CAPTIVE NATURE: EXPLORING THE INFLUENCE OF ZOOS ON VISITOR WORLDVIEW, KNOWLEDGE, AND BEHAVIOR

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DEDICATION

This thesis is dedicated to everyone educating and inspiring others to act sustainably.

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by

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ABSTRACT: Zoological parks are a complex place of human-animal, animal-environment, and human-environment interactions; as the global population becomes more urbanized, zoos are one of the only places in which urban dwellers can learn about and experience the "natural" world. Zoos now act as key purveyors of public conservation education, shaping the ways in which visitors understand and situate themselves within local and global conservation issues and natural environments. Zoos educate the public on these and other topics through the implementation of informal education programs (IEPs) within their institutions, but the effectiveness of these programs in positively altering visitor knowledge, attitude, and behavioral is not well understood. Through interviews, questionnaires, and participant observation conducted at the San Antonio Zoo I explored (1) how zoo visitors interacted with and perceived of a zoo animal species, the white-cheeked gibbon; (2) how zoo visitor perceptions of animals were influenced by visitor-animal interactions in various zoo contexts (e.g. within and outside of IEPs); (3) what zoo visitors were learning about animal and conservation within these various contexts; and (4) the effectiveness of an IEP in inspiring zoo visitors to actively participate in conservation initiatives. I framed my inquiry into visitor and zoo animal relationships within post-humanist theories and explored visitor perceptions of animals, the environment, and conservation through the lens of virtualism, resulting in a novel view of visitor experience and learning within the zoo

setting. In this thesis I discuss the results of this research and their implications for conservation education efforts within zoos.

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INTRODUCTION

"In the end, we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught."
- Baba Dioum (1968)

Zoological parks,[1] henceforth called zoos, are a complex place of human-animal, animal-environment, and human-environment interactions in which visitors are encouraged to engage with "exotic"[2] animals in a controlled captive setting. As the global population becomes more urbanized, zoos are often one of the only places in which urban dwellers can learn about and experience the "natural"[3] world. Zoos have thus become a critical player in global conservation efforts and now act as key purveyors of public conservation education (Falk *et al*. 2007; Knowles 2003; Rabb 2004). In order to make conservation education efforts more effective it is important to understand how visitors are learning about zoo animals, global conservation, and the complexity of ecosystems within the zoo setting.

As we face an ever-growing global extinction crisis, conservation education is more crucial than ever before; it is estimated that between 1-5% of plant and animal species will go extinct every decade due to habitat loss, over hunting, climate change, pollution, and other anthropogenic changes to the environment (Stork 2009). Conservation organizations around the world are working to prevent the extinction of these species but these efforts are futile without the support of local and global communities. Yet it is often difficult to garner support for conservation efforts, especially in cities where people do not have direct contact with wild animals and natural environments.

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[1] After Lyles (2001), in this study a "zoo" is defined as any permanent establishment housing animals which is open to the public and whose goal is to provide education and recreation opportunities.
[2] In this context, "exotic" refers to "animals [or plants] that have not been domesticated for use by humans in agriculture or as pets; it also connotes that the wild animal [or plant] is from another region of the world" (Lyles 2001)
[3] Here, "natural" indicates any environment that people *perceive* as unaffected by or outside of the sphere of human influence.

People living in urban areas often find it difficult to emotionally connect with animals and environments with which they have no personal experience. Thus, many zoos now focus on offering visitors memorable encounters with animals and simulated natural habitats. The dedication of zoos to educating the public about wild animals and natural environments is reflected in the accreditation requirements of The Association of Zoos and Aquariums (AZA), which now requires that conservation play a major role in the missions of member institutions (AZA 2013). In response to these accreditation requirements many zoos have implemented zoo-sponsored informal education programs (IEPs) which aim to enhance the conservation knowledge, attitudes, and behaviors of the visiting public (Luebke and Grajal 2011; Ogden, Gentile, and Revard 2004; Patrick *et al*. 2007), and conservation education themes are prevalent in many zoo mission statements (Patrick *et al.* 2007). Unfortunately, studies assessing the effectiveness of zoo-sponsored conservation education efforts have produced conflicting results (Falk *et al*. 2007; Kellert and Dunlap 1989; Lukas and Ross 2005 (but see Marino *et al.* 2010)]. This may be because zoo visitors experience zoo animals in different contexts with many (if not most) visitor-animal interactions occurring outside of any IEP provided by the zoo. It is therefore necessary to examine all of the contexts in which zoo visitors are engaging with and learning about animals and the environment and what zoo visitors are learning and experiencing in these various contexts.

To address this problem, I investigated the ways in which zoo visitors experience and interact with a primate species, the white-cheeked gibbon (*Nomascus leucogenys*), both within and outside of a zoo-sponsored IEP at The San Antonio Zoo and Aquarium in San Antonio, TX. Numerous conservation-oriented programs have been implemented at this institution within the last five years, all of which aim to engage the visiting public in conservation efforts by

increasing public awareness of local and global conservation issues (San Antonio Zoo Annual Report 2012). I examined the circumstances under which zoo visitors are engaging with these animals, both within and outside of the IEP, as well as assessed what visitors are learning and experiencing during these encounters. Finally, I examined whether participation in a structured informal education program provided by the zoo (e.g. the "*Education Connections*" program) alters zoo visitor attitudes toward and knowledge of the white-cheeked gibbon and gibbon conservation.

Research Questions

This study had two overarching goals: (1) to gain insight into how zoo visitors are interacting with and experiencing zoo animals in the zoo environment; and (2) to better understand the role that zoos play in educating the public about animals, conservation, and ecosystems. To accomplish these goals the following research questions (henceforth abbreviated as RQs) were identified at the beginning of this study and will be addressed in depth in the following chapters:

1. RQ1: How do zoo visitors experience and interact with white-cheeked gibbons when they are engaged in a semi-structured IEP (the "*Education Connection"*) and when they are not?
2. RQ2: What are zoo visitors learning about white-cheeked gibbons and other animals in the zoo environment within and outside of the IEP and how does this information shape or alter the visitor's perception of the natural world?
3. RQ3: Does a visit to the zoo alter zoo visitors' attitudes toward animals, specifically primates?
4. RQ4: Does participation in a zoo-sponsored IEP alter zoo visitors' attitudes toward animals, specifically primates?
5. RQ5: Does participation in an IEP affect the conservation-oriented actions of zoo visitors?

Thesis Overview

This thesis is divided into five chapters, preceded by this introduction and followed by a conclusion. In chapter one I discuss the history of human/animal relationships within the zoo

context by tracing the evolution of zoos from menageries to modern conservation-focused institutions. I then explore the three theoretical perspectives that have guided this research by conducting a literature review of: (1) the anthropological view on human/animal relationships; (2) the theory of virtualism and how it can be applied to conservation education; and (3) the literature on informal education from both anthropological and visitor studies perspectives. Chapter two focuses on the methods used to conduct this research as well as a discussion on the methodological challenges faced during this research.

In chapters three and four I present and interpret the results of this research. In chapter three I examine the results of the IEP on visitor knowledge, attitudes, and conservation-oriented behaviors (RQ2, RQ3, RQ4, RQ5). Chapter four focuses on the zoo visitor experience with animals both within and outside the context of the IEP (RQ1, RQ2) and how the zoo visitor experience can be understood through the lens of the "virtualist" paradigm (RQ1). In the conclusion, I provide a summation of the results, the implication of this research for zoo education programming, and future directions for research in this area.

CHAPTER ONE: UNDERSTANDING RELATIONSHIPS, REALITIES, AND EDUCATION IN ZOOS: A LITERATURE REVIEW

Zoos are fascinating microcosms of cultural human, animal, and environmental relationships offering visitors the unique opportunity to explore species and habitats they would not otherwise experience. In addition to offering recreational opportunities, zoos aim to instill an appreciation of the natural world by educating visitors on local and global conservation issues through informal educational programs (IEPs). Thus zoos act to simultaneously inform visitor perceptions of the natural world and educate visitors on conservation issues facing these species and habitats. I conducted this research to gain insight into how zoo visitors interact with and experience animals in the zoo environment and to understand the role zoos play in educating the public about animals, conservation, and ecosystems.

In this chapter, I briefly outline the history of zoos in Western culture. I then discuss the three bodies of literature in which I situated this research. First, I discuss the ways in which human-animal relationships are perceived in Western culture; I examine human-animal interactions as discussed in anthropological literature, specifically the ways in which human relationships with captive animals have been understood and how insights in this field can help us understand the ways in which humans and animal interact in the zoo context. Next, I outline the concept of "virtualism" and discuss how this theoretical framework can help us understand the ways in which humans frame their interactions with and attitudes towards zoo animals, the environment, and conservation initiatives. Finally, I discuss the effects of IEPs on program participants and explore the factors which have been found to influence their effectiveness.

A brief history of zoos: From menageries to pillars of conservationism

The role of the zoo within Western society has changed dramatically since the Classic period, during which time captive animals were often used in blood sports to reaffirm the

strength and superiority of man over beast and the holding of exotic "trophy" animals signaled personal power and prestige (Baratay and Hardouin-Fugier 2002; Coates 2004; Hancocks 2001). This mentality remained prevalent throughout the mid-1800s when royal and wealthy upper-class families held extensive exotic animal collections in private menageries which continued to be used for personal entertainment and as living symbols of power and wealth (Acampora 2010; Baratay and Hardouin-Fugier 2002; Hancocks 2001; Knowles 2003). This began to change during the late nineteenth and early twentieth centuries when zoos became important places not only for animal tourism (Beardsworth and Bryman 2001; Desmond 1999) but for environmental education (Falk *et al.* 2007).

As private menageries were transformed into public institutions they offered middle and lower class individuals the opportunity to experience foreign animals for the first time (Baratay and Hardouin-Fugier 2002). As Bartay and Hardouin-Fugier (2002) discuss, this transformation corresponded with a few dramatic cultural changes. First, social shifts in this period led to an increase in social mobility in many Western countries as increases industry led to higher standards of living and an increase in disposable income in lower and middle class families. Subsequent demands for public education resulted in an increase in educational leisure destinations and natural history museums and zoos became popular recreational destinations for members of the public. In addition to these social changes, Bartay and Hardouin-Fugier (2002) also note that more intensive globalizations during this period led to a renewed public fascination with foreign lands and zoos thus provided an opportunity for members of the public to marvel at exotic animals from exotic lands. Finally, as a trend toward urbanization continued in Western countries during the nineteenth and twentieth centuries, more people began living in cities than in rural areas (Bartay and Hardouin-Fugier 2002). This cultural shift led to an increase in public

interest in nature conservation, and parks, zoos, and other natural areas became the preferred weekend leisure destinations.

Living in urban areas limits the quantity, quality, and variety of encounters individuals can have with animals and natural areas. Not only do urban areas have a reduced number of individual plants and animals but biodiversity also decreases in these areas (McKinney 2006) which leads to a more homogenous experience of nature within cities. This means that urban dwellers will have fewer direct experiences with plants and animals in their environment, resulting in a more pronounced cognitive disconnect between humans and the environment as well as a skewed perception of animals, nature, biodiversity, and ecosystems. In order to engage urban people in local and global conservation issues, zoo educators and other conservation leaders now attempt to reconnect people with the natural world by providing animal encounters and other informal education opportunities for urbanites.

Modern zoos have taken up the mantle of conservation and conservation education and have become critical players in global conservation initiatives. In response to increasing global conservation concerns, public conservation education has become a crucial aspect of the mission of these institutions (Falk *et al.* 2007; Knowles 2003; Rabb 2004, Rabb and Saunders 2005) and conservation education programs are now requirements for institutions seeking accreditation from the Association of Zoos and Aquariums (AZA) (AZA 2013). While many people are still conflicted over the role zoos should play in society and whether animals should continue to be held in these institutions,[4] zoos have increasingly become one of the few places in which people can access and interact with living animals. Yet the nature of these interactions and the ultimate efficacy of conservation educational programming within zoos are influenced by cultural

[4] This divisive issue is outside the scope of this thesis. These arguments have been debated elsewhere: for an argument against the continuation of the Western zoo see Acampora 2010, and for an argument in favor of zoos and the maintenance of captive exotic animals see Hutchins 2003.

perceptions of human/animal relationships, visitor perceptions of animals, the environment, and conservation, the portrayal of animals and "natural" environments within the zoo context, as well as the effectiveness of the IEPs.

Human-animal interactions

Humans and animals have a rich and complex history of interaction. Since the late 1980s these interactions have been studied by scholars in many diverse disciplines, including literary and religious studies, sociology, psychology, history, geography, and psychology (Mullin 1999, Russell 2010). Within anthropology, studies of human-animal relations are often examined when trying to understand the evolution of human-animal relationships cross-culturally and across time (Lawrence 1985, Schwabe 1994; Serpell 1986). While the interactions between humans and livestock have been well studied (see Clutton-Brock 1999), interactions between humans and captive exotic animals, or even of the dynamics between humans and domestic pets, are rare (Fox 2006). The interest in human-animal relationships, coupled with post-modernist critiques of traditional Western dichotomies such as those in traditional views of gender and identity, have led many to reexamine more traditional human-animal relationships within Western cultures.

Western perceptions of the boundaries between humans and animals have shifted dramatically over time as humans struggled to find "man's place in nature" (Huxley 1863, cited in Lawrence 1995). In both the Classical World and pre-Christian Europe humans and animals were seen as fundamentally similar, and the boundaries between "human" and "animal" were fluid (Lawrence 1995; Ritvo 1987). With the adoption of Judeo-Christian values, however, Western peoples adopted a view of human separation from and superiority over animals and the natural world, which is inherent in the teachings of Christianity (Lawrence 1995; Hancocks

2001). The cultural perception of a rigid human-animal divide was further cemented during the early eighteenth and late nineteenth centuries as the spread of Enlightenment philosophies shaped the ways in which humans defined animals and their relationship with nature (Lawrence 1995; Shea 2006). During this period, rational scientific models for understanding natural phenomenon began to replace traditional religious frameworks for understanding the natural world, as in the popular Linnaean classificatory system where animals are defined and grouped based on the difference and similarities between them (Desmond 1999; Shea 2006). Additionally, the philosophies of Rene Descartes became incredibly influential during this period. Descartes argued that there was a sharp distinction between the body and the mind, the corporeal body and the soul, the observer and the observed, and man and animals (Lawrence 1995). The influence of Cartesian thought cannot be overemphasized, as Descartes' philosophical teachings "became fundamental to the ethos of the Western world, and…they are still ingrained in [Western] culture" (Lawrence 1995:76).

This Cartesian divide persists in the "humanistic" tradition that defines Western human-animal relationships. These views led to "a shift in the relationship between humans and their fellow creatures… as a result of which people systematically appropriated power they had previously attributed to animals, and animals became significant primarily as the objects of human manipulation" (Ritvo 1987:2). Within the Western humanist epistemology human-animal interactions are strictly relationships of power in which humans continually reinforce their dominance over animals during interspecies interactions. Scholars who examine human-animal relations within this framework argue that "human contact with other animals is chiefly organized around humans' own consumption and 'needs'" (Sollund 2011:437). Most writings on human-animal interactions within the zoo context have examined these relationships as ones

of unequal power, within which humans exert their superiority over captive zoo animals. Kellert argued that

> the incarceration and exhibition of animals in zoos can perversely increase the sense of human separation and alienation from wild animals, encouraging feelings of superiority and unalterable difference. Somehow, these barriers need to be diminished and a sensitive focus on the ways in which our species destiny is inextricably linked with the welfare of nonhuman animals could help (1986, in Coe 1996:167).

The humanist framework to understanding human-animal interactions is now being questioned by the "post-humanist" viewpoint, which argues: (1) the Cartesian human-animal divide is a false dichotomy, and (2) interactions between humans and animals cannot be simply described as relationships of power inequality, but rather as relationships within which all human and nonhuman animal actors are mutually influenced and defined by other actors within the network of interaction (Haraway 2003, 2008).

In the "Companion Species Manifesto" (Haraway 2003) and "When Species Meet" (Haraway 2008), Donna Haraway argues that human-animal relationships are not solely defined by relationships of power inequality. Instead she argues that the human/animal divide that has traditionally defined human-animal interactions in the West is a false dichotomy based on an erroneous but pervasive notion of "human exceptionalism." This "human exceptionalism," what other authors may also title "speciesism" (Ryder 1970; Sollund 2011) is based on the ideas that: (1) humans are unequivocally distinct from non-human animals, (2) in their distinctness humans are superior to animals, and (3) humans always have absolute power within the human-animal relationship. Contrary to this, Haraway argues that, instead of humans being in a position of absolute power within these interactions, humans and animals are involved in relationships within which all (humans and animals) are actors influenced by one another. To describe this relationship, Haraway has suggested the concept of the "companion species," in which all

interacting 'humananimals' are considered entangled within the existence of the other. While Haraway does not deny that within these relationships there may often be an imbalance of power, she argues that we need to think outside of traditional dualisms to better understand the complexities of these relationships and the effects all actors have on the others within the humananimal network.

Though humans and animals within a zoo context certainly do not hold equal power within their engagements, it is clear that both humans and animals are affected by these encounters. Numerous studies have found that zoo animals are highly influenced by their interactions with visitors, both positively and negatively (Davey 2007; Davis, Schaffner, and Smith 2005; Hosey 2000; Mitchell *et al*. 1992), and increased controlled animal/visitor interactions have been proposed as an effective enrichment tool for captive animals (Hosey 2000; Claxton 2011). Visitors interacting with animals within the zoo can also be profoundly influenced by these interactions, indicating that animals can indeed hold some "power" over humans within these relationships.

