomes associated with African flagships (Kaltenborn, Bjerke, Nyahongo, & Williams, 2006; Western, 1987; Williams, Burgess, & Rahbek, 2000). However, very few studies have addressed the expected conservation outcomes associated with African flagship species, as explicitly defined by the literature, which are raising awareness and action (Heywood, 1995; Mittermeier, 1986; Simberloff, 1998). This study filled a critical gap in the literature by assessing if African megafauna were capable of generating flagship responses in wildlife tourists. Specifically, the research examined if the traditional East African 'Big 5', as well as eight additional species – often assumed by tourists as part of the 'Big 5' – were able to stimulate an emotional connection and willingness to participate in pro-conservation behaviors within tourists. These conservation outcomes are by definition the basis of flagship status.

Results supported the role of the 'Big 5' cohort to stimulate both types of flagship responses in tourists. Additionally, the 'Safari 8' cohort was able to generate both flagship responses. Furthermore, there were no differences in levels of response, or predictive abilities between cohorts. Therefore, while the 'Big 5' was capable of generating flagship responses, eight additional charismatic megafauna species generated an equivalent response in tourists. Additionally, both cohorts were capable of stimulating a significant willingness to support biodiversity oriented behaviors.

These findings provide crucial, and heretofore missing, empirical support for the conservation benefits of flagship-based wildlife tourism. Specifically, tourists were capable of forming an emotional connection to thirteen African species, and this connection was strongly predictive of pro-conservation behaviors. Furthermore, results imply that many additional species may be potential flagships. Purposively selecting additional species as flagships could provide a tourism boost to sites lacking traditional charismatic species, and a wider distribution of conservation benefits across species. Both of these issues are shortfalls attributed to flagship-based wildlife tourism (Roe et al., 1997).

One of the broader implications for the use of flagships in wildlife tourism is derived from results pertaining to willingness to engage in biodiversity oriented behaviors. The ability for a flagship species to stimulate action beyond itself is more of a hoped for, than expected outcome (Caro & Girling, 2010). This study has extended the flagship literature by finding empirical support for tourists' willingness to engage in biodiversity oriented behaviors, as a result of the emotional connection they formed with

an African species. This can provide managers a useful tool to extend conservation benefits to a greater array of species and a wider diversity of habitats. Achieving these outcomes can help fulfill the long-term sustainability of wildlife tourism.

Major Themes & Management Implications

Overall, the findings of this dissertation have found strong potential for the ability of *in situ* and *ex situ* flagship-based wildlife tourism to deliver meaningful conservation outcomes. These outcomes are substantiated by three major themes that emerged from the data. The first theme was the identification and role of Conservation Caring as a factor. Conservation Caring was found to be a robust measure of the cognitive and affective dimensions of the connection visitors form with a species. Understanding tourists' connection to wildlife is a foundational element of wildlife tourism and answers the call to fill a widely recognized gap in the literature (Manfredo, 2008; Myers et al., 2004; Perkins, 2010; Waylen et al., 2009). The factor showed a high degree of reliability across *in situ* and *ex situ* venues (Chapters 2 & 4), as well as when applied in different contexts (Chapter 3). Conservation Caring also displayed strong content, criterion, and construct validity. The strengths of reliability and validity measures are important criteria in factor development (DeVellis, 2003).

Conservation Caring was also found to be a significant intermediary and predictive step to willingness to engage in pro-conservation behaviors. The identification of this step in the pathway to behaviors is a new and important contribution to the literature. Furthermore, the models assessed in this dissertation (Chapters 2 – 4) suggest that experiential elements, which included items such as interpretation, proximity to the

animal, and species' morphology do not directly predict behaviors, only Conservation Caring. This would suggest that the wildlife tourism experience can directly influence Conservation Caring, and in so doing influence behaviors.