In this research I examined the ways in which the human-animal divide and the nature of human-animal relationship are understood and altered within the zoo contexts, as well the consequences that these interactions and worldviews have on visitor attitudes towards animals and animal conservation efforts. I investigated whether zoos are a context in which humans and animals become "companion species," and whether these interactions could change the ways in which visitors perceived animals and their relationship with them during their visit.

Virtualism

In addition to exploring theories of human/animal and humananimal networks within the zoo setting, the theory of virtualism was also applied to this research. Virtualism, presented by

Carrier and Miller (1998), is defined as a person's "attempt … to make the world around us look like and conform to an abstract model of it… [and] the world is expected to transform itself in accordance with the model…" (West and Brockington 2006:609). Carrier and Miller (1998) argue that individuals create their own "virtual reality" based on personal experiences which then define the way in which people understand the world. Carrier and West write:

> [An individual's] virtual reality becomes virtualism when people forget that the virtual reality is a creature of the partial analytical and theoretical perspectives and arguments that generate it, and instead take it for the principles that underlie the world that exists and then try to make the world conform to that virtual reality (2009:7).

Therefore, virtualism is

> not just a process that occurs in people's heads. It is also a social process by which people who are guided by a vision of the world try to shape that world to bring it into conformity with their vision (Carrier and West 2009:7).

Virtualism is most often used in economic anthropology to understand the economic re-structuring that has taken place at numerous points throughout history (Carrier and Miller 1998; Swain 2006). In recent years, however, this theoretical framework has been applied to other fields including studies of ecotourism (West and Carrier 2004) and conservation management (West and Brockington 2006). West and Brockington (2006) examined the consequences of various conservation strategies, specifically the creation of protected areas as a strategy to conserve stressed environments. The creation of protected areas remains a popular conservation strategy, with conservation leaders identifying the creation of protected areas as a conservation priority despite extensive evidence that protected areas are effective in maintaining species biodiversity and populations (Geldmann et al. 2013). West and Brockington (2006) argue that this is an example of virtualism; conservation leaders want to create additional protected areas because they are structuring their expectations of the effectiveness of this strategy based on the

idealized view that protected areas are one of the most effective conservation actions. The disconnect between the reality of the effectiveness of protected areas and this "virtual reality" in which they are always successful has had serious consequences on the conservation outcomes of implemented protected areas, both financially and in terms of measured conservation success.

The framework of virtualism can likewise be applied to research on visitor-animal interactions within the zoo context, as visitors' interactions with animals are influenced by their preconceived attitudes towards animals,[5] the environment, and what it means to be "natural." The virtualism framework is also valuable when trying to understand the conflict between representations of animals within the zoo context and the conservation education goals of zoological institutions. Zoos are complex networks of human-animal-environment-institution interactions in which visitor perceptions of the human-animal relationship and an idealized view of the "natural world" are simultaneously *reinforced* by the institutions' representations of animals and environments and *problematized* through the implementation of conservation-oriented educational programs. Specifically, conservation education programs aim to alter the ways in which zoo visitors perceive their relationships with animals and the environment, while the views and expectations of zoo visitors, as well as some actions of the institutions, perpetuate the idealized image of animals living in harmony with a "pristine and natural" environment that is unblemished by human activities. In this way, zoological institutions are contributing to the creation of and maintenance of visitor virtual realities by "selling" these realities to visitors.

[5] Visitors enter the zoo with preconceived attitudes toward animals that are informed by historical and/or cultural influences and the visitors' past knowledge about specific animals. These preconceptions can either be positive or negative and can influence the ways in which individuals learn about and understand these animals. For example, historical and cultural perceptions of gorillas as fearsome and violent creatures continue to color people's attitudes toward these animals within the zoo setting and may influence the ways in which visitors feel about gorilla conservation. Additionally, visitors are drawn to socially and culturally popular animals such as zebra and giraffe, making these exhibits and talks about these animals more popular than those of species with more urgent need of conservation, such as endangered bat species or small-medium sized mammals such as duiker or fossa.

This idealized image of the animal-environment relationship is achieved and conveyed through the presentation of animals in a naturalistic enclosure setting within the broader confines of the zoo itself. While these naturalistic enclosures are built in response to better knowledge of the physical and psychological needs of captive exotic animals (Fabregas *et al*. 2012; Newberry 1995), many of the aesthetics of these enclosures, such as landscaping, size, and the type of restrictive barriers used are largely chosen for the benefit of zoo visitors. Numerous studies have shown that zoo visitors respond more positively to seeing animals housed in environments that mimic what visitors perceive to be the animals "natural" habitat (i.e. environments with extensive "wild" vegetation, minimal man-made structures, etc.); animals viewed in more free-range, naturalistic environments were perceived by visitors as more happy and playful, less stressed, and more healthy than conspecifics housed in more traditional barred cage enclosures and other settings deemed less natural (Finlay *et al.* 1988; Reade and Waran 1996; Shea 2006; Shettel-Neuber 1988).

While naturalistic enclosures are often more beneficial to animal well-being, there are circumstances under which the public's call for "naturalistic" enclosures can be detrimental. For instance, because visitors perceive man-made objects as less natural for captive animals (and therefore less desirable within the enclosure), many animal curators working within zoos will not allow visibly man-made items such as barrels of water, swings, etc. within animal enclosures that are visible to the public (*personal observation*). Yet these types of structures and enrichment opportunities are incredibly important to animal well-being, as interaction with these enrichment tools prevent animal boredom and associated psychological pathologies (which manifest as stereotypic behaviors) in captive animals (Shepherson *et al.* 1998; Shyne 2006; Swaisgood and Shepherdson 2005; Young 2008). Thus, creating the optimal living conditions for captive

animals is often measured against the ways in which the animal enclosures will be perceived by zoo visitors (Cottle *et al*. 2010; Davis 1997; Miller 2012). In these cases, the application of the idealized "virtual reality" of the environments in which animals *should* live is in direct contradiction to the reality of what is truly healthy for captive animals.

In this light, it can be seen that the naturalistic enclosures of captive animals are being shaped by a false and idealized view of animal-environment interactions. The dissonance between this abstraction of the "natural" habitat of zoo animals becomes especially evident when the life circumstances of individual zoo animals are considered. Naturalistic enclosures are built to emulate a pristine wilderness in which the animal and its conspecifics should reside. Yet these built environments are often in direct contradiction with the individual animal's experiences with their environment, as most zoo animals are now born and raised in captivity (Desmond 1999). These naturalistic enclosures also fail to represent the true state of the natural environment of zoo animals' wild counterparts, as these habitats are often heavily degraded or completely destroyed due to harmful human activities. Therefore, the expectations zoo visitors have of the proper "natural" environment of captive species is vastly different than the reality in which these captive and wild populations currently live. By visiting the zoo and viewing what visitors perceive to be the "natural" habitat for zoo animals, the false idea of these animal species eternally living within pristine environments is perpetuated. Therefore, in future instances where visitors are learning about or experiencing similar animals and/or environments (such as during conservation education programs), visitor understanding of these situations will conform to their abstract model of it, and their virtual reality will continue to be reaffirmed as an accurate understanding of the natural world.

Zoological institutions are in part responsible for selling[6] these virtual realities to visitors. The "abstraction" and "dis-embodiment" (Carrier and Miller 1998) of the animal from its "natural" environment occurs in zoos due to widely accepted policies and budgetary constraints which limit the construction and maintenance of interspecies displays which would better represent the complexities of ecosystems. Zoo visitors are presented with a simplified version of the natural world that is unrepresentative of the more complex ecosystem process, and visitors are asked to believe that the "naturalistic" enclosures which house zoo animals are true and accurate representations of the external natural environment. Yet the presentation of a virtual reality in which animals are harmoniously situated within a pristine nature is in direct contradiction with the conservation message of most zoos, which relies on the zoo successfully conveying to visitors: (1) harmful effects of human activities on the environment, (2) the fragile state of ecosystems as a whole, and (3) the pressing need for conservation of animals and the environment due to rapid environmental degradation and/or total loss. As visitors interact with animals in the zoo context, their preconceived world view of the human-animal, animal-environment, and human-environment relationships make it difficult for them to accept a conflicting reality that is offered by conservation IEPs.

While the total assessment of this conflict between zoo representations of the environment, visitor understanding of the environment, and conservation messaging was outside

[6] Here the term "selling" refers to the for-profit experience of a commercialized nature. This idea is referential to the writings of Davis (1997) and Desmond (1999). Davis argues that, in emphasizing the ways in which visitors to Sea World can "contact" nature and "cross the boundaries" between environments, the Sea World corporation brands itself as "a medium that connects customers to nature…it both continues and revives the quasi-religious nineteenth-century tradition of nature as self-discovery and gives the domination of nature a gentle, civilized face" (1997:35). Desmond likewise argues that institutions of animal tourism "sell an experience of the natural through exposure to wild animals, whether or not the particular animals have ever lived in or ever seen the mythical wilderness they are tied to in our imaginations" (1999:147). While zoos are typically non-profit institutions (though they may be regarded as animal tourism destinations), entrance fees are still collected from visitors and the marketing of zoos aims to "sell" the zoo experience to the public as a desirable destination and a wholesome family destination for individuals who desire to "get back to nature".

of the scope of this project, in this research I sought to understand how the representations of animals within the zoo impact visitor understanding and knowledge of these animals. By examining the way in which visitors interact with and perceive animals during various contexts (i.e. prior to zoo visits, and during and outside of IEPs) I addressed the following two questions. First, what is the "virtual reality" to which visitors ascribe when they visit a zoo, and are these realities based in humanist or post-humanist views of human-animal and animal-environmental relationships? Second, are the "virtual realities" through which visitors view and understand zoo animals prior to visits to zoological institutions reaffirmed or altered by the interactions that visitors have with zoo animals, zoo staff (during and outside of conservation-oriented IEPs), and other visitors in the zoo context?

Informal Education

As the global population becomes more urbanized, the quality and quantity of direct, unregulated interactions humans have with wildlife is decreasing (Turner *et al*. 2004). In the absence of this direct contact, knowledge about animals and the environment must be acquired through means other than personal experience. While formal educational settings such as schools and universities play a role in educating the public about animals and the natural world, from a young age people acquire a significant amount of this knowledge within 'informal' educational settings.

In visitor studies literature an educational setting is considered informal when learning is wholly voluntary, learner motivated, unstructured, nonlinear and open ended (National Research Council 2009, cited in Diamond *et al.* 2006). In anthropological literature, informal education is defined as "the lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experiences and exposure to the environment (Coombs

and Ahmed 1974:8). This term is quite broad and does not encompass learning within an unstructured educational program. Learning within an educational program is referred to as nonformal education within anthropology. Nonformal education occurs during "any organized, systematic, educational activity carried on outside the framework of the formal system to provide selected types of learn to particular subgroups in the population, adults as well as children" (Coombs and Ahmed 1974:8; La Belle 1975). In this research, I address learning in an informal environment (as defined by visitors studies literature) where both informal and nonformal visitor learning (as defined by anthropological literature) occur within the same time and space, therefore I use the term "informal education" or "informal learning" to encompass both informal and nonformal learning.

Settings which lend themselves to informal education include museums, botanical gardens, nature centers, and zoological institutions (Diamond *et al.* 2006; Morgan *et al*. 2009). These institutions have been estimated to receive over 200 million visitors annually within the United States alone, making them important resources of environmental knowledge for the public (The Ocean Project 2009, cited in Morrell 2011). They play a large role in public environmental education because they are popular destinations for people of all ages and can be visited multiple times over the course of an individual's lifetime. The San Antonio Zoo and Aquarium encourages informal learning directly through educational programing (e.g. through zoo camps, youth programs, school tours, "*Education Connections,"* and "*Keeper Connections*"), and indirectly through its educational signage, self-directed educational displays, etc.

While educational programs such as those implemented by The San Antonio Zoo and Aquarium have been widely implemented by zoos globally, studies assessing the effectiveness of

conservation-oriented IEPs in conveying animal and conservation knowledge, as well as inspiring later conservation-oriented actions in visitors, have produced mixed results. In early studies of zoo visitor knowledge and attitudes, Kellert (1979) observed that zoo visitors were less knowledgeable about animals than people participating in any other animal interest activity. Further investigation by Kellert and Dunlap (1989) found that a visit to the zoo did not make an individual more knowledgeable about animals, nor did a zoo visit alter visitor's opinions of animals. These authors argued that "they failed to observe any appreciable increase in either factual or conceptual knowledge of animals. Learning, when observed, was largely restricted to basic issues of animal appearance or behavior, with little in the way of enhanced knowledge of interest in…wildlife conservation" (1989, quoted in Swanagan 2000:26). More recently, Balmford *et al.* also found "very little evidence…of any measurable effect of a single informal visit on adults' conservation knowledge, concern, or ability to do something useful" (2007:133), though the authors note that informal education may only be successful after multiple experiences at these institutions.

Yet results from other studies suggest that zoo visits and participation in IEPs do have significant impact on the conservation-oriented attitudes and knowledge of participating zoo visitors. In a recent study conducted by the AZA, researchers found that zoo visitors were more likely than non-zoo visitors to be knowledgeable about conservation initiatives and have positive opinions of zoos, animals, and conservation (Falk *et al.* 2007, but see Marino *et al.* 2010 for a rebuttal). Lukas and Ross (2005), assessing whether a visit to the Lincoln Park Zoo's Lester E. Fisher Great Ape House (GAH) altered visitor knowledge and attitudes towards African apes, found that visitors were significantly more knowledgeable about African apes after visiting the GAH (though interestingly attitudes towards animals were not affected). Howard (2012) also

found that a visit to a zoo exhibit increases visitor knowledge and positively influences conservation attitudes in zoo visitors at the *Madagascar Journey* exhibit at The South Carolina Aquarium.

These conflicting findings have resulted in confusion as to whether IEPs are effective tools for disseminating animal and conservation knowledge to the public and/or positively influencing visitor attitudes towards animals and conservation. As researchers try to understand these results, many have examined the external factors which may be influencing the effectiveness of IEPs in the zoo setting, and many potentially influencing factors have been identified. Some of these factors influencing IEP effectiveness are within the zoos' control. For example, studies have shown that zoo visitors are more likely to be influenced by animal exhibits which are more naturalistic in style (Nakamichi 2007), and children have been shown to have more positive attitudes towards animals and retain more animal-specific knowledge after participating in education programs that use live animals (Tomažič 2008). Consequently, zoos have moved towards using more naturalistic enclosures for their animals and are creating IEPs that allow visitors to interact with live animals. Additionally, the zoos resource investment in IEP (in staffing, program evaluation, program financing, etc.) also contribute to the effectiveness of zoo IEPs (Luebke and Grajal 2011), and zoos have made it a goal to improve their conservation messaging efforts by increasing the institutions financial and resource support of these programs.

However, many of the factors influencing visitor knowledge and attitudes are outside of the control of the zoo itself. For example, the way in which people perceive animals has been shown to affect whether they are interested in species-specific conservation programs, which subsequently influences the degree to which these people will acquire animal and conservation

knowledge. In a study of children's attitudes about bats, animals which are generally viewed as "disgusting", Prokop and Tunnicliffe (2008) found a link between an individual's attitude toward bats and the amount of knowledge they held about them, with children holding negativistic attitudes having less knowledge about these animals than children with more positive attitudes. Additionally, both prior knowledge and interactions with animals and conservation programs have been found to influence the degree to which zoo visitors are impacted by IEPs in the zoo context (Lukas and Ross 2005; Swanagan 2000).

IEPs, while widely implemented by zoos, still remain enigmatic. In order to address different gaps in our knowledge about IEPs in zoos, I sought to understand zoo visitor interactions with IEPs in three areas. First, despite numerous studies in this area, the effectiveness of IEPs in conveying animal and conservation knowledge is not understood. In this research I examined whether IEPs at The San Antonio Zoo were effective in conveying knowledge and positively influencing attitudes towards animals and conservation in zoo visitors. I took a novel approach to this topic, examining both the educational effect of 'direct' education, in the form of visitor participation in the IEP "*Education Connection*," and 'indirect' informal education measures, such as zoo signage, on zoo visitors in the absence of participation of IEPs. Second, the factors that affect learning outcomes in zoo visitor are not well understood. To address this problem, I combined anthropological methods (e.g. participant observation and interviewing) with the quantitative techniques that have traditionally been used to measure the effectiveness of IEPs in zoo settings (e.g. questionnaires, mail-in card response rates, etc.) in order to better understand the factors which influence IEP effectiveness in altering visitor knowledge and attitudes about animals and conservation (i.e. zoo visitor experience with animals, group dynamics, degree of previous knowledge, familial status, etc.). Finally, the

influence of visitor participation in IEPs on later conservation action is not clear. In this research I examined whether participation in a zoo sponsored IEP altered the likelihood that visitors would participate in a conservation activism activity.

Summation

This research had two overarching goals. The first goal was to gain insight into how people interact with and experience animals within the zoo environment. To achieve this goal I examined the ways in which humans contextualize their relationships with animals, and how these contextual frameworks affected how visitors interacted with and learned about animals in the zoo context. I assessed whether visitor-animal interactions could be understood as unequal power relationships (i.e. a humanist framework), or as a humananimal network where all actors are influenced by the interaction (i.e. post-humanist framework).

These epistemological frameworks also help shape the "virtual realities" that zoo visitors construct about zoo animals and animal-environment interactions. As discussed above, these virtual realities influence (1) the ways in which zoo visitors interact with and learn about animals and conservation in the zoo environment, and (2) the degree to which zoo visitors accept the conservation messages presented in IEPs which may directly contradict these virtual realities. By framing my inquiry on visitor-animals interactions within the theoretical framework of virtualism, I was able to better understand the role zoos play in either maintaining or altering zoo visitor "virtual realities" regarding the nature of animal-environment interactions, which has important implications for the success of IEPs in the zoo context.

The second goal of this research is to understand the role that zoos play in educating the public about animals and conservation, and whether IEPs are a successful medium through which to convey conservation information. I explored whether two IEPs at the San Antonio Zoo

was successful in influencing the conservation-oriented behaviors of participants, and sought to understand the factors that influence the effectiveness of IEPs in the zoo setting. In the following chapter I detail my research question, describe my field site and the study design, and discuss the methods used to address these goals.

CHAPTER TWO: METHODS

For this research I took a mixed methods approach to explore human and animal relationships, the construction of environmental worldview (i.e. virtualism), and the impacts of informal education programs in zoo settings. In this chapter I outline the five research questions and specific hypotheses that guided this research. Next I discuss my research site, the San Antonio Zoo and Aquarium, as well as the focal animal species in this study, the white-cheeked gibbon (*Nomascus leucogenys*) and state why they were both appropriate for this study. I then discuss the methods used to address the research questions, the methodological challenges I faced in the zoo setting throughout this study, and how data were analyzed. All methods discussed in this chapter were approved by the Institutional Review Board at The University of Texas at San Antonio on June 13, 2013, prior to the commencement of the study (see Appendix A for the approval letter for this project, IRB 12-207E).

Research Questions and Hypotheses

This study had two overarching goals: (1) to gain insight into how zoo visitors interact with and experience zoo animals in the zoo environment; and (2) to better understand the role that zoos play in educating the public about animals, conservation, and ecosystems, and how this is accomplished within and outside of informal education programs. To accomplish these goals I identified the following research questions (RQs) and hypotheses at the beginning of the study:

RQ1: How do zoo visitors experience and interact with white-cheeked gibbons when they are engaged in a semi-structured informal education program (IEP) (the "*Gibbon Education Connection," or GEC*) and when they are not? Because this research question was exploratory in nature I did not enter this study with explicit hypotheses addressing this question.

RQ2: What are zoo visitors learning about white-cheeked gibbons and other animals in the zoo environment within and outside of the IEP, and how does this information shape or alter the visitor's perception of the natural world? This question was also exploratory, and I did not have specific hypotheses addressing this question.

RQ3: Does a visit to the zoo alter zoo visitors' attitudes toward animals, specifically primates?

(3)H_0- There will be no difference in attitudes toward animals, specifically primates, between zoo visitors just entering the zoo and those who are exiting the zoo.

(3)H_1- Zoo visitors' attitudes toward animals, specifically primates, will be more positive than first-time visitor entrance attitudes.

RQ4: Does participation in a zoo-sponsored IEP alter zoo visitors' attitudes toward animals, specifically primates?

(4)H_0- There will be no difference in attitudes toward animals, specifically primates, between IEP participants and non-participant zoo visitors.

(4)H_1- Zoo visitors who participated in a zoo sponsored IEP will have more positive attitudes toward animals, specifically primates, than non-participating zoo visitors.

RQ5: Does participation in an IEP affect the conservation-oriented actions of zoo visitors?

(5)H_0- There will be no difference between zoo visitors who participate in an IEP and those who do not in the rate of participation in a low-cost[7] conservation initiative.

(5)H_1- Zoo visitors who participate in an IEP will be more likely to participate in a low-cost conservation initiative.

Research Site: The San Antonio Zoo and Aquarium

Situated on 35 acres (14 ha) of land north of downtown San Antonio, Texas, the San Antonio Zoo and Aquarium houses over nine thousand animals representing approximately 750 animal species (SA Zoo Annual Report 2012). This AZA accredited institution receives over one million visitors per year, 40% of whom are non-local tourists. Of the 1,059,653 people that visited the San Antonio Zoo in 2012, over 64% (687,035 visitors) participated in additional informal education opportunities and/or interactive experiences provided by the zoo (SA Zoo Aquarium Annual Report 2012). While the San Antonio Zoo remains active in international conservation initiatives by both donating funds for international animal research programs and participating in captive breeding programs, conservation education has become a key part of its Mission Statement and Strategic Plan in recent years (SA Zoo Annual Report 2012). The conservation education initiatives implemented by the zoo, specifically the interactive informal education programs such as the *Education Connection* and *Keeper Connection* programs

[7] In this study, a "low cost" conservation initiative is one that requires a minimal time commitment with no financial obligation.

(described in Chapter Three), made this zoo an ideal location to examine the effects these programs have on zoo visitors. Additionally, my prior work as an intern at this zoo provided me with the suitable contacts to establish a working relationship with this institution and facilitated my ability to attain the necessary permission to work at this site.

Focal Zoo Animal Species: White-cheeked gibbons

While many species housed at The San Antonio Zoo would have served as ideal focal species for this study, I chose to examine visitor interactions with the family group of white-cheeked gibbons for the following reasons: (1) visitor access; (2) gibbon group structure; (3) gibbon social behavior; and (4) the existence of a gibbon-centered informal education program.

Visitor access: White-cheeked gibbons are diurnal and were thus active during zoo business hours and visibly accessible to visitors. Additionally, this group is housed in a centrally-located enclosure, ensuring that all zoo visitors pass their exhibit as they travel though the zoo. This facilitated data collection by guaranteeing a steady stream of visitors past this exhibit. Finally, the gibbon group's access to their indoor enclosure (hidden from public view) is limited at certain periods of the day. This allowed me to observe visitor-animal interactions continuously for large parts of the day.

Gibbon group structure: The San Antonio Zoo houses a white-cheeked gibbon family group composed of one adult male, one adult female, and two juvenile males. This ensured that zoo visitors are able to observe a wide array of gibbon behaviors and social interactions, as almost many age and sex classes which were represented in this group. This also ensured that visitors could observe gibbon behaviors that closely resemble wild behavior in this species.

Gibbon social behavior: Following the general primate trend, white-cheeked gibbons are highly gregarious. Their active nature and willingness to engage in social behavior with both each other

and human visitors made them an ideal species for examining human-animal interaction in the zoo context, as zoo visitors were able to observe a wide variety of gibbon behaviors in a relatively short period of time. Additionally, the gibbons were completely habituated to human presence and often interacted with zoo visitors.

Existence of a gibbon-centered informal education program: Prior to the commencement of this study The San Antonio Zoo created and implemented an *Education Connection* program which focuses on informing zoo visitors about the physiology, behavior, locomotor patterns, and conservation threats of white-cheeked gibbons. The *Gibbon Education Connection* (GEC) program is scripted and occurred once every day at a fixed time; this facilitated data collection by allowing me to easily observe zoo visitors engaging in a standardized informal education opportunity. Additionally, evidence from Stoinski and colleagues (2001) indicates that (1) students who study non-human primates in formal education programs are more likely to be satisfied with these programs than students working with other species, and (2) ape exhibits are more efficient than non-ape or non-primate species exhibits in educating the public about conservation issues. This suggests that zoo visitors may be more interested in ape exhibits and visitor traffic and interaction with this exhibit will be higher than with non-ape or non-primate species. This further facilitated data collection.

Data Collection and Analysis

Data collection occurred over the course of 6 months, with approximately 680 field hours dedicated to data collection for this project, and data were collected with the help of two research assistants. Both research assistants were undergraduate students at the University of Texas at San Antonio at the time of their participation and had an interest and background in anthropology. During the data collection period they held Educational Internship positions at

The San Antonio Zoo and Aquarium; this internship required that they each dedicated 200 hours to the project, and college credit was available through UTSA for this opportunity.

During data collection I also worked under the title of "Education Intern," which allowed me to collect data at The San Antonio Zoo in an official capacity; this sanctioned zoo affiliation facilitated data collection by enhancing study participation from zoo visitors. I worked closely with employees in the Education Department, planning the project with the Evaluation and Education Coordinators and the Guest Encounters Curator. I also had access to necessary materials such as office supplies, iPads, and signage throughout this association. However, The San Antonio Zoo did not receive a copy of any raw data, nor did any employees or representatives have access to the secured database in which research data was stored. At the conclusion of my data collection I terminated my internship. Since the termination of my internship and my data collection I have been hired by the San Antonio Zoo as the Evaluation and Resources Coordinator; however, raw data is not accessed by other Zoo employees and the San Antonio Zoo will receive the results of this research in a copy of this thesis.

Pilot research this project began on June 20, 2013 and lasted until June 30, 2013, during which time we tested the questionnaire to be administered, as well as gauged the degree of participation that we could expect to receive from zoo visitors during the interview process. Once the questions were perfected, we began collecting data, which lasted from July 7, 2013 to October 10, 2013. Because my research questions were variable and the issues being investigated were interrelated and complex, I used a mixed-methods approach to data collection for this study, including interviews, participant observation, questionnaires, untours, and mail-in response cards data. Here I discuss each method in detail, as well as the methodological challenges we faced with each.

Interviews and Participant Observation: In order to understand the interactions and experiences zoo visitors have with the white-cheeked gibbons during a visit to the San Antonio Zoo [RQ1], and to determine what zoo visitors are learning about animals, ecosystems, and conservation during their visit [RQ2], I relied on data gathered during interviews, participant observation, and during "untours" (described below).

Interviews

To address these research questions I collected 16 interviews with zoo visitors at The San Antonio Zoo, each lasting between 15 and 25 minutes. Recruitment of participants was done opportunistically and all interviews were conducted with zoo visitors at the entrance/exit area of the zoo (most visitors who participated were exiting the zoo at the time of their participation). To enhance the visitor experience and to increase participation of groups with children, coloring pages and crayons were available on the interview table and children were encouraged to color while their group was interviewed. Stickers and temporary tattoos were also offered as incentives to adults and children who completed the interview.

These interviews were semi-structured and interns took notes of responses on a laptop while I administered the questions. An effort was made to seek a balanced representation of visitor demographic variables (i.e. gender, age, familial status, and ethnicity) within the sample. All passing individuals were asked to participate in the interviews until a participant was found, at which time solicitation of participants was suspended until the interview had concluded. When interviewing individuals over the age of 18, oral consent was obtained prior to the interview; when interviewing individuals in a group that were under the age of 18, oral consent for their participation in the study was obtained from their parental guardian prior to the commencement of the interview. Children were eager to answer interview questions and parents often used the

interview questions as teachable opportunities for children facilitating data collection for multiple age groups. Not all interviewees were families, as several couples and a few solo visitors participated in interviews. Interviewing individuals in different age groups and familial status allowed me to explore visitor-zoo animal interactions from many diverse perspectives.

During these interviews I asked questions that helped me understand what visitors were learning about zoo animals and conservation during their visit, how visitors thought they were and/or should interact with zoo animals, and what aspects of their zoo experiences they found the most engaging. For a list of representative interview questions, please see Appendix B. To keep interviews an appropriate length for the groups not all questions were asked of each group.

To better understand the *Education Connection* program from the perspective of the San Antonio Zoo, I conducted an in-depth interview with the creator and curator of the *Education Connection* programs, Lacy M. I asked her questions regarding the goal of the *Education Connections*, how these IEPs reflect and fulfil the zoo's mission of public conservation education, challenges they face when conducting the program, how Education Interpreters were trained for the program, and other related topics (for a complete list of interview questions please see Appendix C). Interviews were also conducted with two of the Education Interpreters[8] who led the GEC. During these interviews I asked Interpreters how they were trained to give the GEC, how they felt visitors of different age groups responded to the program, what common questions they received from visitors about the gibbons, and what challenges they faced when talking to visitors about gibbon life history and conservation (for a complete list of interview questions see Appendix D).

[8] Pseudonyms have been used when discussing Educational Interpreter interview data.

I examined the interview data for over-arching or repeating themes using grounded theory, i.e. using "iterative coding and analysis by constant memoing" (Bernard and Ryan 1998:609) in order to find broad themes in the data. I paid close attention to the ways in which zoo visitors talked about and interacted with zoo animals, their experience at the zoo, and their thoughts on zoo animals and conservation education within the zoo.

Participant Observation

To address these questions I also engaged in moderate participant observation (Dewalt 1998:262), during which time I observed visitor-visitor, visitor-Gibbon, visitor-keeper, and visitor-IEP Educational Interpreter interactions. I specifically focused on the ways in which zoo visitors engaged with white-cheeked gibbons when they were and were not participating in the GEC program. I observed the actions of zoo visitors of all ages during these interactions and I rotated both the time of day and the day of the week during which I conducted these observations to ensure that all interactions and contextual situations that are possible to observe during the study period were represented. In order to be seen as a member of the visiting public and not as a zoo employee during observations I wore street clothes rather than the uniform t-shirt and nametag required of zoo employees and interns.

Approximately 50 hours of observations were recorded using written notes and dictation into an audio recorder. After transcribing observation notes and dictation into Word documents, the data were analyzed in the same way as interview data. I examined the data for over-arching or repeating themes, paying close attention to: (1) the ways in which zoo visitors talked to and interacted with each other and the animals at the gibbon enclosure both during and outside of the GEC, (2) how visitors interacted with the Educational interpreter during the GEC, (3) where visitors placed themselves in relation to the animals, the enclosure, members of their group,

visitors from different groups, and zoo staff during the and outside of the GEC, and (4) how visitors spoke with each other about the animals in the gibbon enclosure when leaving the exhibit area.

Untours

Developed by the Institute for Learning Innovation and used almost exclusively in museum visitor studies (Luke *et al*. 2005; Richhart 2007), the "untour" lends itself well to an anthropological study of visitor experiences in the zoo context. To conduct an untour, the researcher asks the study subjects (e.g. zoo visitors) to give him/her a tour of an area of interest (e.g. a tour of an area of the zoo, white-cheeked gibbons enclosure, etc.). This allows the researcher to discover what the subjects consider to be important information about these places or organisms. The untour can be conducted in person (i.e. with the research accompanying the zoo visitor(s) on the tour), or it can be modified to allow for the researcher to be absent. This would entail giving the zoo visitor either a disposable camera, a video recorder, or a notebook and asking them to document their experience going through different parts of the zoo as if they were giving a tour to someone. There are pros and cons to each approach, but only researcher accompanied untours were to be conducted during this study; being present during the untour should have allowed me to accurately document zoo visitor behavior and the information they give during the untour.

Utilizing the untours as a method in this study should have allowed me to better understand how zoo visitors perceived certain animal or enclosure areas within the zoo, what knowledge they had about specific zoo animals, and what information zoo visitors of different ages thought was important enough to share with me. During the planning of this project I intended to conduct twenty untours during which I was to accompany the zoo visitors along a

route leading from the zoo entrance to the "Cat Grotto" area, a route which encompassed the white-cheeked gibbon enclosure while situating zoo visitor experiences with this exhibit within the larger zoo experience. I intended to conduct at least five untours with zoo visitors who had participated in the IEP and five with those who did not. However, I was able to conduct six untours total, none of which was with visitors who had participated in the GEC. Of the six untours, two of the groups terminated the untour before they passed the gibbon enclosure, two were with school groups and were prearranged by the Education Department rather than recruited opportunistically, and none of them went as planned.

This method was difficult to execute in the zoo setting for a few reasons. First, recruiting untour participants was challenging. I tried to recruit untour participants opportunistically at the entrance of the zoo, but had a difficult time finding individuals who were willing to participate. Additionally, those individuals who agreed to participate in the untours did not narrate their experience but rather continued their visit as they normally would and completely ignored the research team. This was problematic because I did not gain insight into what visitors knew or were feeling about the zoo animals they observed. Of the untours, only two groups acknowledged me during the untour.

The difficulties I faced during the untours may have been the result of poor communication on my part: it is possible I did not clearly explain my expectations of the visitor or encourage them sufficiently so they felt comfortable talking about their experience, the animals they were seeing, or prior knowledge of the animals and the zoo environment. However, I believe that these problems were the result of a lack of rapport with visitors. For many visitors, a day at the zoo is an intimate event; even though they are surrounded by many other people during their visit, most visitors come to the zoo with their families or friends and only interact

with these known individuals. Thus the visit to the zoo becomes an intimate social bonding event and any interruption of their day by strangers or outsiders during their visit may be seen as an intrusion into the social unit's personal space and time. For this reason it was difficult for visitors to share their experiences with researchers whom they had just met. This also would explain why recruiting for this method was so difficult and why those we did recruit either terminated the untour early or failed to narrate and share their experience with us during the untour. Only one group narrated their experience and interacted with me during the untour, and I had a prior relationship with those individuals.

Despite the challenges I faced with this method, I believe this method would be extremely beneficial in the future in circumstances where the researcher has an association and prior rapport with untour participants. I do not recommend recruiting for participants opportunistically with this method, and I believe that recruiting through friends, families, and acquaintances would be more beneficial. The data I did manage to get from the untours that I conducted were considered participant observation data and were analyzed as such.

Questionnaires

I distributed and analyzed unpaired questionnaires to assess (1) whether a visit to the SA Zoo alters visitor attitudes toward animals, specifically primates [RQ3], (2) whether visitor participation in an *Education Connection* program influences visitor attitudes toward animals, specifically primates [RQ4], and (3) whether visitor experiences at the zoo influence or alter their perception and worldview of animals and the environment [RQ2]. Questionnaires have been used in many studies aimed at understanding educational outcomes in children and adults and assessing animal and conservation knowledge (Lukas and Ross 2005;), learning in zoo settings (Kruse and Card 2004; Randler *et al.* 2012), and attitudes towards animals, conservation,

or zoos (Finlay *et al.* 1988; Howard 2012; Lukas and Ross 2005; Peake *et al.* 2009; Puan and Zakaria 2007; Reade and Waran 1996; Swanagan 2000) and allowed me to directly address my RQ3 and RQ4 hypotheses and explore RQ2.