The identification of Conservation Caring also provides a powerful new tool to improve the wildlife tourism experience, and assess a species' flagship potential. Awareness of the intermediary role of a connection to an animal on pro-conservation behaviors can better inform interpretation, exhibit design, and *in situ* viewing options. Managing such elements of the experience to improve the potential of visitors forming a connection to an animal could improve the long-term success of behavior adoption campaigns. Additionally, Conservation Caring could be assessed on a species-by-species basis. Developing baseline levels of tourists' ability to connect with a species could better inform flagship-based campaigns and broaden marketability of lesser-known species.

The second major theme to emerge was the equivalency of wildlife tourism experiences (Chapter 2). A comparison of *in situ* and *ex situ* wildlife tourism venues revealed no meaningful differences in levels of Conservation Caring and willingness to engage in pro-conservation behaviors. These findings provide empirical support for the potential of either venue to produce equivalent levels of tourist-based conservation outcomes and extends the literature which has discussed the theoretical role of captive and wild venues, potential linkages between sites, and frameworks for improving conservation outcomes (Catibog-Sinha, 2008; Green & Higginbottom, 2000; Reynolds & Braithwaite, 2001; Tribe, 2004).

These findings also provide support for the continued role of captive and wild venues, as both types are capable of stimulating conservation outcomes. Developing intentional linkages between *in situ* and *ex situ* sites could provide a powerful new framework to address the challenges associated with wildlife tourism. Such linkages have the potential to capitalize on the types of animal interactions and differences in visitor typologies , as well as address the ephemeral nature of visitors' emotional state (Kellert, 1996; L. Smith, Broad, et al., 2008; Woods, 2002). In so doing, conservation campaigns could be more tailored for specific audiences, target specific behaviors, and linked to broader biodiversity concerns. Such actions could improve the delivery of conservation benefits.

The third theme to emerge from the data was the potential for a wide array of species to be eligible for flagship status. The studies presented in Chapters 2 – 4 allowed tourists to freely identify the species with which they connected. The study in Chapter 4 grouped tourist responses *a posteriori*. As responses were freely chosen, the results imply that when tourists form an emotional connection to any species, that connection strongly predicts a willingness to engage in pro-conservation behaviors. As such, the expected flagship responses of increased levels of connection and action could be supported for a myriad of species.

These results provide encouraging news for wildlife tourism venues. The precedent for flagship selection has been large, charismatic mammals and birds (Home, Keller, Nagel, Bauer, & Hunziker, 2009; Sergio, Newton, Marchesi, & Pedrini, 2006; Tisdell et al., 2005). This can often cause tourists and conservation efforts to overlook

venues without such species. The data from this dissertation extends the flagship tourism literature by providing empirical support for a greater diversity of species to resonate with tourists.

Results may provide alternative strategies for sites lacking traditional flagship species. Because tourists identified such a wide diversity of species, sites may be better positioned to promote a greater array of on-site species than previously thought. This could allow *in situ* sites to create specialized niche markets and experiences. *Ex situ* sites could expand the role of underutilized portions of their collections. Furthermore, incorporating elements of the first two themes (i.e. influencing levels of Conservation Caring, and linking *in/ex situ* campaigns) could improve delivery of tourism-based conservation benefits to a wider range of biodiversity.

The final management recommendation relates to the existing literature recommendations for eliciting tourists' participation in desired behaviors (Peake et al., 2009; L. Smith et al., 2010; Swanagan, 2000). The greatest levels of success occur when tourists are presented with the opportunity for immediate execution of the desired action. There are two reasons for this. First, it provides tourists an example of the behavior and an entry point for participation (Ham et al., 2007; Powell & Ham, 2008). Second, it capitalizes on the emotional state achieved during the experience (Arnould & Price, 1993; DeMares & Krycka, 1998; Lukas & Ross, 2005). Thus, tourists are given the immediate opportunity to help objects of newly found affection. It is therefore strongly recommended that wild and captive wildlife tourism venues seeking to promote pro-

conservation behavior adoption in their visitors provide on-site opportunities for participation.