Questionnaire participants were recruited opportunistically at the entrance/exit area of the zoo and outside of the gibbon enclosure, and all participants were offered stickers and temporary tattoos to incentivize participation. All visitors who passed the questionnaire table were asked to participate,[9] as random sampling during the pilot period led to low response rates; less than seven questionnaires were collected per hour using random sampling, while opportunistic sampling led to a response rate of at least ten questionnaires collected per hour. The questionnaire was written in English and both electronic versions (via iPads) and paper versions of the questionnaire were available for visitors. The majority of questionnaires were administered using paper, as iPad surveys took more than five minutes to complete which frustrated visitors and led to a lower completion rate. Questionnaires were collected at different hours of the day and on different days of the week to ensure a representative sample was achieved. Visitors were only eligible for this the survey if they were 18 years old, and adults accompanying school groups were not approached during this study. However, adults were able to ask their children to answer questions along with them on their surveys.

Two different questionnaires were administered. The first questionnaire (n=944) examined visitor attitudes and knowledge and contained 33 closed questions: eight demographic questions were administered by the research team, and visitors self-administered fifteen Likert scale attitude questions and ten true/false questions assessing guest knowledge about gibbons and

[9] Voluntary Questionnaire participants: Zoo visitors who volunteer to participate in this questionnaire by approaching the researcher or research assistant were allowed to participate; these questionnaires were be marked as 'Voluntary participant," but were still counted towards the pre-set number of questionnaires to be gathered in either category.

gibbon conservation modeled after Lukas and Ross (2005) (also see Kellert and Dunlap 1989) (see Appendix E). The questionnaires took participants between two and five minutes to complete. The second questionnaire (*n*=241) assessed visitor opinions about zoos and zoo animals and contained 19 closed questions; nine demographic questions were administered by the research team and ten questions on zoos and zoo animals were self-administered (see Appendix F). This questionnaire took between one and three minutes to complete.

"Attitude and Knowledge" Questionnaires

Unpaired questionnaires: The distribution of unpaired questionnaires to determine the results of an educational program is a common method in zoo visitor studies, and I loosely based this method on studies by Howard (2012) and Lukas and Ross (2005). Both studies used the unpaired pre- and post-questionnaire methodology to examine the impact of a zoo exhibit on visitor attitudes and/or knowledge. Since I examined two different exit populations (IEP participants and IEP non-participants) I needed to administer exiting questionnaires to both populations. I also differentiated between visitors who were returning to the zoo and those who were visiting the zoo for the first time to determine whether there were any significant differences between those populations.

When planning this study I conducted an a priori power analysis using the software G*Power 3.1.9.2 (Faul *et al* 2007) to determine the sample size necessary to detect a medium effect size of 0.3 (Cohen 1988) in this data set. Through this method I determined that I would achieve a power of 0.95 at α=.05 with a sample size of 145 participants in each visitor subcategory. I collected unpaired questionnaires as follows: 469 questionnaires were collected from zoo visitors entering the zoo (248 from first time visitors and 221 from returning visitors), and 474 were collected from zoo visitors exiting the zoo (168 from visitors who participated in

the GEC and 306 from non-participating visitors), for a total of 943 total questionnaires collected (for a breakdown of the specific demographics for each study subpopulation, see Appendix J). Using a post hoc analysis for χ^2 Goodness-of-fit tests[10] (Df=1) I determined that the smallest sample size in the entering visitor category (221 returning visitors) achieved a power of .99 at a medium effect size of .3 (Cohen 1988) at α=.05, and the smallest sample size for the exiting visitor category (168 GEC participants) achieved a power of .97 at the same parameters. This suggests that an adequate sample size was achieved for all visitor categories assessed.

Of the exit surveys, 168 were collected from zoo visitors who participated in the GEC and 306 were collected from zoo visitors who did not.[11] This allowed me to examine the differences in attitude and knowledge between visitors prior to a zoo visit, after a visit to the zoo, and after participation in an IEP. Toward the beginning of the study we realized that identifying IEP participants at the zoo exit was limiting our potential sample, so most of the post-IEP exit surveys were administered to visitors at the white-cheeked gibbon enclosure directly after their participation in the IEP.

To analyze unpaired questionnaires I used descriptive statistics and all data set comparisons were run on IBM SPSS Statistics for Windows Version 22.0. For animal *knowledge* questions, the percentage of correct responses for each question in each visitor

[10] The Chi-square Goodness-of-fit test was chosen for the power analysis because this data is nonparametric and statistical tests run using this data in the future will be comparing proportions of questionnaire responses between categories.

[11] While the sample size of exiting visitors who participated in the GEC is smaller than that of exiting visitors who did not, I do not believe this skewed my results. The number of individuals who participate in the GEC each day is much less than the total number of visitors who attend the zoo per day: on average, between 10 and 60 people participated in the GEC program while daily attendance for the summer and fall months can be between 1,500 and 4,000 visitors. Therefore, I believe a smaller sample size for the GEC participant population is acceptable and representative of the number of individuals who participate in the program.

category was calculated and then compared.[12] I used this test to compare the following visitor groups:

- Entering: First time visitors v. returning visitors- These were compared in order to determine whether visitors with past experience (i.e. returning visitors) had greater knowledge about gibbons than first-time visitors.
- Entering visitors v. exiting visitors- This was done to determine whether there were any broad differences in visitor knowledge between visitors entering the zoo and those exiting, regardless of past experiences with or within the zoo.
- Exiting visitors who did participate in the GEC v. exiting visitors who did not- These were examined to determine whether visitors participating were more knowledgeable about gibbons than individuals who had not participated.
- All entering visitors v. exiting GEC participants- This was done so the results could be compared to the knowledge of exiting non-participants of the GEC in order to determine what information visitors were learning at the GEC and what visitors could learn from a zoo visit alone.
- All entering visitors v. exiting non-participants of the GEC- This was done so the results could be compared to the knowledge of the exiting GEC participants to determine what information visitors were learning at the GEC and what visitors could learn from a zoo visit alone.

When analyzing the data for any differences between visitor *attitudes* towards animals I recoded the responses into three categories, Disagree (1 & 2), Neutral (3), and Agree (4 & 5) rather than analyze each Likert item separately. This allowed me to get a more clear picture on whether individuals agreed or disagreed with certain attitude statements by removing the skewing effect of individuals not wanting to choose extreme cases of their opinion, i.e. a bias to choose Disagree or Agree over Strongly Disagree or Strongly Agree. The response percentages for these Agree and Disagree response in each visitor category was calculated and then compared using descriptive statistics for each question. For each attitude question the following visitor groups were compared:

- Entering first time visitors v. entering returning visitors- These were compared in order to determine whether visitors with past experience (i.e. returning visitors) had more positive or negative attitudes about animals than first-time visitors.

[12] I compared the percentages of correct and incorrect responses to the T/F questions. "Do not know" was considered an incorrect response and was grouped with the incorrect answer during these analyses.

- First time entering visitors v. exiting visitors- This was done to determine whether there were any differences in visitor attitudes between visitors entering the zoo for the first time and those exiting, in order to remove the influence of past entering visitor experiences with or within the zoo.
- Exiting visitors who did participate in the GEC v. exiting visitors who did not- These were examined to determine whether visitors participating in the GEC had more positive or negative attitudes towards animals than individuals who had not participated.

"Opinion" Questionnaires

The opinion questionnaires were on the same Likert scale as the attitude questionnaires, where visitors responded to each statement by circling a number between one and five, where 1=Strongly Disagree, 2= Disagree, 3=Neutral, 4=Agree, and 5=Strongly agree. These data were thus treated in the same way as the attitude questionnaire data. I recoded the responses into three categories, Disagree (1 & 2), Neutral (3), and Agree (4 & 5) rather than analyze each Likert item separately; the percentages of responses in these three response categories were compared using descriptive statistics. For each opinion question the following visitor groups were compared:

- Entering first time visitors v. entering returning visitors
- Entering visitors v. exiting visitors
- Exiting visitors who did participate in the GEC v. exiting visitors who did not

Mail-in Response Cards

To determine whether participation in an IEP at The San Antonio Zoo made zoo visitor more likely to participate in a "low cost" conservation initiative [RQ5] I distributed mail-in cards which allowed visitors to participate in a conservation activism project related to the information presented in the GEC. The postcards were pre-addressed (to the San Antonio Zoo to be forwarded to the corporations listed on the cards, see Figure 1), and pre-stamped, meaning that participation in this initiative entailed no financial cost and only a minimal time commitment (i.e. filling out and mailing in the card). This technique was used successfully in a study of elephant conservation education programs (Swanagan 2000) and measuring the return rates of these cards

(measured as the number of cards which were mailed back to the zoo) for each visitor category allowed me to assess whether visiting the San Antonio Zoo or participating in the IEP at The San Antonio.

Participants were recruited opportunistically at the zoo exit, at the gibbon enclosure after the GEC, and at the tiger enclosure after the Tiger Education Connection. The Tiger Education Connection (TEC) was included in this part of the study in order to facilitate recruitment for this part of the study. This was appropriate because the GEC and the TEC used the same program format and conservation message, and the conservation activism message was applicable to both species. For both the TEC and the GEC the Educational Interpreters discussed the palm oil crisis, how it was affecting tigers and gibbons, and handed out sustainable palm oil shopping guide cards to visitors. Thus the use of the mail-in response cards was appropriate to both programs.

After a visitor expressed interest in the project and we determined whether they had or had not participated in an *Education Connection* program, visitors were told the following information, which usually took less than one minute to relay.

> Palm oil is a type of vegetable oil that is extracted from the fruits and nuts of palm trees. It is cheaper to produce than most other oils so it is in almost everything you can buy, from makeup to cleaning supplies, and in most processed foods. In order to meet the high demand for palm oil, large areas of tropical rainforests are being clear cut to make way for palm tree plantations, especially in Southeast Asia. This is a problem because animal species in these areas are already stressed and endangered, and habitat loss is a huge threat to species like tigers, orangutans, and white-cheeked gibbons. Because of this problem, many corporations have pledged to only use palm oil that was grown sustainably, which means that no tropical habitat is being cut down to grow the palms. Unfortunately, some large companies, such as Pepperidge Farm, the Campbell Soup Company, and Post Foods have not made this pledge. That is where you come in!

Visitors were handed the pre-addressed and pre-stamped post cards (Figure 1) at this time. The cards were discretely marked as they are handed out to keep track of who did and did not participate in the IEP. Once visitors had the card in hand the project was explained:

> We are asking people to take these cards home and on the back write a message to these companies asking them to use sustainable palm oil in their products. Your message can be simple, such as 'We love your products, not your policies,' or 'Use sustainable palm oil please,' or you can make it more involved. You can even have your kids color the gibbon on the back to involve them too. Once you are done all you need to do is put it in your mailbox and we will take it from there. It is already stamped so it will come back to us at the Zoo, and at the end of October will take all of the cards we receive back and mail them to these companies, along with a letter asking them to use sustainable palm oil.

Once visitors had received the instructions, they were asked once more if they wanted to participate. Very few individuals declined to participate at this point.

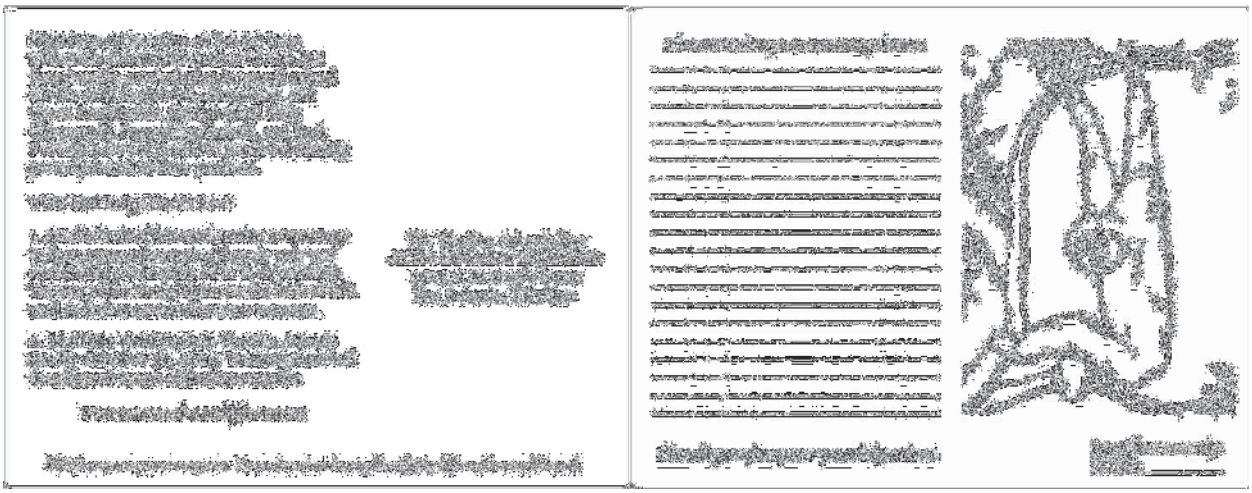

Figure 1: The front (left) and back (right) of the mail-in response card.

A total 30 mail-in response cards were distributed to visitors who participated in an *Education Connection*, either the GEC (15 cards distributed) or the TEC (15 cards distributed), and 30 cards were distributed to visitors who did not participate in any *Education Connection* program (eight were distributed near the white-cheeked gibbon enclosure and 22 were distributed near the tiger enclosure). Data were explored using descriptive statistics, and the proportions of returned and unreturned cards were compared in each category.

When planning this project I planned to have a larger sample size of response cards for both IEP participants and non-participants, intending to distribute at least 100 cards per group. However, before investing in stamps for this many cards I decided to pilot this method by distributing 30 cards in each group (a total of 60 cards distributed rather than at least 200). I intended to expand this method if the difference in the number of responses between IEP participants were significant or bordering on significant using Fisher's Exact Test ($p \leq 0.05$). This was not the case, and the project was not expanded.

Summation

I employed many different methods during this research, and while not all of them were successful and all had their challenges, I believe this research benefited from a mixed-methods approach. Using a variety of methods commonly used within anthropology (i.e. participant observation and interviews) and by exploring methods often used outside of the field (i.e. untours and mail-in response cards) I was able to gather an extensive data set which allowed me to address many aspects of my research questions. In the following chapters I discuss the results of this research and how they help us understand visitor learning and experience in zoos.

CHAPTER THREE: DECODING THE GIBBON EDUCATION CONNECTION PROGRAM

In this research, I explored the impact of an informal education program (IEP) on visitors, examining whether participation in an IEP altered zoo visitor knowledge and attitudes towards white-cheeked gibbons and gibbon conservation (RQ2, RQ3, RQ4), or affected conservation-oriented behaviors in visitors (RQ5). In this chapter I discuss the results of this research. I begin by discussing the specific goals of the *Gibbon Education Connection* program (GEC) as understood through interviews with zoo staff. I then explore the impact of the GECs in three areas. First, I examine the effectiveness of the GEC program in conveying factual animal and conservation knowledge to visitors. I discuss the impact of both the indirect informal education measures, such as zoo signage, and the direct informal education where visitors participate in the GEC by examining the results of the "Attitude and Knowledge" questionnaires distributed to general zoo visitors who did not participate in the GEC (i.e. those learning through 'indirect' educational methods) and to visitors who did participate in the GEC (i.e. visitors who learned through 'direct' educational methods). Second I explore the effect of these indirect and direct measures on visitor attitudes towards wild and zoo animals and conservation, examining the results of aforementioned questionnaires. Finally I discuss the impact of the GEC on visitor conservation-oriented behaviors by examining the results of the sustainable palm oil conservation activism opportunity (i.e. the mail-in response cards) offered to GEC participants and non-participating visitors. I conclude by discussing the implications of these results on visitor conservation education in zoos.

Understanding the goal of the GEC

Informal education programs (IEPs) are widely implemented by zoos worldwide but their impact on zoo visitors is not well understood. The ultimate goal of these programs is to instill a

deep appreciation for animals and the environment in visitors by expanding their knowledge in these areas. But creating IEPs that can achieve these goals is an involved process. In our interview, Lacy M., the creator and curator of the GEC and other visitor education outreach programs at the San Antonio Zoo, said:

> *When the Education Connections were developed it was more on the concept of providing guests with an opportunity to encounter a staff member…and was really just developed to enhance their experience. As the program [has] continued with success we are trying to change it to also include a conservation message… trying to take it to the next step to hopefully change a behavior in these people. The ultimate goal of course would be for everyone who goes to the GEC and receives a palm oil card put that into their daily life and practice.*

As Lacy explained, the GEC has two goals. The short term goal is to provide a positive experience for visitors that will encourage them to return to the zoo in the future. In 2012 the San Antonio Zoo conducted an evaluation which found that visitors do enjoy the GEC and these results are supported by my own observations of GEC participants. The ultimate goal of this program, to change visitor conservation attitudes and behaviors through conservation education, is more challenging to assess. To achieve this goal, the GEC must not only increase visitor knowledge about the gibbons and gibbon conservation, but also positively influence visitor attitudes towards animals and visitor conservation-oriented behaviors.

Figure 2: Visitors participating in the GEC, engaging both the white-cheeked gibbons within the enclosure, such as the male in the viewing window (upper right-hand side), and the Educational Interpreter (in orange). Zoo signage, such as the "How do you compare?" sign (left), encourages visitors to learn more about gibbon locomotor patterns in an interactive way.

Visitor questionnaire results: Knowledge

For the GEC to be successful visitors must learn something about gibbons and gibbon conservation. To assess this I distributed the "Attitude and Knowledge" questionnaire to first time visitors and non-first time visitors entering the zoo and visitors exiting the zoo that did and did not participate in the GEC. Visitors answered ten True/False questions about gibbons and gibbon conservation; all answers to these questions were given in the scripted GEC program and could be found by zoo visitors on related zoo signage [Figure 2 in this chapter, Figures 8, 9, & 11 in Appendix G] or by briefly observing the gibbons in their enclosure. Here I discuss the results of this portion of the questionnaire.

Entering: First time visitors versus returning visitors

There was no difference between the percentage of first time and returning visitors who answered the gibbon knowledge questions correctly[13] for all questions asked (see Table 1). First time and returning visitors did not differ in their ability to identify white-cheeked gibbons (Statement 1), with 59.5% of first time visitors and 62.1% of returning visitors positively identifying an image of a white-cheeked gibbon. First time and returning visitors also did not differ in their knowledge of gibbon locomotion (Statement 3: 54.5% of first time visitors versus 63.3% of returning visitors; Statement 5: 66% of first time visitors versus 71% of returning visitors), physical attributes (Statement 4: 71.6% of first time visitors versus 68.3% of returning visitors; Statement 10: 45.8% of first time visitors versus 48.5% of returning visitors), or geographic location (Statement 8: 10% of first time visitors versus 10.1% of returning visitors). Additionally, returning visitors were not more likely than first time visitors to identify palm oil production as a threat to gibbon habitats (Statement 6), nor were they more likely than first time visitors to identify gibbon species as endangered or critically endangered (Statement 7). These results indicate that previous visits to and experiences within the San Antonio Zoo do not contribute to greater general knowledge about gibbons and gibbon conservation during future visits. Therefore, in subsequent analyses I combined the first time visitor and returning visitor data to create the "Entering" visitor data set.

Table 1: % Correct response to True/False knowledge questions- First Time v. Returning Visitors

Statement and the correct response	First Time Visitor (% correct response)	Returning Visitor (% correct response)
1. The image on the table is that of a white-cheeked gibbon. (True)	59.5	62.1
2. Gibbons are apes. (True)	26.9	27.9

[13] Correct responses were compared to the percent of visitors who responded incorrectly to each statement; visitors who responded with "Do not know" were considered to have responded incorrectly because they could not correctly answer the statement.

Table 1: Continued		
3. Gibbons spend most of their time on the ground. (False)	54.5	63.3
4. Monkeys have tails, but apes do not. (True)	71.6	68.3
5. Gibbons move through trees using brachiation. (True)	66	71
6. Palm oil production is a threat to gibbon habitat. (True)	37.1	40.7
7. Most gibbon species are listed as endangered or critically endangered. (True)	45.6	41.1
8. In the wild, gibbons are found in South America. (False)	10	10.1
9. Mated gibbon pairs vocalize together. (True)	50	55.5
10. Male white-cheeked gibbons are a different color than females. (True)	45.8	48.5

Entering visitors versus exiting visitors

I compared all entering visitors (both first time visitors and returning visitors) with all exiting visitors (visitors who did and did not participate in the GEC) to determine whether there was an overall trend toward fact-based learning about gibbons and gibbon conservation within the zoo. Exiting visitors had a higher correct response rate for six of the ten knowledge questions (see Table 2). Exiting visitors were not more likely to correctly identify a white-cheeked gibbon when presented with an image (Statement 1), but were more likely to correctly classify gibbons as apes (Statement 2: 27.4% of entering visitors versus 35.3% of exiting visitors). Exiting visitors were also able to correctly answer some general knowledge questions significantly more often than entering visitors, specifically questions regarding gibbon locomotion (Statement 3: 58.5% of entering visitors versus 76.2% of exiting visitors; Statement 5: 68.3% of entering visitors versus 81.8% of exiting visitors), and physical characteristics (Statement 4: 70.1% of entering visitors versus 76.4% of exiting visitors; Statement 10: 47% of entering visitors versus 62.7% of exiting visitors).

Additionally, more exiting visitors than entering visitors were able to identify gibbon species as endangered or critically endangered (Statement 7: 43.6% of entering visitors versus 54.7% of exiting visitors). Interestingly, as a group exiting visitors were *not* more likely to

identify palm oil production as a threat to gibbon habitats (Statement 6), with 38.7% of entering and 43.8% of exiting visitors responding correctly to this question. This indicates that a visit to the San Antonio Zoo does lead to a general increase in fact-based knowledge about the white-cheeked gibbon, though specific conservation threats to this species are not well understood by visitors when they leave. However, in order to determine whether this is due to direct learning opportunities (i.e. participation in the GEC) or through indirect learning (i.e. reading signage or personal observation) it is necessary to compare the correct response rates for exiting visitors who did and did not participate in the GEC.

Table 2: % Correct response to True/False knowledge questions- Entering v. Exiting Visitors

Statement and the correct response	Entering Visitors (% correct response)	Exiting Visitors (% correct response)
1. The image on the table is that of a white-cheeked gibbon. (True)	60.7	66.8
2. Gibbons are apes. (True)	27.4	35.3
3. Gibbons spend most of their time on the ground. (False)	58.5	76.2
4. Monkeys have tails, but apes do not. (True)	70.1	76.4
5. Gibbons move through trees using brachiation. (True)	68.3	81.8
6. Palm oil production is a threat to gibbon habitat. (True)	38.7	43.8
7. Most gibbon species are listed as endangered or critically endangered. (True)	43.6	54.7
8. In the wild, gibbons are found in South America. (False)	10	13.4
9. Mated gibbon pairs vocalize together. (True)	52.5	54.8
10. Male white-cheeked gibbons are a different color than females. (True)	47	62.7

Exiting visitors: GEC participants versus non-participants

To further understand the impact of the GEC on visitor learning I compared the correct response rate of exiting visitors who did and did not participate in the GEC. When compared with visitors who did not participate, GEC participants had a higher correct response rate for seven of the ten knowledge questions (see Table 3). Surprisingly, visitors who participated in the GEC were not able to correctly identify an image of a white-cheeked gibbon more often than

visitors who did not participate (Statement 1), nor are they able to identify the region of the world where gibbons are found[14] (Statement 8). However, they were able to answer many general knowledge questions with a higher success rate after participating in the GEC, including those regarding taxonomic classification (Statement 2: 21.8% of exiting Non-participants versus 60.9% of exiting GEC participants), physical features (Statement 4: 72.5% of exiting Non-participants versus 83.9% of exiting GEC participants; Statement 10: 55.4% of exiting Non-participants versus 76.4% of exiting GEC participants), and locomotion (Statement 3: 68% of exiting Non-participants versus 91.7% of exiting GEC participants; Statement 5: 75.3% of exiting Non-participants versus 94.2% of exiting GEC participants). Interestingly, participation in the GEC makes visitors more aware of specific conservation issues faced by this species, as participants are more aware that gibbon species are listed as endangered or critically endangered (Statement 7: 50% of exiting Non-participants versus 63.5% of exiting GEC participants), and that palm oil is a threat to gibbon conservation in the wild (Statement 6: 39% of exiting Non-participants versus 52.9% of exiting GEC participants). These results indicate that participation in the GEC to the San Antonio Zoo does lead to a general increase in fact-based knowledge about the white-cheeked gibbon in visitors. These results also suggest that the GEC is successful in conveying a conservation message, i.e. that palm oil is a threat to gibbon habitats.

Table 3: % Correct response to True/False knowledge questions- Exiting Non-GEC Participants v. Exiting GEC Participants

Statement and the correct response	Non-Participants (% correct response)	GEC Participants (% correct response)
1. The image on the table is that of a white-cheeked gibbon. (True)	64.2	71.8
2. Gibbons are apes. (True)	21.8	60.9
3. Gibbons spend most of their time on the ground. (False)	68	91.7
4. Monkeys have tails, but apes do not. (True)	72.5	83.9
5. Gibbons move through trees using brachiation. (True)	75.3	94.2

[14] Gibbon species are native to Southeast Asia, not South America.

Table 3: Continued		
6. Palm oil production is a threat to gibbon habitat. (True)	39	52.9
7. Most gibbon species are listed as endangered or critically endangered. (True)	50	63.5
8. In the wild, gibbons are found in South America. (False)	8.5	22.9
9. Mated gibbon pairs vocalize together. (True)	49.5	64.9
10. Male white-cheeked gibbons are a different color than females. (True)	55.4	76.4

Entering visitors versus exiting GEC participants and exiting non-participants of the GEC

Finally, in order to determine whether direct or indirect learning opportunities were more successful in conveying information about white-cheeked gibbons and gibbon conservation the correct response rates of exiting visitors who did and did not participate in the GEC were compared to those of entering visitors for each statement. After participating in the GEC visitors had an increased correct response rate to all ten statements when compared with entering visitors (Figure 3). However, non-participants had a higher correct response rate for three of the ten statements; interestingly, these statements (#3, 5 & 10) were those where the correct answer could be identified from personal observation of the gibbons rather than from reading signage. These results suggest that participation in the GEC leads to an increase in fact-based knowledge in visitors more than a zoo visit alone, although personal observation and interaction with zoo animals is the most effective indirect educational method for visitors.

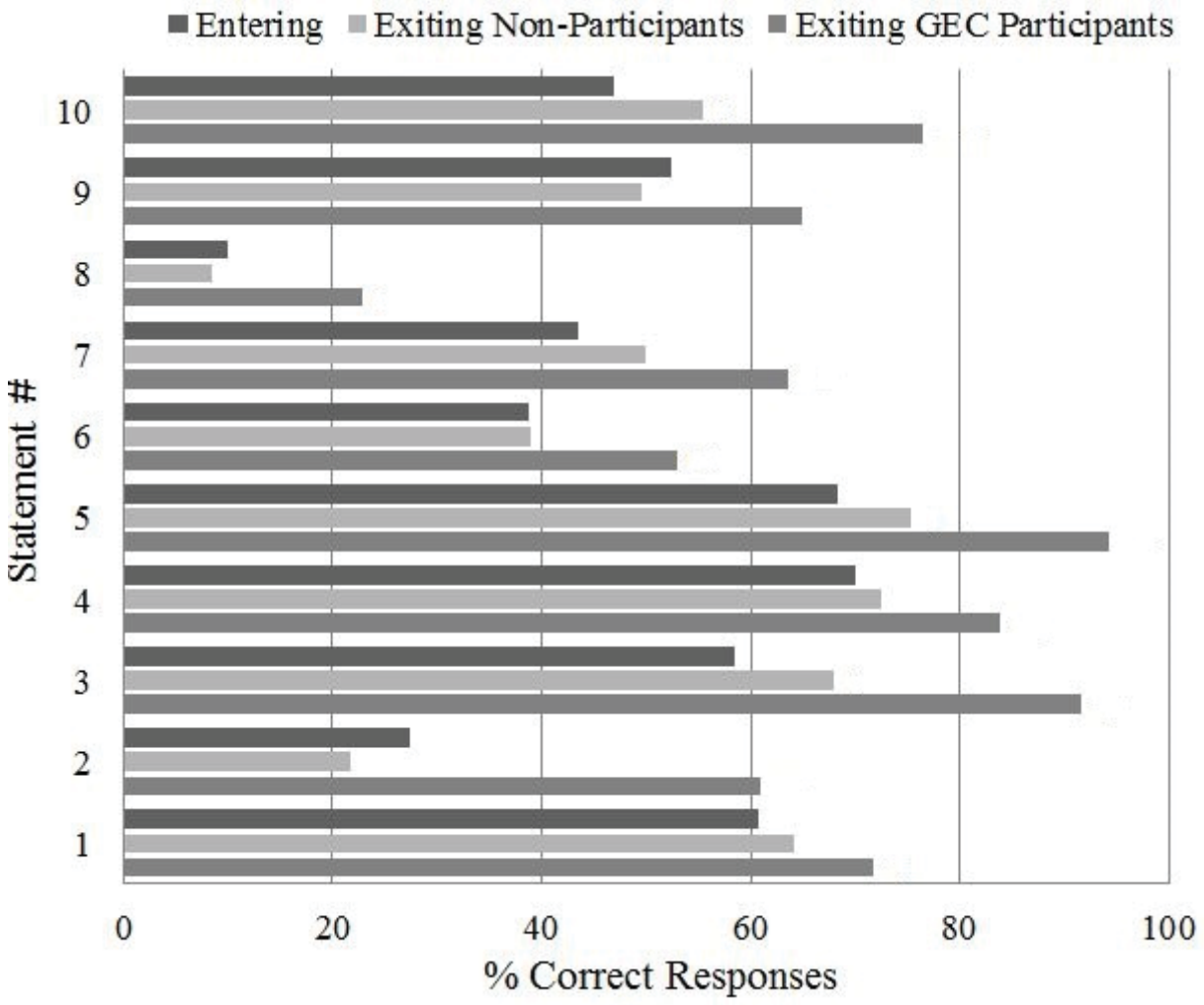

Figure 3: % correct response to True/False statements

Summary of findings

In this section I addressed the results of a portion of RQ2: What are zoo visitors learning about white-cheeked gibbons and other animals in the zoo environment within and outside of the IEP? I found that the GEC plays an important role in educating visitors about gibbons and gibbon conservation. Visitors who participate in this program are not only more likely to learn life history information about the gibbons but also to remember important conservation information about this species.[15] The GEC is successful at conveying the conservation message

[15] It should be noted that there was the potential for selection bias in this sample. Because my study design did not entail randomly assigning visitors to GEC participant or non-participant study groups, and I did not assess the

that palm oil is a threat to gibbon habitats, with visitors who participate in the GEC remembering this information more than visitors who did not participate. Visitors also learn about gibbons outside of the GEC through indirect methods, such as observation and reading zoo signage, and visitors who did not participate in the GEC were still able to recall and apply information they learned from personally observing and interacting with the white-cheeked gibbons housed at the San Antonio Zoo. However, these visitors did not learn any information about gibbon conservation through indirect educational opportunities. These results indicate that the GEC is an effective tool for educating visitors about animals and animal conservation.

Visitor questionnaire results: Attitude

While the GEC is effective in conveying animal and conservation knowledge to visitors, knowledge is not the only thing that this IEP is trying to impact; an additional goal of the GEC is to positively influence visitor attitudes towards gibbons and conservation. Changes in attitudes toward animals were also assessed through the "Attitude and Knowledge" questionnaire, as well as through interviews with visitors. In this section I discuss the results of the attitude portion of this questionnaire in the same visitor categories as discussed in the previous section.

Entering: First time visitors versus returning visitors

First time visitors and returning visitors had similar attitudes towards primates and zoo animals for ten of the 15 Likert type questions in this section (see Table 5 in Appendix H), and overall visitors entering the zoo have positive attitudes towards animals. Visitors in both groups said they would enjoy learning about the habitat of wild primates (Statement 1), suggesting an interest in these animals. Questionnaire results also suggest that visitors feel connected with animals. First time and returning visitors generally disagreed with the statement "I believe love

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baseline gibbon and gibbon conservation knowledge of GEC participants, it is possible that visitors who participated in the GEC were more likely to have prior knowledge about gibbons and gibbon conservation, which would have influenced these results.

is an emotion that people should feel for other people, not for animals" (Statement 12) with approximately 75% of visitors in each category selecting disagree or strongly disagree. Visitors also feel a connection with the animals they see at the zoo; approximately 50% of visitors in each group said they could become very emotionally attached to animals they see in the zoo (Statement 6).

Despite feeling positively towards zoo animals, visitors remained unsure as to whether animals are safer and healthier in zoos than they are in the wild (Statement 9), with more visitors in each category selecting neutral over agree or disagree when responding to this statement. Most visitors believed that it is good to keep primates in zoos as long as they are treated properly (Statement 13) with 61% of visitors in each category agreeing with this statement while most of the rest of visitors in each category selected neutral. However, visitors seem to be uncomfortable with the idea of primates "performing" for human entertainment; first time and returning visitors generally believed that primates should not be trained to do tricks (Statement 3), and visitors in both groups were conflicted as to whether primates should act on TV commercials (Statement 2).

There were some differences in attitudes between first time and returning visitors in regard to visitors' perceived relationship with primates and their desire to learn about these animals. First time visitors to the zoo were more likely to agree to the statement "I would like to have a monkey or an ape as a pet" (Statement 4) with 25.4% of first time visitors agreeing as opposed to the 15.1% of returning visitors. First time visitors were also more likely to agree to the statement "I would like to live near wild primates," (Statement 11) with 27.8% of first time visitors agreeing versus 18.4% of returning visitors. Additionally, returning visitors were significantly more likely to agree with the statement "I would prefer to watch a TV program about wild gibbons or other primates than travel to see them in the wild" than first time visitors,

with 33.8% and 24% agreeing respectively. Thus, returning visitors are less likely to desire physical and/or repeated contact with wild or "domesticated" pet primates.

Returning visitors are also more likely to be interested in learning about wild gibbons and other primates than first time visitors (Statement 7: 66.3% of first time visitors selected agree or strongly agree versus 70.5% of returning visitors). However, it is not clear whether multiple visitors to the zoo encouraged visitor curiosity in primates or whether curious visitors visited the zoo more often. Finally, prior experience within the San Antonio Zoo made visitors more likely to have a positive opinion about the welfare of animals within the San Antonio Zoo (Statement 15), with returning visitors responding more positively and with significantly fewer neutral answers than first time visitors.

These results indicate that prior visits to the San Antonio Zoo discourage people from desiring direct and/or intimate contact with primates. When considered from a conservation education standpoint this is positive for the zoo, as one of the primary conservation threats to primates is the pet trade. The San Antonio Zoo tries to discourage visitors from keeping exotic animals, specifically primates, as pets, and this message is particularly important to visitors who live in Texas where exotic animal laws are particularly lax. This message is not clearly stated in any zoo signage or IEP, thus visitors may be discouraged from having primates as pets after watching their behavior in zoos. However, it may also be the case that visitors who are likely to visit zoos often are less likely to desire exotic pets in general, and assessing this was beyond this research.[16]

[16] To assess this, future scholars should administer the "Attitude and Knowledge" questionnaire to a sample population outside of the zoo setting and compare these results with those attained from zoo visitors.