Limitations

The results of this dissertation provide new and needed empirical support for conservation outcomes associated with wildlife tourism. However, several limitations temper the generalizability of the findings. First, tourists were asked which species they connected with during the experience. As such, responses were restricted to observed species. Viewing different species may alter results. Second, behavioral intentions and not actual behaviors were assessed. Therefore, results represent tourists' *willingness to engage in behaviors* and not actual behavior performance. Third, items for Conservation Caring may be further refined to provide a more detailed analysis of the factor. This could alter the strength of the connection and/or its influence on behavior. Fourth, surveys were collected at the end of the 'high season.' This may represent a different subset of wildlife tourists, relative to other seasonal visitation patterns. Fifth, the experience was measured at a very coarse level. A more detailed comparison may reveal significant differences not detected by this survey instrument.

Future Research

The majority of this dissertation was exploratory in nature. While the results provide a substantial contribution to the field, there is a great deal of refinement required. Foremost would be to test longitudinal participation in actual behaviors. Additionally, Conservation Caring could be developed as a scale. This could provide a more nuanced understanding of visitors' emotional connection to wildlife. The role of specific species

also remains unresolved. Utilizing SEM sample comparison methods models could be tested across species to create rank orders of flagship abilities. Finally, all of these hypotheses should be tested with resident populations. Natural areas are under increasing pressure from local populations and trans-boundary threats. Understanding neighboring communities' connection to wildlife, and perceptions of tourism and conservation, as well as how those differ from tourist populations could provide new paradigms in conservation management.

APPENDICES

Appendix A

Survey Instrument Administered to Post-Visit *In Situ* Wildlife Tourists

CLEMSON
PARKS, RECREATION AND TOURISM MANAGEMENT

Hello, my name is Jeffrey Skibins and I am a graduate student at Clemson University, USA. I am conducting a study of wildlife tourism. Your responses are confidential and anonymous. Results from this study will be reported in broad statistical terms, such as, 20% of respondents were male. Thank you very much for participating.

After you complete this survey, please return it to the field researcher.

Please give your opinion of the following statements about wildlife viewing. A '5' indicates you neither agree nor disagree.	Strongly Disagree ← → Strongly Agree								
1. I actively seek opportunities to view wildlife.	1	2	3	4	5	6	7	8	9
2. I feel a deep connection to wildlife.	1	2	3	4	5	6	7	8	9
3. I am highly motivated by the need to interact with wildlife.	1	2	3	4	5	6	7	8	9
4. I enjoy viewing all types of wildlife.	1	2	3	4	5	6	7	8	9
5. I spend a lot of time learning about wildlife.	1	2	3	4	5	6	7	8	9
6. I have a responsibility to do all I can to protect wildlife.	1	2	3	4	5	6	7	8	9

Please tell us about your current level of participation in conservation activities.

7. How many conservation organizations are you a member of?_____

8. Within the past year, how many times have you donated to a conservation organization?_____

9. Within the past 5 years, how many vacations have you taken to view wildlife?_____

For the following questions, please think about the animal that you formed the strongest connection with during your visit. Indicate if the following factors helped you form your connection with this animal. A '5' indicates you neither agree nor disagree.