First time entering visitors versus exiting visitors

First time visitors and exiting visitors (visitors who did and did not participate in the GEC) had similar attitudes towards primates and zoo animals for seven of the 15 Likert type questions in this section (see Table 7 in Appendix H). Visitors in both groups were interested in learning about the habitat of wild primates (Statement 1), though exiting visitors were more interested in learning about how different primate species were related than first time entering visitors (Statement 14: 72.1% first time visitors selected agree or strongly agree versus 76.1% of exiting visitors), and were more interested in learning about wild gibbons and other primates in general (Statement 7: 66.3% first time visitors selected agree or strongly agree versus 72.8% of exiting visitors). Visitors in both groups also had positive overall attitudes towards animals. As with the entering visitors discussed in the previous section, exiting visitors also believed they could feel connected with animals. Exiting visitors also disagreed with the statement "I believe love is an emotion that people should feel for other people, not for animals" (Statement 12) with 77.1% of respondents selecting disagree or strongly disagree, and approximately 50% of the visitors in both groups said they could become very emotionally attached to animals they see in the zoo (Statement 6).

Yet as with the entering visitors discussed in the previous section, exiting visitors were unsure as to whether animals are safer and healthier in zoos than they are in the wild (Statement 9), with more visitors selecting neutral (46.2%) over agree (24.9%) or disagree (28.6%) when responding to this statement. Exiting visitors and those entering for the first time believed that it is good to keep primates in zoos as long as they are treated properly (Statement 13: 61.3% first time visitors and 68.3% of exiting visitors selected agree or strongly agree), and most visitors in both groups believed that the animals at the San Antonio Zoo were well cared for (Statement 15:

75.7% first time visitors and 90.3% of exiting visitors selected agree or strongly agree), with exiting visitors agreeing more often and with fewer ambivalent neutral answers than first time entering visitors. These results suggest that experience and/or interactions with animals within the zoo may make visitors more comfortable with the concept of captive animals. These results also indicate that interactions with animals in an outwardly clean and well-kept zoo positively influence visitor perception of captive animal health and wellness.[17]

Exiting visitors also seemed uncomfortable with the idea of primates "performing" or being put on "display" for human entertainment; while visitors in both groups generally believed that primates should not be trained to do tricks, with exiting visitors being more uncomfortable with this idea than first time visitors (Statement 3: 44.7% first time visitors selected disagree or strongly disagree versus 51.7% of exiting visitors). Entering and exiting visitors were also conflicted as to whether primates should act on TV commercials, although first time entering visitor felt more positive about primates acting on TV than exiting visitors (Statement 2: Statement 2: 58.2% first time visitors selected agree or strongly agree versus 38.9% of exiting visitors). These results suggest that visitors may be more empathetic toward primates after viewing them in the zoo than first time visitors who have little or no prior experience viewing and/or interacting with these animals.

The differences in attitudes between first time entering visitors and exiting visitors in regard to visitors' perceived relationship with primates emulate those between first time and returning visitors. Exiting visitors to the zoo were less likely to agree to the statement "I would

[17] Visitors to the zoo are likely more "pro-zoo" and "pro-captive animals" than the general population, as they support these institutions as consumers; people who do not believe animals are better off in zoo settings are not likely to visit these institutions, and were likely not represented in this study sample. Additionally, visitors are not likely to condemn the keeping of animals in zoos after their visit, as doing so would require self-critique due to their participation in animal tourism. In order to determine if these attitudes are representative of the general population the "Attitude and Knowledge" questionnaire should be administered to a sample population outside of the zoo, and these results should be compared to those attained from zoo visitors. Additional in-depth interviews regarding visitors' perceptions of captive animals before and after their zoo visit would also be beneficial in this context.

like to have a monkey or an ape as a pet" (Statement 4), with 18.6% of exiting visitors agreeing as opposed to the 25.4% of first time visitors, and were also less likely agree to the statement "I would like to live near wild primates," (Statement 11) with 19.3% of exiting visitors agreeing versus 27.8% of first time visitors. These results further suggest that visitor experiences with primates within the zoo setting make them less likely to desire prolonged, repeated, and/or intimate contact with wild or "domesticated" primates.

Exiting visitors: GEC participants versus non-participants

In order to determine the affective impact of the GEC on visitors I compared the attitudes of exiting visitors in two categories, visitors who had not participated in the GEC and those who had. Exiting visitors in both categories had similar attitudes towards primates and zoo animals for 13 of the 15 Likert type questions (see Table 8 in Appendix H). Visitors in both exiting groups were similar in their desire to learn about primates, primate habitats, and taxonomic relationships (Statements 1, 7, & 14). There was no difference between exiting groups regarding visitor attitudes toward exotic primate pet ownership, with approximately 71% of visitors in each category stating that they did not want an ape or monkey as a pet (Statement 4). Exiting visitors in both groups also did not differ in their attitudes toward their proximity to wild primates, with most visitors in each group preferring not to live near wild primates and with approximately 50% of visitors in each group preferring to watch TV programs about primates than traveling to seem them in the wild (Statements 10 & 11). Approximately 50% of visitors in both categories did not think that primates should be trained to do tricks (Statement 3), and both GEC participants and non-participants were conflicted as to whether they wanted to see primates act on TV commercials (Statement 2). Thus participation in the GEC did not alter visitor attitudes towards the preferred proximity and level of contact with wild primates, nor did it influence visitors'

desire to learn about various aspects of primate life history, habitat, and/or taxonomic relationships.

Visitors in both groups also had overall positive attitudes towards animals and approximately 50% of exiting visitors in both category believed they could feel connected with animals (Statement 6). While the majority of exiting visitors in each group disagreed with statement #12, "I think love is an emotion that people should feel for other people, not for animals," visitors who participated in the GEC were more likely to disagree with the statement than non-participating visitors; 73.8% GEC participants selected disagree or strongly disagree versus 83.2% of non-participating visitors. Finally, 90% of visitors in each group believed that the animals at the SA Zoo were well cared for (Statement 15), but GEC participants were more likely to believe that it is acceptable to keep primates within the zoo setting as long as they are treated properly (Statement 13: 66.9% first time visitors selected agree or strongly agree versus 71% of exiting visitors). Participants in the GEC had more positive attitudes towards the idea of housing animals in zoos and felt they were able to form emotional connections with zoo animals more than nonparticipants, suggesting that participation in the GEC and other IEPs may increase visitor "connectedness" with captive animals and positively influence their opinion of the housing of animals in zoos.

Summary of findings

In this section I discussed the results of this research that addressed two research questions. In RQ3 I asked "does a visit to the zoo alter zoo visitors' attitudes toward animals, specifically primates?", and in RQ4 I asked "does participation in a zoo-sponsored IEP alter zoo visitors' attitudes toward animals, specifically primates?" These results indicate that a visit to the San Antonio Zoo does alter visitor attitudes toward the types of relationships visitors wish to

have with and their desire to learn about primates, while participation in the GEC may influence visitor attitudes regarding animals in captivity and their emotional connectedness to zoo animals.

There is a general trend towards positive attitudes towards animals in all zoo visitors, entering and exiting. Even in the first time visitor category, at least 75% of visitors believed that they could feel love for animals, and at least 50% of visitors in each category believed they could feel emotionally attached to animals they saw in the zoo. This makes sense, as people who did not like animals would likely not choose to visit a zoo for recreation. In future studies it would be interesting to examine peoples' responses to these same attitude statements outside of the zoo setting to determine whether people who choose to visit the zoo are more likely to have positive attitudes towards animals than those who do not.

Not only do most visitors in all categories feel positive towards animals, they also tend to believe they can feel emotionally connected with animals they see in the zoo. Yet most visitors hesitate to say that animals in zoos are better off than those in the wild; this may be partially because visitors seem uncomfortable with the perceived nature of zoo animals as "on display," as visitors tend to have more negative attitudes towards actions that make the animal seem "unnatural" such as acting in TV commercials or being taught to do tricks. Exiting visitors feel more uncomfortable with this idea, suggesting that visitors may be more empathetic toward primates after interacting with them within the zoo. These results indicate that visitors are forming emotional connections with the animals they observe during their visit, even though visits with individual animals are limited.

While experience with zoo animals may make visitors more empathetic towards them, it is interesting that visitors returning to the zoo and those exiting the zoo were significantly less likely to desire prolonged, repeated, and/or intimate contact with wild or "domesticated"

primates. Compared to first time visitors, returning visitors were significantly less likely to want to live near wild primates and both returning and exiting visitors were less likely to want to travel to see primates in the wild or to desire a primate as a pet. It is positive that returning and exiting visitors do not wish to have primates as pets, especially because pet primates are relatively easy to obtain in the state of Texas, but it is puzzling that visitors desire less physical closeness to the animals they feel they can connect with. This contradiction may give insight into the nature of the human/animal and humananimal relationships visitors are experiencing and creating within the zoo, as well as they ways in which visitors are conceptualizing the natural world through virtualism; I discuss this paradox and its possible interpretations in depth in Chapter 4.

There is also a general trend toward an increase in interest in learning about primates after visitors interact with and experience primates within the zoo. Returning visitors as well as exiting visitors were significantly more interested in learning more general information about wild gibbons and other primates when compared to first time visitors, and exiting visitors were also more interested in learning about how different primate species were related to one another than first time visitors. Interestingly, these visitors were not significantly more interested in learning about the habitats of wild primates, suggesting that visitors may be mentally abstracting the primate from its environment when interacting with and reflecting on their experience with primates in the zoo.

Not only are returning and exiting visitors more interested in learning life history and taxonomic information about primates, their experiences interacting with primates and other animals within the San Antonio Zoo have led them to have a more positive attitude towards the housing of captive animals within the San Antonio Zoo. While most entering and exiting visitors

in all categories believed that it is good to keep primates in zoos as long as they are treated properly, returning and exiting visitors were significantly more likely to believe the animals at the San Antonio Zoo were well cared for. This indicates that interactions with animals in an outwardly clean and well-kept zoo positively influence visitor perception of captive animal health and wellness.

Participation in the GEC also positively influences visitors' attitudes towards housing animals in zoos; when compared to exiting visitors who had not participated in the GEC, visitors who participated in this program were significantly more likely to believe that it is good to keep primates in zoos as long as they are treated properly. GEC participants were also significantly more likely to believe that they could form emotional connections with zoo animals. Yet in most of the attitude areas assessed here, participation in the GEC did not alter visitor attitudes towards primates and other animals. Participation in the GEC did not significantly alter a visitors' desire to learn about various aspects of primate life history, habitat, and/or taxonomic relationships, nor did it seem to influence their general attitudes towards animals. Additionally, participation in the GEC did not significantly alter visitor preferred level of contact with wild and/or "domesticated" primates or alter their opinions about primates performing and being "on display".

This indicates that this program is making visitors more pro-zoo and helping them form connections with zoo animals. This may be due to the fact that the visitor experience with gibbons during the GEC is mediated by an enthusiastic and passionate Educational Interpreter. The enthusiasm of the interpreter, as well as receiving the "insider" information relayed by the Interpreter during the program, may lead visitors to feel more positive about the white-cheeked gibbon and the ways in which animals are treated within the zoo context. However, while this is good that the GEC is making visitors more pro-zoo and pro-zoo animal, this does not influence

visitors' desire to learn about or their attitudes towards wild primates more than a zoo visit alone. From these results I conclude that a visit to the zoo is effective in altering visitor attitudes toward animals, specifically primates, in many areas, and while the GEC is effective in altering visitor attitudes toward captive animals it is less effective in altering attitudes than I had hypothesized.

Assessing changes in visitor behavior

In order to achieve the San Antonio Zoo's long term goal for this program, the GEC would have to increase visitor participation in positive conservation-oriented behaviors. To assess this, visitors were offered the opportunity to participate in a conservation activism project focusing on the sustainable use of palm oil. This conservation message was integrated into the GEC script and guidelines to shopping for products which use sustainable palm oil in their products were handed out during the GEC by the education interpreter staff. The problem of unsustainably used palm oil affects numerous species with individuals on exhibit in the San Antonio Zoo, such as white-cheeked gibbons and Sumatran tigers; this ensured that visitors who did not participate in the GEC could still theoretically be emotionally invested in the activism project,[18] though the number of visitors who were informed about this issue would likely be low.

Palm oil cards were given out to two groups: visitors who did participate in the GEC and visitors who did not. Response rates for each category were low; of the 30 cards distributed in each category, two were returned from GEC participants (6.7%) and three cards were returned from non-participants (10%) (Table 4). Post-card response rates did not differ between visitors who participated in the GEC and visitors who did not.

[18] Two Sumatran tiger cubs were born at the San Antonio Zoo in August 2014. While the cubs were not on exhibit until October 2014, their birth was widely publicized and drew many visitors to the zoo thus making the Sumatran tiger on exhibit very popular with visitors.

Table 4: Palm Oil post-card return rates

	Returned [Count (%)]	Not Returned [Count (%)]	Total Distributed
GEC Participant	2 (6.7%)	28 (93.3%)	30
Non-Participant	3 (10%)	27 (90%)	30

The types of responses received also did not differ significantly between the two groups. Figure 4 (below) shows the response cards received from visitors who did not participate in the GEC or TEC. The card on the left reads: "Please help!!!! Use sustainably grown palm oil." This respondent also chose to depict the gibbon crying. The center card reads: "We will stop buying your products until you stop destroying (illegible) habitat!" Finally, the card to the right reads "Please use sustainable oils in our products, esp. palm oil. I use lots of your products but also think you should preserve our environment + animals. Thx!" These responses show that visitors understood the palm oil conservation message as described by the research team when the cards were handed out, making their experience with the palm oil conservation message similar to that of visitors who participated in the GEC.

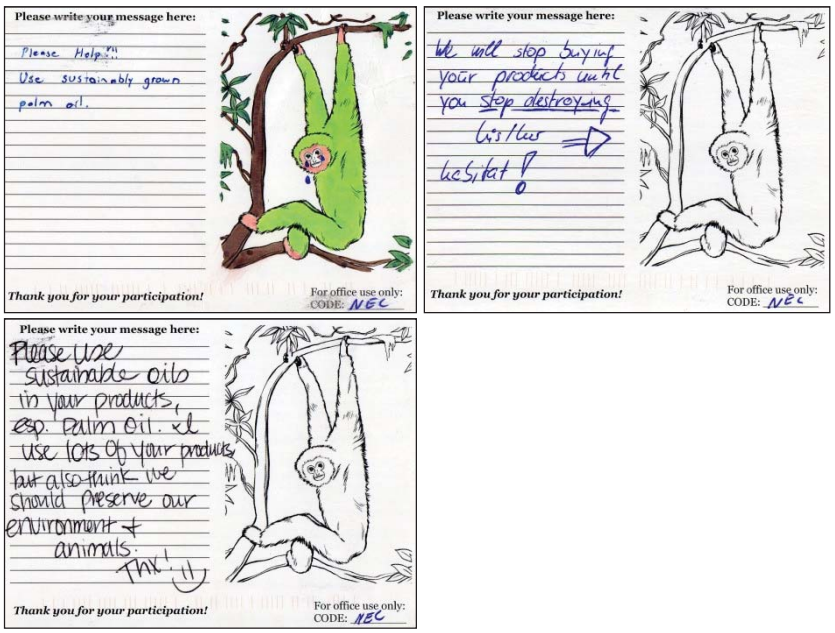

Figure 4: The response cards received from visitors who did not participate in the GEC.

Figure 5 (below) shows the returned response cards from visitors who did participate in the GEC or TEC. The card on the left, returned by a visitor who participated in the TEC, reads: "To all companies that use non-sustainable palm oil in their products: please help stop the destruction of Asian palm forests that animals depend on to survive. Please obtain the palm oil you require from already established plantations that are environmentally friendly and support the members of the R.S.P.O. It is everybody's responsibility to preserve wildlife for the future. Thanks!" The card to the right, returned by a visitor who attended the GEC, reads: "Dear compane (sic) please stop harming the big rainforest." As with the responses from non-participating visitors, these responses indicate that visitors understood the palm oil conservation message conveyed by the research team and the Educational Interpreter during the GEC program.

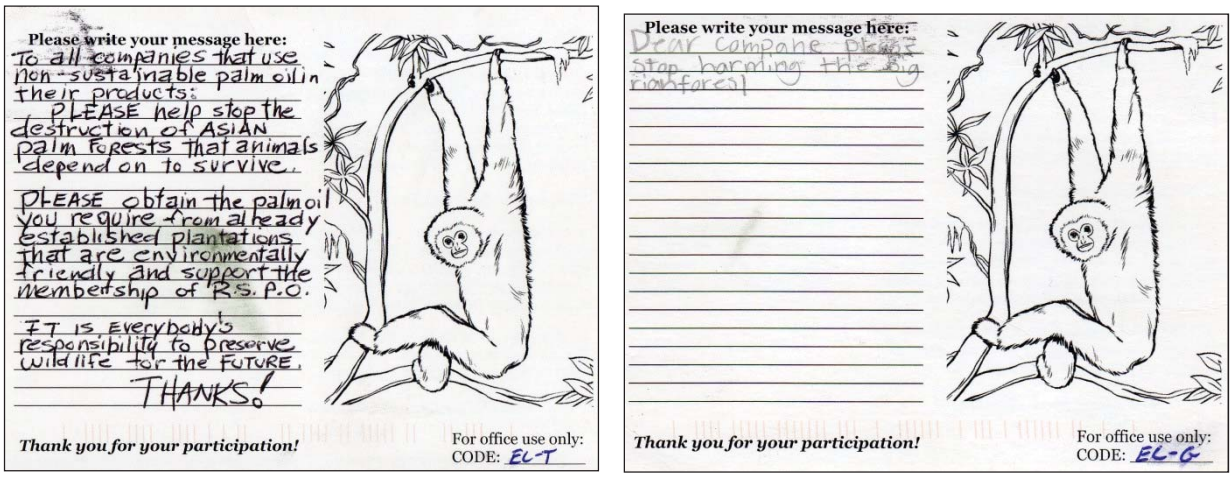

Figure 5: The response cards received from visitors who did participate in the GEC.

Summary of findings

These response card results indicate that the GEC does not significantly impact visitor behavior; not only are visitors who participate in the GEC not more likely to participate in a conservation activism opportunity, their responses are similar to those of visitors who did not participate in the program. In research question 5, "Does participation in an IEP affect the

conservation-oriented actions of zoo visitors?" I hypothesized that visitors participating in the GEC would be more likely to participate in a low cost conservation opportunity than non-participating visitors. However, this was not the case, and there was no difference in successful completion rate of this conservation activism behavior between zoo visitors who did participate in the GEC/TEC program and those that did not. Therefore, while participate in the GEC increases visitor knowledge about white-cheeked gibbons and gibbon conservation, this increase in knowledge does not translate into a positive change in future conservation behavior as measured in this study.[19] These results were unexpected, but may have been due to the use of the mail-in response card method used to assess changes in visitor conservation-oriented behaviors.

Decoding the GEC

Zoos and aquaria in the United States aim to promote conservation values in visitors by providing memorable recreational and educational experiences (Patrick *et al.* 2007). The San Antonio Zoo addresses this by providing informal education opportunities, such as the GEC, to visitors with the goal of increasing visitor knowledge and conservation-oriented behaviors. IEPs are complex; this mixed methods approach to assessing the impact of an IEP at the SA Zoo yielded intriguing results. Participation in the GEC program improves visitor knowledge of gibbons and gibbon conservation more than a zoo visit alone[20] (Figure 3); this indicates that the GEC is meeting its goal of educating visitors on basic animal life history and conservation information. Despite the success of the GEC in educating visitors on specific facts about gibbons and gibbon conservation, the GEC did not alter individuals' attitudes towards primates

[19] In future studies, the mail-in response card sample size should be increased to determine whether this response rate and these results are typical.

[20] During data collection I noted that individuals participating in the GEC often did not stay at the presentation to hear all of the scripted information. This resulted in different groups of people being exposed to different information, which was not the intended study design. Yet when taken as a whole, exiting visitors who participated in the GEC, even if they only attended part of the presentation, were able to correctly answer more questions on gibbons and gibbon conservation when compared to both entering visitors and non-participant exiting visitors (see Figure 3).

and other animals in most of the attitude areas assessed (Appendix H), nor did participation in the GEC make individuals more likely to participate in a low-cost conservation activism opportunity (Table 4).

These results suggest that an increase in animal and/or conservation knowledge may not correlate with an increase in positive attitudes towards animals or medium-term pro-conservation behaviors in zoo visitors. This is a problem for the GEC and other IEPs, as the assumption of a positive correlation between knowledge and attitude/future behavior is the core principle upon which these programs are founded.

There are a few possible reasons for the apparent disconnect between knowledge and behavior change. First, these results could indicate a methodological challenge that was unanticipated during the study design. Medium-term behavioral changes may be difficult to affect with a single short program; short-term behavior change assessments, such as opportunities for immediate visitor conservation activism through petitions programs, may be a better indicator of program success and should be included in future studies. Positive correlations between IEPs and indicators of short-term behavior change will further elucidate the nature of the relationship between the IEPs and conservation behaviors in participants. An increased mail-in response card sample size in both the GEC participants and non-participants would also better address the connection between participation in the GEC and changes in medium-term conservation-oriented behaviors.

An additional methodological challenge was the available study audience. When creating IEPs, zoo employees aim to engage visitors of every age and make their programs fun and interactive. However, when planning the GEC, Lacy M. noted that the program was designed with children in mind:

> *We kind of started with the kids because we felt that the majority of people who come into the zoo have some age of child, and if you can get those kids to stay put long enough then the parents will actually receive some information and we can potentially change their behavior as we are interacting [with them].*

Because the "Attitude and Knowledge" questionnaire and the mail-in palm oil cards were only given to adults, it is possible that these results do not represent the complete impact that participation in the GEC can have on younger visitors, such as children and teenagers. While the program hopes to engage children in order to then draw in adults, it is possible that the program has more of an impact on the attitudes and behaviors of children than adults. Affective and long-term behavior changes in children are more difficult to assess in a limited study period, and future long-term studies would be useful in assessing how IEPs influence children's appreciation for, understanding of, and behavior toward animals and the environment.

While methodological changes in future studies may help us better understand the relationship between knowledge acquisition and attitude and behavior change, I believe that these results are indicative of the challenges zoos face when planning and executing IEPs. In creating programs that are engaging to children and adults, many of the "harsh realities" of conservation are removed from the presentation. As Lacy M. explains, "it's kind of a hard… it's hard to deliver conservation messages a lot of times when you are trying to be interactive and fun." In order to keep these interactions upbeat, kid-friendly, and fun the true state of species and habitat conservation is often blunted or sanitized. This could lead to visitors of all ages to be less emotionally impacted by the IEPs, which could explain the disconnect between an increase in knowledge and any significant changes in visitor attitudes and/or behavior.

In the following chapter I explore this idea further. I explore the ways in which visitors related to animals within the zoo setting and discuss the ways in which visitors understand and

construct the “reality” of the “natural” and their place within the environment through their experiences with animals and “naturalistic” environments within the San Antonio Zoo.

CHAPTER FOUR: THE CAPTIVE HUMANANIMAL

Throughout our lives we have contact with animals in a variety of contexts. Many people live with pets, care for live-stock, or interact with wildlife during nature hobbies such as hiking, fishing, and bird watching. Even individuals living in urban areas in the United States interact with a variety of animal species, including mice and rats, squirrels, pigeons, deer, lizards, snakes, and many invertebrates. Yet within the zoo environment visitors experience a variety of novel animals and built naturalistic environments that they would otherwise not encounter in their daily lives. Thus, visitors' past experiences with animals and the environment inform their interactions with and understanding of these new animals and environments, while experiences with these novel animals and environments have the potential to alter visitors' preconceptions and understanding of the natural world.

Throughout this study I investigated the ways in which visitors learned about the natural world through their interactions with animals and "built" environments within the zoo (RQ1, RQ2) and how these experiences influenced visitor perception, understanding, and appreciation of animals and "natural" environments (RQ3, RQ4, RQ5). In this chapter I examine how visitors interact with and experience animals within the zoo context, and explore how these visitor/zoo animal interactions influence visitor affective, knowledge, and behavioral outcomes during and outside of the *Gibbon Education Connection* program (GEC). I then discuss whether these relationships can be understood within the context of the dichotomous humanist paradigm or whether the post-humanist humananimal network is a more appropriate framework for understanding the complexities of these interactions. I then discuss how visitor experiences with zoo animals and the "naturalistic" habitats in which zoo animals live are simultaneously shaped by and influence visitors' understanding not only of the zoo animals, but also the visitors' "virtual reality" of the state of the "natural" environment and animal conservation needs. I

conclude by discussing the implications of these "virtual realities" on the success of visitor conservation education in zoo.

Visitor/zoo animal interactions

Human and animal relationships have long been understood within the humanist framework, in which humans and animals are seen as dichotomous and separate entities within their interactions. Many scholars exploring human/animal relations within zoos have looked at these interactions through the humanist lens, examining them as relationships of unequal power and domination (Coe 1996; Kellert 1986; Ritvo 1987; Sollund 2011). The assertion that human/animal relationships within all contexts, especially in zoos, are ones of human domination and subjection of animals has fueled many anti-zoo sentiments and animal rights philosophies that continue to gain ground today.

The humanist understanding of human/animal relationships has been challenged by "post-humanist" scholars such as Donna Haraway, who argues that the "human exceptionalism" which guided humanist perspectives on human/animal relationships has caused scholars to ignore the true complexities of human and animal interactions. Rather than humans being in a position of absolute power within these interactions, Haraway (2003, 2008) argues that humans and animals are involved in relationships within which all humans and animals are actors influenced by one another, becoming "companion species" within the entangled "humananimal" network. While all species may not hold equal power during these their interactions, Haraway argues that studying human and animal relationships within the light of the humananimal network allows us to understand the true complexities of these relationships

Traditional zoo education strategies have long recognized that the dichotomous approach to human/animal relationships is problematic when trying to promote visitor empathy for animal

species within and outside the zoo. Zoo educators try to emotionally connect visitors to animals in the zoo, as well as those still living in their natural habitats, with the hope that these emotional connections will spur positive changes in visitor conservation actions after their visit. However, as discussed in Chapter 3, while zoo education programs such as the *Gibbon Education Connection* program (GEC), an informal education program (IEP) at the San Antonio Zoo, try to meet these goals, these attempts are not consistently successful; visitors may learn about gibbons and gibbon conservation during the GEC, but this additional knowledge may not affect later conservation actions despite visitors reporting that they could feel emotionally connected with zoo animals.

To determine why the GEC was not successful in impacting visitor conservation actions, the ultimate goal of this program, I explored the ways in which visitors interacted with white-cheeked gibbons and the gibbon exhibit, zoo staff members, and other visitors during and outside of the GEC (RQ1, RQ2). I further examined whether these interactions could be understood through a humanist or post-humanist framework. Through participant observation and interviews I found specific differences in visitor behavior between GEC participants and non-participants which may explain the "Attitude and Knowledge" questionnaire and mail-in response card results discussed in Chapter 3. These differences can be grouped into three categories, which will be discussed here: (1) visitor engagement with the exhibit and zoo staff; (2) the quantity and quality of direct visitor/ gibbon interaction; and (3) the nature and quantity of intragroup interactions.

Visitor engagement with the exhibit and zoo staff

With so many experiences and exhibits available to them, visitors have many choices in which animals they interact with and programs they participate in during their visit. Visitors I

interviewed said they came to the zoo for a fun, engaging, educational experience, and noted that they expected to see "new," "different," and/or "exotic" animals during their visit, "animals that you do not see every day". Thus, visitors are drawn to perceived "new" or "exotic" animals who they believe are fun, interactive, or engaging. Many visitors choose to spend time viewing the gibbon enclosure watching the Asian small-clawed otters and the white-cheeked gibbons that live in the same exhibit. This exhibit is on a main pathway, the exhibit is large, and the otters and gibbons are charismatic, and because gibbons are not kept in many zoos they are new and exotic to most visitors. For these reasons, many visitors who pass this exhibit stop at the viewing windows (for photos of the exhibit, see Appendix H). However, visitor interest and engagement with the exhibit, as well as visitor knowledge, affective, and/or behavior outcomes are influenced by three factors: (1) gibbon activity level and visibility; (2) encounters with a zoo staff member; and (3) the number of visitors already engaged with the exhibit and/or GEC

Animal activity

The biggest factor influencing visitor engagement with the gibbons and their exhibit is the activity level of the animals themselves. White-cheeked gibbons are charismatic and their enclosure is most popular when the white-cheeked gibbons are very conspicuous, moving quickly and acrobatically throughout their enclosure, actively engaging with enrichment items, acknowledging and interacting with visitors, or vocalizing. During these active periods, visitor engagement with the gibbons is highest, and more visitors are drawn to the exhibit (and linger there longer) than in periods of gibbon inactivity. As one visitor told me, "I like to see the animals out and moving, not when they are boring and not moving"; this attitude is prevalent in visitors, and active animals draw more of a crowd than inactive or "boring" animals.

When the gibbons are active and/or highly visible, visitors become more animated in their attempted interactions with these animals, pointing at them, speaking rapidly and loudly, and mimicking stereotypical non-human primate movement and vocalization in an attempt to engage "one-on-one" the gibbons, and exclaiming when gibbons "perform" a particularly acrobatic movement, such as jumping long distances. That visitors preferred to interact with animals that were active or charismatic is not surprising, as most visitors said they came to the zoo for a fun recreational experience and expected to be entertained during their visit. In my observations active animals who engage with visitors attract and retain more visitors than less active animals; when gibbons were active and moving from one part of their exhibit to another, visitors stopped to view the gibbons more often and stayed at the exhibit for a longer period of time than when the gibbons were less active. Because visitors are more attracted to more active animals, visitors are more likely to want to learn about and interact with these animals. Therefore, the degree to which visitors perceive animals as engaging, fun, or active influences the amount of information they seek out and retain about this animal. Outside of the GEC, visitor fascination with charismatic and active animals helps draw more visitors to the exhibit and engage them with the animal and the information presented about them at the exhibit. When the gibbons are active, visitors become more curious about them, asking each other questions about them such as what types of animals they are and wondering at how the gibbons can move so quickly. During these times visitors would examine signs only after they had viewed the gibbons or when the gibbons became less active.

The IEPs at the San Antonio Zoo capitalize on the charismatic nature of the white-cheeked gibbon and visitor interest in more active animals by running programs that highlight these and other charismatic species. During an interview, Jean and Miranda, both Educational

Interpreters for the *Connections* IEP, observed that visitors were drawn to charismatic and active animals during the *Education Connections*. Miranda noted that visitors were more likely to approach an enclosure where an *Education Connection* is about to start or during the presentation if the animals discussed were particularly active, saying, "The animal themselves attract people before we even get there." Miranda noted that visitors were drawn to the gibbons over other animals for which there was an *Education Connection*, particularly because of Mel, an adult male gibbon known for his visible interest in and interactions with visitors:

> *[Visitors] like the gibbons better because, especially with Mel if you want to call it interaction or whatever, the attitudes or behaviors he is showing toward us, you don't get that when we did it with rock pythons, when we did it with alligators, when we did it with tigers. You don't get it like you do with the gibbons. They are so attention grabbing; I think that is why people stay to listen to [the presentation].*

The activity of the gibbons draws people into the exhibit and encourages them to linger there for a longer period of time, both within and outside of the GEC. However, as Jean noted, the attention grabbing power of charismatic or active animals was a double-edged sword which may actually hinder visitor learning during the *Education Connections*:

> *If the tiger is out and active, then [visitors] are ignoring you. You might as well be talking to yourself. And even Mel [the gibbon] does that. I mean, sometimes you are talking and you know [visitors] are not listening to you. I mean, that just happens.*

Thus visitors are drawn to view and engage with active animals that they perceive to be charismatic or exciting. Yet while these viewing opportunities are exciting for visitors they may actually hinder them from fully participating in additional informal learning opportunities. This was confirmed by my own observations; when the gibbons were very active during the GEC, visitor attention was on the gibbons rather than on the Educational Interpreter, and if the gibbons stopped to rest or generally became less active during the GEC visitors were likely to leave the exhibit area rather than stay and listen to the rest of the talk. This lack of engagement with the

conservation message may contribute to why there was no significant difference in conservation behavior between visitors who did and did not participate in the GEC, despite GEC participants being more knowledgeable about factual gibbon conservation and life history information (as discussed in Chapter 3). While I did not assess whether the activity level of the gibbons affected visitor knowledge, attitudes, and behavior, this would be an interesting direction for future studies.

Visitor engagement with the gibbon exhibit decreases when the gibbons are resting or not visible, both during and outside of the GEC. When the GEC is not occurring and the gibbons are inactive, fewer visitors stop to engage with the exhibit and instead walk past it and continue to other areas of the zoo. Visitors that do stop are more likely to read the educational signage and engage with more interactive parts of the exhibit, such as the "How do you compare?" sign in front of the gibbons (see Figures 2 & 9), than visitors who stop when the gibbons are active, but their attention to these signs is limited. For example, the following interaction was typical of visitors when the gibbons were not active and visitors instead interacted with gibbon signage:

> *A young girl, approximately 7 years old, approaches the enclosure with her brother (~10 years of age), two parents and two grandparents. She runs ahead to the "How do you compare" sign and looks at it, reading it to herself. She then begins making monkey vocalizations, saying "eee! ee! eee! ee!" while mimicking the arm and leg posture of the gibbon she saw on the sign. She looks back at the rest of her group as they approach, continuing her motion and vocalizations. The girl calls her brother over to the sign, and he joins her at the sign and begins doing the sounds and movement. They both lean back on the sign to pose as the rest of their party approaches and take their pictures. The parents laugh and make comments to the children about how they are "just like the monkeys!" and the group moves away from the enclosure area, peering into the enclosure as they leave.* (Adapted from field notes, 7/11/2013)

While the gibbons are inactive, visitors rely on signage to attract them to the exhibit, interacting with these interactive components rather than the actual animals. This is not the case when the GEC is occurring; when the gibbons are inactive or not visible and the GEC is

occurring, visitors are still attracted to the exhibit, albeit in smaller numbers, and instead listen to the information presented by the Educational Interpreter. Thus the presence of the zoo staff member and the opportunity to participate in a free zoo program also influences visitor behavior with the exhibit.