10. What animal did you form the strongest connection with during your visit?_____

I connected with this animal because:	Strongly Disagree								Strongly Agree
11. I understood this animal's behaviors.	1	2	3	4	5	6	7	8	9
12. I understood this animal's emotions.	1	2	3	4	5	6	7	8	9
13. I felt empathy for this animal because of its emotions.	1	2	3	4	5	6	7	8	9
14. This animal displayed human qualities.	1	2	3	4	5	6	7	8	9
15. This animal was intelligent.	1	2	3	4	5	6	7	8	9
16. I was able to photograph this animal.	1	2	3	4	5	6	7	8	9
17. I was able to get very close to the animal.	1	2	3	4	5	6	7	8	9
18. This animal paid attention to me.	1	2	3	4	5	6	7	8	9
19. I made eye contact with this animal.	1	2	3	4	5	6	7	8	9
20. I directly interacted with this animal.	1	2	3	4	5	6	7	8	9
21. I shared the experience with people who are important to me.	1	2	3	4	5	6	7	8	9
22. There was time for personal reflection.	1	2	3	4	5	6	7	8	9
23. Seeing this animal makes me think of its habitat.	1	2	3	4	5	6	7	8	9
24. This animal is a symbol of its country's culture.	1	2	3	4	5	6	7	8	9
25. Information obtained from educational materials/signs.	1	2	3	4	5	6	7	8	9
26. Information obtained from Interpreters/Park Rangers.	1	2	3	4	5	6	7	8	9
27. The quality of interpretation was exceptionally high.	1	2	3	4	5	6	7	8	9

28. Was the animal you formed the strongest connection with during your visit also the animal you were most looking forward to seeing?

❑ Yes ❑ No: The animal I was most looking forward to seeing was_____

29. Do you feel that your connection was with: (please check all that apply)

❑ The individual animal ❑ The species in general ❑ All the wildlife you saw during your visit

Based on the animal you formed the strongest connection with during your visit please answer the following questions. A '5' indicates you neither agree nor disagree.	Strongly Disagree								Strongly Agree
30. My level of compassion for this species has dramatically increased because of my visit.	1	2	3	4	5	6	7	8	9
31. I am deeply concerned about the care and well-being of this animal at this site.	1	2	3	4	5	6	7	8	9
32. This species has as much right to exist as any human being.	1	2	3	4	5	6	7	8	9
33. Ensuring this species' survival is my highest priority.	1	2	3	4	5	6	7	8	9
34. My emotional sense of well-being will be severely diminished by the extinction of this species.	1	2	3	4	5	6	7	8	9
35. I need to learn everything I can about this species.	1	2	3	4	5	6	7	8	9
36. I would protest this site if I learned of the mistreatment of this animal.	1	2	3	4	5	6	7	8	9
37. I will alter my lifestyle to help protect this species.	1	2	3	4	5	6	7	8	9
38. My connection to this animal has increased my connection to the species as a whole.	1	2	3	4	5	6	7	8	9
39. Wildlife protection must be society's highest priority.	1	2	3	4	5	6	7	8	9

As a result of the strength of the connection you formed with this animal during your visit, please indicate how likely it would be for you to perform the following actions.	Extremely Unlikely				Neutral				Extremely Likely
40. I would support entrance fees at this site being $10 - $25 higher, if the extra money were used for the care and survival of this species.	1	2	3	4	5	6	7	8	9
41. I will donate up to $75 to "adopt" this animal at this site.	1	2	3	4	5	6	7	8	9
42. I will make a charitable contribution up to $150 to help purchase habitat in the wild for this species.	1	2	3	4	5	6	7	8	9
43. I will become a member of an organization committed to protecting this species, within the next 6 months.	1	2	3	4	5	6	7	8	9
44. I will volunteer at an event designed to help the conservation of this species, within the next 6 months.	1	2	3	4	5	6	7	8	9
45. Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal.	1	2	3	4	5	6	7	8	9
46. I would write a letter/sign a petition to a government official supporting the protection of this species.	1	2	3	4	5	6	7	8	9
47. Even if I never return, I will provide on-going financial support to this site.	1	2	3	4	5	6	7	8	9
48. If asked, I would donate as much as $50 to help protect a species I've never heard of.	1	2	3	4	5	6	7	8	9
49. I will endorse public policy that severely restricts future growth & development in order to protect wildlife.	1	2	3	4	5	6	7	8	9
50. Elected officials' views on wildlife will be a major factor in my voting.	1	2	3	4	5	6	7	8	9
51. Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation.	1	2	3	4	5	6	7	8	9

52. Please list all the areas you saw wildlife during your visit. (for example: national parks, protected areas, sanctuaries etc.)

53. In which area(s) did you see the animal you formed the strongest connection with?

54. Do you own a pet?

❑ No ❑ Yes: what kind(s)?_____

53. May we contact you for a brief follow up survey?

❑ No ❑ Yes: please provide email address_____

54. What is your country of residence?_____

If U.S. citizen, what is your ZIP code?_____

55. What is your gender?

❑ Male ❑ Female

56. In what year were you born?_____

57. How many years of formal schooling have you completed? *(please circle only one)*

5 6 7 8	9 10 11 12	13 14 15 16	17 18 19 20+
(Elementary)	(High School)	(College)	(Graduate Study)

58. What is your race/ethnicity?_____

Thank you for your help! If you have questions regarding this survey, please contact:
Jeffrey Skibins • Clemson University • 01-630-234-5909 • skibins@clemson.edu

Researcher use only

Location:	Date:	Time:	Number:

Appendix B

Survey Instrument Administered to Post-Visit *Ex Situ* Wildlife Tourists

Hello, my name is Jeffrey Skibins and I am a graduate student at Clemson University. I am conducting a study of wildlife tourism. Your responses are confidential and anonymous. Results from this study will be reported in broad statistical terms, such as, 20% of respondents were male. Thank you very much for participating.

After you complete this survey, please return it to the field researcher.

Please give your opinion of the following statements about wildlife viewing. A '5' indicates you neither agree nor disagree.	Strongly Disagree ⟷								Strongly Agree
1. I actively seek opportunities to view wildlife.	1	2	3	4	5	6	7	8	9
2. I feel a deep connection to wildlife.	1	2	3	4	5	6	7	8	9
3. I am highly motivated by the need to interact with wildlife.	1	2	3	4	5	6	7	8	9
4. I enjoy viewing all types of wildlife.	1	2	3	4	5	6	7	8	9
5. I spend a lot of time learning about wildlife.	1	2	3	4	5	6	7	8	9
6. I have a responsibility to do all I can to protect wildlife.	1	2	3	4	5	6	7	8	9

Please tell us about your current level of participation in conservation activities.

7. How many conservation organizations are you a member of?_____

8. Within the past year, how many times have you donated to a conservation organization?_____

For the following questions, please think about the animal that you formed the strongest connection with during your visit. Indicate if the following factors helped you form your connection with this animal. A '5' indicates you neither agree nor disagree.

9. What animal did you form the strongest connection with during your visit?_____

I connected with this animal because:	Strongly Disagree ⟷								Strongly Agree
10. I understood this animal's behaviors.	1	2	3	4	5	6	7	8	9
11. I understood this animal's emotions.	1	2	3	4	5	6	7	8	9
12. I felt empathy for this animal because of its emotions.	1	2	3	4	5	6	7	8	9
13. This animal displayed human qualities.	1	2	3	4	5	6	7	8	9
14. This animal was intelligent.	1	2	3	4	5	6	7	8	9
15. I was able to photograph this animal.	1	2	3	4	5	6	7	8	9
16. I was able to get very close to the animal.	1	2	3	4	5	6	7	8	9
17. This animal paid attention to me.	1	2	3	4	5	6	7	8	9
18. I made eye contact with this animal.	1	2	3	4	5	6	7	8	9
19. I directly interacted with this animal.	1	2	3	4	5	6	7	8	9
20. I shared the experience with people who are important to me.	1	2	3	4	5	6	7	8	9
21. Seeing this animal makes me think of its habitat.	1	2	3	4	5	6	7	8	9
22. Information obtained from educational materials/signs.	1	2	3	4	5	6	7	8	9
23. Information obtained from Interpreters/Park Rangers.	1	2	3	4	5	6	7	8	9
24. The quality of interpretation was exceptionally high.	1	2	3	4	5	6	7	8	9

25. Was the animal you formed the strongest connection with during your visit also the animal you were most looking forward to seeing?

❑ Yes ❑ No: The animal I was most looking forward to seeing was_____

26. Do you feel that your connection was with: (please check all that apply)

❑ The individual animal ❑ The species in general ❑ All the wildlife you saw during your visit

Based on the animal you formed the strongest connection with during your visit please answer the following questions. A '5' indicates you neither agree nor disagree.	Strongly Disagree ⟷ Strongly Agree								
27. My level of compassion for this species has dramatically increased because of my visit.	1	2	3	4	5	6	7	8	9
28. I am deeply concerned about the care and well-being of this animal at this site.	1	2	3	4	5	6	7	8	9
29. This species has as much right to exist as any human being.	1	2	3	4	5	6	7	8	9
30. Ensuring this species' survival is my highest priority.	1	2	3	4	5	6	7	8	9
31. My emotional sense of well-being will be severely diminished by the extinction of this species.	1	2	3	4	5	6	7	8	9
32. I need to learn everything I can about this species.	1	2	3	4	5	6	7	8	9
33. I would protest this site if I learned of the mistreatment of this animal.	1	2	3	4	5	6	7	8	9
34. I will alter my lifestyle to help protect this species.	1	2	3	4	5	6	7	8	9
35. My connection to this animal has increased my connection to the species as a whole.	1	2	3	4	5	6	7	8	9
36. Wildlife protection must be society's highest priority.	1	2	3	4	5	6	7	8	9

As a result of the <u>strength of the connection</u> you formed with this animal during your visit, please indicate how likely it would be for you to perform the following actions.	Extremely Unlikely			Neutral					Extremely Likely
37. I would support entrance fees at this site being $10 - $25 higher, if the extra money were used for the care and survival of this species.	1	2	3	4	5	6	7	8	9
38. I will donate up to $75 to "adopt" this animal at this site.	1	2	3	4	5	6	7	8	9
39. I will make a charitable contribution up to $150 to help purchase habitat in the wild for this species.	1	2	3	4	5	6	7	8	9
40. I will become a member of an organization committed to protecting this species, within the next 6 months.	1	2	3	4	5	6	7	8	9
41. I will volunteer at an event designed to help the conservation of this species, within the next 6 months.	1	2	3	4	5	6	7	8	9
42. Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal.	1	2	3	4	5	6	7	8	9
43. I would write a letter/sign a petition to a government official supporting the protection of this species.	1	2	3	4	5	6	7	8	9
44. Even if I never return, I will provide on-going financial support to this site.	1	2	3	4	5	6	7	8	9
45. If asked, I would donate as much as $50 to help protect a species I've never heard of.	1	2	3	4	5	6	7	8	9
46. I will endorse public policy that severely restricts future growth & development in order to protect wildlife.	1	2	3	4	5	6	7	8	9
47. Elected officials' views on wildlife will be a major factor in my voting.	1	2	3	4	5	6	7	8	9
48. Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation.	1	2	3	4	5	6	7	8	9

49. Do you own a pet?

❑ No ❑ Yes: what kind(s)?_____

50. May we contact you for a brief follow up survey?
❑ No ❑ Yes: please provide email address_____

51. What is your zip code?_____
If non-U.S. citizen, what is your country of residence?_____

52. What is your gender?
❑ Male ❑ Female

53. In what year were you born?_____

54. How many years of formal schooling have you completed? *(please circle only one)*

5 6 7 8	9 10 11 12	13 14 15 16	17 18 19 20+
(Elementary)	(High School)	(College)	(Graduate Study)

55. What is your race/ethnicity? *(please check all that apply)*

❑ American Indian or Alaska Native
❑ Asian
❑ Black or African American
❑ Hawaiian or Pacific Islander
❑ Hispanic or Latino/Latina
❑ White
❑ Other

56. Which category best describes your total annual household income in U.S. dollars? *(please check only one)*

❑ Less than $24,999
❑ $25,000 to $34,999
❑ $35,000 to $49,999
❑ $50,000 to $74,999
❑ $75,000 to $99,999
❑ $100,000 to $149,999
❑ $150,000 to $199,999
❑ $200,000 or more
❑ Do not wish to answer

Thank you for your help! If you have questions regarding this survey, please contact:
Jeffrey Skibins • Clemson University • 630-234-5909 • skibins@clemson.edu

Researcher use only

Location:	**Date:**	**Time:**	**Number:**

Appendix C

Survey Instrument Administered to Pre-Visit *Ex Situ* Wildlife Tourists

CLEMSON
PARKS, RECREATION AND TOURISM MANAGEMENT

Hello, my name is Jeffrey Skibins and I am a graduate student at Clemson University, USA. I am conducting a study of wildlife tourism. Your responses are confidential and anonymous. Results from this study will be reported in broad statistical terms, such as, 20% of respondents were male. Thank you very much for participating.

After you complete this survey, please return it to the field researcher.

Please give your opinion of the following statements about wildlife viewing. A '5' indicates you neither agree nor disagree.	Strongly Disagree ← → Strongly Agree								
1. I actively seek opportunities to view wildlife.	1	2	3	4	5	6	7	8	9
2. I feel a deep connection to wildlife.	1	2	3	4	5	6	7	8	9
3. I am highly motivated by the need to interact with wildlife.	1	2	3	4	5	6	7	8	9
4. I enjoy viewing all types of wildlife.	1	2	3	4	5	6	7	8	9
5. I spend a lot of time learning about wildlife.	1	2	3	4	5	6	7	8	9
6. I have a responsibility to do all I can to protect wildlife.	1	2	3	4	5	6	7	8	9

Please tell us about your current level of participation in conservation activities.

7. How many conservation organizations are you a member of?_____

8. Within the past year, how many times have you donated to a conservation organization?_____

9. The animal I am most excited to see on my trip is:_____

Thinking about the animal you just listed, please answer the following questions. A '5' indicates you neither agree nor disagree.	Strongly Disagree ⟷ Strongly Agree								
10. I am deeply concerned about the protection and well-being of this animal.	1	2	3	4	5	6	7	8	9
11. This species has as much right to exist as any human being.	1	2	3	4	5	6	7	8	9
12. Ensuring this species' survival is my highest priority.	1	2	3	4	5	6	7	8	9
13. My emotional sense of well-being will be severely diminished by the extinction of this species.	1	2	3	4	5	6	7	8	9
14. I need to learn everything I can about this species.	1	2	3	4	5	6	7	8	9
15. I would protest a site if I learned of the mistreatment of this animal.	1	2	3	4	5	6	7	8	9
16. I will alter my lifestyle to help protect this species.	1	2	3	4	5	6	7	8	9
17. My connection to this animal has increased my connection to the species as a whole.	1	2	3	4	5	6	7	8	9
18. Wildlife protection must be society's highest priority.	1	2	3	4	5	6	7	8	9

As a result of the <u>strength of the connection</u> you have with this animal, please indicate how likely it would be for you to perform the following actions.	Extremely Unlikely ⟷ Neutral ⟷ Extremely Likely								
19. I would support park entrance fees being $10 - $25 higher, if the extra money were used for the care and survival of this species.	1	2	3	4	5	6	7	8	9
20. I will donate up to $75 to "adopt" this animal at a park or protected area.	1	2	3	4	5	6	7	8	9
21. I will make a charitable contribution up to $150 to help purchase habitat in the wild for this species.	1	2	3	4	5	6	7	8	9
22. I will become a member of an organization committed to protecting this species, within the next 6 months.	1	2	3	4	5	6	7	8	9
23. I will volunteer at an event designed to help the conservation of this species, within the next 6 months.	1	2	3	4	5	6	7	8	9
24. Before my visit is over, I will sign up for a mailing/email to receive updates about the care and conservation of this animal.	1	2	3	4	5	6	7	8	9
25. I would write a letter/sign a petition to a government official supporting the protection of this species.	1	2	3	4	5	6	7	8	9
26. Even if I never return, I will provide on-going financial support to Tanzanian national parks.	1	2	3	4	5	6	7	8	9
27. If asked, I would donate as much as $50 to help protect a species I've never heard of.	1	2	3	4	5	6	7	8	9
28. I will endorse public policy that severely restricts future growth & development in order to protect wildlife.	1	2	3	4	5	6	7	8	9
29. Elected officials' views on wildlife will be a major factor in my voting.	1	2	3	4	5	6	7	8	9
30. Even when they are more expensive or harder to find, I will buy groceries & products that support wildlife conservation.	1	2	3	4	5	6	7	8	9

31. Do you own a pet?

❑ No ❑ Yes: what kind(s)?_____

32. What is your country of residence?_____

If U.S. citizen, what is your ZIP code?_____

33. What is your gender?

❑ Male ❑ Female

34. In what year were you born?_____

35. How many years of formal schooling have you completed? *(please circle only one)*

5 6 7 8	9 10 11 12	13 14 15 16	17 18 19 20+
Elementary	High School	College	Graduate Study

36. What is your race/ethnicity?_____

Thank you for your help! If you have questions regarding this survey, please contact:

Jeffrey Skibins • Clemson University • 630-234-5909 • skibins@clemson.edu

Researcher use only

Location:	**Date:**	**Time:**	**Number:**

Appendix D

Respondent Demographics

Table D.1 *Gender of survey respondents*

Gender	*In Situ*		*Ex Situ*	
	Total	Percentage	Total	Percentage
Male	194	49%	159	39%
Female	199	51%	250	61%

Table D.2 *Country of origin of survey respondents*

Country of Origin	*In Situ* (*n* = 390)		*Ex Situ* (*n* = 393)	
	Total	Percentage	Total	Percentage
United States of America	85	21.8%	378	96.2%
England	58	14.9%	0	0
France	40	10.3%	0	0
Tanzania	25	6.4%	0	0
Netherlands	28	7.2%	0	0
Canada	22	5.6%	3	0.8%
Germany	17	4.4%	1	0.3%
Switzerland	16	4.1%	0	0
Australia	11	2.8%	1	0.3%
Sweden	11	2.8%	0	0
Italy	10	2.6%	0	0
Spain	10	2.6%	0	0
Belgium	7	1.8%	0	0
Austria	6	1.5%	0	0
India	5	1.3%	0	0
Norway	5	1.3%	0	0
Finland	4	1.0%	0	0
Singapore	4	1.0%	0	0
Brazil	3	0.8%	0	0
Luxembourg	3	0.8%	0	0
Denmark	2	0.5%	0	0
Ireland	2	0.5%	0	0
Latvia	2	0.5%	0	0
Russia	2	0.5%	0	0
South Africa	2	0.5%	1	0.3%
China	1	0.3%	4	1.0%
Czech Republic	1	0.3%	0	0
Hungary	1	0.3%	0	0
Israel	1	0.3%	0	0
Kenya	1	0.3%	0	0
Morocco	1	0.3%	0	0
Puerto Rico	1	0.3%	0	0
Thailand	1	0.3%	0	0
Turkey	1	0.3%	0	0
Uganda	1	0.3%	0	0
Mexico	0	0	2	0.5%
Dominican Republic	0	0	1	0.3%
Japan	0	0	1	0.3%
Venezuela	0	0	1	0.3%

Table D.3 *Tanzanian northern circuit sites visited by respondents*

Site	Total	Percentage
Arusha N.P.	35	11%
Lake Manyara N.P.	43	13%
Mount Kilimanjaro N.P.	13	5%
Ngorongoro Crater C.A.	51	16%
Serengeti N.P.	90	28%
Tarangire N.P.	71	22%
Other sites	17	5%

Note. Percentages calculated on provided responses (n = 320).

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