Encounters with zoo staff

While visitors are more attracted to the exhibit when the gibbons are active and were more likely to try to engage with the animals during these times, in both periods of gibbon activity and inactivity the presence of a zoo staff member attracted visitors to the exhibit. Outside of the GEC, when staff such as zoo keepers were near the gibbon exhibit or entering the exhibit service area, visitors at or around the exhibit become excited and lingered at the exhibit longer than when these staff members are not present. In my observations, during these times adult visitors encouraged younger visitors to stay at the exhibit longer, as they expected that the staff member would interact with the gibbons and visitors would be able to see something "out of the ordinary," such as a feeding or training session. While feeding and training go on "behind the scenes" in the service area and are not visible to visitors, the promise of this more intimate human/animal interaction increased visitor retention time at this exhibit. When visitors were waiting for the feeding or training event, visitors watched the gibbons respond to the zoo staff member[21] and read the available informational signage.[22] While visitors did not often question staff members outside of the GEC, some would occasionally ask staff questions about what they

[21] White-cheeked gibbons are able to identify specific staff members and often interact with specific staff members they see regularly. Thus when they see a staff member such as a zoo keeper they reacted vocally and/or physically, traveling toward their service area in preparation for "shifting" into their off exhibit service area. The additional activity of the gibbons also attracted more visitor attention and led to more visitors lingering at the exhibit waiting for the "show".

[22] Visitors also modified their own perceived negative behaviors when they noticed staff members were present. For example, if visitors were antagonizing and/or trying to get the attention of the gibbons, such as mimicking stereotypical monkey sounds loudly at them, taunting the animals, yelling, making exaggerated body motions and/or threatening gestures, or attempting to feed the animals through the enclosure fence, these behaviors were curtailed by the presence of a staff member. This occurred in both during and outside of the GEC.

were doing with the animals and/or exhibit, the names of individual animals and why the animals were behaving in particular ways. Once it became clear that there would be no visible staff interaction with the gibbons, visitors moved on to a different exhibit.

When asked to respond to the statement "I enjoy talking with zoo keepers and other zoo staff about the animals I see in the zoo" on the Opinion questionnaire, 80% of exiting visitors and 85% of entering visitors responded with agree or strongly agree (Table 9, see Appendix H). This indicates that visitors find the idea of interacting with a zoo staff member positive, and most people would take advantage of this opportunity when it is available. This is further supported by my observations, where I noted that zoo visitors were interested in the experiences and knowledge of zoo staff members, and get excited by the idea of seeing or participating in something "exclusive" and "behind the scenes." Thus, it is not surprising that visitors were also curious about the GEC when they saw the Educational Interpreter setting up for the program. Most visitors who attended the GEC did not plan to attend the program, but instead stumbled upon it during their visit and stayed due to curiosity. The addition of the Educational Interpreter at the gibbon enclosure introduces a new opportunity for a novel interaction with zoo staff, an opportunity which many visitors considered "exclusive" despite the program being advertised. When visitors saw the Interpreter setting up the microphone and checking their presentation props, they lingered at the exhibit and waited for the presentation. Miranda noted that visitors were more likely to approach the Educational Interpreter and then stay for the GEC if the interpreters have "a lot of stuff" to display, such as biofacts or other interactive elements which support the presentation and interest the crowd. Thus the Interpreters themselves became a factor which attracts visitors to the exhibit and the GEC.

Visitors reacted to the Educational Interpreter during the program in different ways, and during the GEC visitors tended to either be very engaged with the speaker or ignored them completely. When asked how they felt that visitors responded to the *Education Connections,* Jean and Miranda noted this trend as well. Jean shared the following:

> *You get every kind of response. I mean, some people are really thankful that you are there and really enjoy it. [They] really like it, are glad to have you there. [But] some people you feel like you are holding on to them to get any information to them at all. Some people just plain walk away from you.*

As Jean and Miranda noted, visitors were either very enthusiastic about the GEC or did not engage with the program at all.[23] Visitor motivations for attending the zoo are varied; visitors who are there for exclusively recreational purposes may not be as inclined to participate in these programs as those who cite education as a motivation for their visit. In interviews I asked visitors if they had participated in programs like the *Education* or *Keeper Connections*, and most responded that they had. One woman shared that she likes to participate in them with her kids because "I want to get more information out of taking my kids to the zoo. My kids like it because they can't read yet and they like seeing the animal activities, and when [the presentations] are done we can talk about habitats and animals together." For her, participating in the GEC and other IEPs was an opportunity to have a shared learning experience with her kids and to "get her money's worth" when she brought them to the zoo. When another woman responded that she tried to bring her kids to the IEPs whenever she saw them, I inquired why she tried to attend. With a smile, she responded "What's the point of just looking at animals? I want my kids to learn about them, too."

[23] Additionally, most visitors who participated in the GEC did not stay for the entire program, yet despite this visitors who participated in the GEC were more knowledgeable about gibbons and gibbon conservation than those who did not. However, this may result in fewer visitors actually receiving the conservation message; this should be examined in future studies.

Visitors who come to the zoo with their children want to learn something in a fun and interactive way, specifically one that will engage their children. Yet even visitors who want an educational experience can have difficulty fully engaging with the Educational Interpreter during the IEPs. The visitors who said they did not participate in the IEPs cited a concern that the programs would not hold the children's attention. In our interview, a woman who was visiting the zoo with her three children said "We like to go to them when the kids stand still for it. Sometimes my kids run ahead and I have to chase after them." When the programs are more interactive or have elements that the children can see and touch, the Educational Interpreters noted that children are more likely to stay engaged, resulting in adults staying for more of the program as well. Lacy, the creator of the GEC, shared with me that the zoo audience is mostly families with children, and the Educational Interpreters are trained to engage children in order to retain the parents in the program. In this way, she says, they try to provide families with a fun and interactive opportunity that engages children so the parents can stay long enough to be told the conservation message.

In order to successfully engage children in the GEC, Educational Interpreters present a plastic gibbon hand to illustrate the differences between gibbon and human hands when discussing gibbon locomotion. Interpreters also provide a knotted rope which is tied along the exhibit window viewing area, which they use to encourage children to "swing like a gibbon" (see Figure 11 in Appendix G). When it was used it was very affective in encouraging visitor participation in the program and increased visitor retention. Additionally, using the rope affected visitor enjoyment of the presentation and likely impacted their subsequent attitude

toward the IEP and the gibbons discussed within it.[24] However, many Educational interpreters did not use the rope element consistently; therefore the visitor retention times at the GEC were lower than they would otherwise be, especially when visitor groups contained young children.

Perhaps because it is informal and Educational Interpreters invited and answered audience questions throughout the program, visitors who attended the GEC asked more questions of the Educational Interpreter than they did of other zoo staff members they saw outside of this context. These questions were often similar in nature to those that visitors ask of zoo keeper staff, but many visitors also referenced material presented in the GEC, asking questions regarding gibbon habitat and diet, social structure, and conservation. This indicates that GEC participants have a greater learning opportunity than visitors who do not participate, and the addition of an available staff member can help stimulate visitor interest in zoo animals. This could further explain why visitors who participated in the GEC were more knowledgeable about gibbons and gibbon conservation than those who did not, despite most of the information being available to non-participants through exhibit signage. However, because the program was not consistently interactive many visitor groups left the GEC before the conservation messaging portion, which may also explain why participants were not more likely to complete a conservation action.

While the presence of the Educational Interpreter stimulated visitor questions, and allowed them to learn additional "behind the scenes" information about the gibbons, visitor experience with the GEC was likely influenced by the degree of interactivity the Educational Interpreters provided during their presentation. Visitor engagement with the staff member, the GEC, and the gibbons and their enclosure were also influenced by the number of visitors

[24] While I did not track this, many programs which teach educational interpretation make note of the relationship between interactivity and program success. The impact of the degree of "interactive-ness" in IEPs on visitor enjoyment and subsequent attitudes toward animals at this location would be an interesting future study.

participating in the GEC, which may have affected the degree to which visitors could directly interact with zoo staff and the gibbons themselves.

Number of visitors at the exhibit

While the availability of a zoo staff member offered visitors an additional interaction opportunity during their visit, the visitor experience with the exhibit and GEC was also affected by the number of people also viewing the exhibit or GEC at the time. The number of people viewing the exhibit simultaneously impacted visitors' view of the gibbons, the availability of "up close" viewing areas like the two viewing windows (see Figures 2, 7, 9, & 10), the degree to which visitors could approach and speak with a zoo staff member, and the quantity and nature of the direct interactions visitors had with gibbons.

When the GEC was not occurring, visitors freely use the space in front of the gibbon exhibit. When the gibbons are easily seen and/or very active, many visitors will try to get close to the exhibit or in the viewing window to get the best vantage point. When the gibbons are active, many visitors will stop and gather in front of the enclosure to view them, with visitors utilizing the entire pathway along the enclosure. If the gibbons are high up in the enclosure visitors will stepping away from the exhibit to get a better vantage point of the gibbons by moving back on the pathway. When there is a small (less than 10-15 individuals) to medium size (between 15-30 individuals) group of people at the enclosure visitors tended to use the viewing windows and/or line up along the fence that separates the enclosure from the visitor pathway, using whichever area gave them a clear view and taking turns with other visitor groups to access the best viewing angles. When groups were small to medium size adults and children would view the gibbons in one location together. When larger (more than 30 individuals) groups

gathered, families and other groups waited their turns to see the gibbons, and parents with children lifted their children up to get a better view of the enclosure.

Even when large groups of visitors congregate in front of the gibbon enclosure, all parts of the exhibit are utilized, and visitors move freely along the path from one viewing window to the other and toward and away from the exhibit along the pathway. However, during the GEC the visitor experience with gibbons and the gibbon exhibit is more affected by the number of people who are attending the presentation, as well as the Educational Interpreter. When the Educational Interpreter is setting up or presenting the GEC, the way in which visitors position themselves in relation to the Interpreter and the gibbon exhibit is significantly impacted by the number of additional visitors participating in the GEC.

The size of the groups listening to the GEC affects the positioning behaviors of visitors during the presentation. When there was a small group of visitors at the exhibit participating in the GEC they tended to cluster in the viewing window area of the exhibit, with the Educational Interpreter engaging them in a more informal manner. The interpreter would stand with this group at the viewing window or along the fence and speak with them about the gibbons, letting the visitor questions guide the discussion rather than sticking to the set script. Visitor interactions with the gibbons is not very altered when there are smaller crowds participating in the GEC, as the Educational Interpreter is not "presenting" so much as talking with the smaller group. In these cases the Educational Interpreter and the GEC were not competing with the gibbons for visitor attention, and visitor groups stayed together when viewing the exhibit and speaking with the presenter. In these smaller groups Educational Interpreters are able to answer more visitor questions, allowing visitor interest to guide the presentation topics. In these cases I

observed the Educational Interpreters engaging the most with individual children, getting down to their level and pointing out different parts of the exhibit, while also answer adult questions.

When medium to large sized groups attended the GEC, this dynamic changed. The Educational Interpreter could no longer engage on a one-on-one basis with children or small groups, and usually stuck with the script when presenting to visitors.[25] With medium groups the Educational Interpreter would stand off to one side of the exhibit, usually next to one of the viewing windows. This allowed them to engage with more visitors at one time, as well as invite visitors walking by the presentation to join. This had an impact on visitor positioning in interesting ways. First, when more visitors were engaged in the GEC from the beginning, this led to a snowball effect, leading to more visitors stopping at the GEC to see what other visitors were seeing. Therefore, medium sized groups turned into large groups more quickly than small groups turned into medium sized groups. Additionally, when the presentation was well attended and a large crowd had gathered, adult visitors tended to form a large semicircle around the exhibit, standing back on the path away from the Educational Interpreter and the exhibit viewing window, while children and adults with very small children clustered closer to the Educational Interpreter and watched the gibbons in the viewing window. If there are many children in the group, they tend to cluster together in a close group around the Educational Interpreter, leaving their care givers in the large semi-circle so they could get closer to the interactive elements and the Interpreter. This was especially true if the gibbons are not very active and the Interpreter is the main draw to the exhibit, and this behavior was encouraged by caregivers who stood back to allow the younger children to view the exhibit and the presentation.

[25] While visitors could and did ask questions during the presentations, the Educational Interpreter would answer them and continue back into the script as soon as possible.

The number of individual visitors participating in the GEC affected the ways in which visitors positioned themselves in relation to the exhibit and the Educational Interpreter, as well as how groups of visitors approached the exhibit and the GEC as a unit. When groups were smaller, visitors could get a more intimate and informal experience with the GEC and stayed engaged in the GEC for a longer period of time than when medium to larger sized groups attended. Additionally, as participant group size increased the way in which visitor groups experienced the exhibit altered, with adults and children becoming more separated as children were encouraged to get closer to the Educational Interpreter and the gibbon exhibit. This likely affected the ways in which children and adults learned about the exhibit, and the ways in which they interacted with other visitors in their group, all of which can alter visitor attitudes and behaviors outcomes[26]. Furthermore, as the GEC participant group increased, individual visitors had less direct interactions with the Educational Interpreter and the GEC material. Because most GECs I saw were attended by medium to large sized groups, visitor participation in a well-attended GEC may have affected the degree to which visitors felt emotionally connected to gibbons after the presentation, which would contribute to the low rate of participation I saw in the mail-in response card conservation action.

The number of visitors at the exhibit, the presence of the interpreter, as well as the activity level of the gibbons all impacted the ways in which visitors interacted with the gibbon exhibit and can affected visitor learning, attitude, and behavior toward gibbons and gibbon conservation. These different contexts also affected the ways in which visitors were able to interact with the gibbons themselves within and outside of the GEC, which may also affect visitor attitudes and behavior toward gibbon conservation.

[26] I was unable to assess the impact of this group separation on visitor outcomes, but this would be an excellent avenue for future research.

Visitors' direct interaction with gibbons

While animal activity, presence of zoo staff members, and the number of visitors at the exhibit the degree to which visitors are attracted to the exhibit, most visitors are very affected by their interactions with the gibbons and other zoo animals during their visit. As discussed in Chapter 3, most visitors feel they can become emotionally connected to zoo animals during their visit, and the "Attitude and Knowledge" questionnaire results also suggest that visitors become empathetic toward gibbons and other zoo animals as a result of their encounters with them in the zoo. Visitors form these attitudes towards and emotional connections with zoo animals during direct interactions with zoo animals. These interactions do not need to include physical connections, though some exhibits at the San Antonio Zoo encourage touch as a way to encourage emotional connectedness to animals; instead, they are usually instances where visitors engage with zoo animals and make a perceived connection with them. Visitors achieve this by making eye contact with zoo animals, vocalizing at them, mimicking animal behavior, "playing" with the zoo animal through the enclosure barriers, and eliciting neutral to positive reactions from the zoo animals. The gibbons are a particularly engaging species at the San Antonio Zoo, as they routinely engage with visitors by swinging across the viewing window, sitting near or on top of the viewing window and enclosure netting, vocalizing at visitors, and mimicking visitor motions.

Visitor interactions with gibbons outside of the GEC are varied, but in my observations a few trends emerged. First, when visitors attempt to engage the gibbons by approaching the enclosure, one individual in the group generally initiates the interaction, encouraging the rest of their group to follow. When a visitor group contains young children between 5 and 10 years of age, these children were more likely to approach the exhibit, initiate contact with gibbons, and

encourage party participation than older or younger children. The following interaction (Interaction A) was typical of those I observed in which a child initiated the interaction with the gibbons and the gibbon exhibit:

> Interaction A: *A girl approximately 8 years old approaches the gibbon enclosure with a small school group (4 children and two adults), and passes the "How do you compare" sign. She stops by it, saying "I am going to measure myself here." The rest of her group follows and go to the sign. They read sections of it aloud to each other, and the girl says "I can be a monkey" while spreading her arms wide against the gibbon image. She then looks at the enclosure, seeing two of the gibbons grooming one another above the viewing window. She says "Oh my gosh they came through to see us! They are hugging each other." She runs to the viewing window and the rest of the group follows her, exclaiming about the gibbons they see. Mel, the adult male gibbon, urinates on the viewing window (this is a common occurrence that happens many times daily). An adult in the group says "Oh, that's a good show he is putting on here." The other adult says "Why do you think he is doing it?" The girl responds "Maybe he's marking territory. Look they are picking stuff out of their fur and eating it!" The group watches the gibbons grooming one another, and the questioning adult points to them, speaking to the children and says "Look how much larger their arms and legs are. What do you think they are doing?" The additional adult and the other three children head to another part of the exhibit. The girl replies "They are picking at each other, eating fleas." The girl and the questioning adult keep watching the animals, and the girl muses "I wonder if they hear us reacting to them." The girl and her teacher leave to join the rest of the group.* (Adapted from field notes, 10/24/2013)

In this and similar encounters, young children initiate the group's interaction with the gibbons, drawing the rest of their group to the enclosure. However, when adults were in a group that contained young children under 5, or when their children are more reserved, the adults tended to initiate the interaction with the gibbons and their enclosure, encouraging children to join in. The following is a typical interaction of this type, in which a group is led to the enclosure by the adults in the group. In this interaction (Interaction B) parents led their children toward the exhibit:

> Interaction B: *Two parents approach the exhibit with their three daughters. The father points to one of the gibbons in the enclosure and says "Look up there!" The mother then looks points to the gibbon as well, then faces her children and*

> *says "Look, isn't that amazing!" The children nod their heads in excitement and say something inaudible. Mother repeats, saying "Let's go, she says" and laughs. The family stops in the shade of the viewing window, and the mother goes up to the enclosure with her infant child and takes a photo.*[27] *The two daughters and the father remain in the shade, watching the gibbons. One of the girls tells her father "Gibbons are apes." And he replies "They are, you are right!" After watching the gibbons move across the enclosure, the other girl says "They look like they are doing the monkey bars." The mother, who had just rejoined them, replies "You're right, they do look like that. I wouldn't have thought of that. You are so smart." The family continues to watch the gibbons, and the mother says to the family "That's so cool, right?" The father replies, "That was very cool," and the two girls agree. The group moves to the next exhibit, watching the gibbons as they go.* (Adapted from field notes, 7/11/2013)

In this and similar encounters, adults initiate the group's interaction and subsequently lead the encounters visitors have with gibbons. When groups are composed of all adults, the gibbon interactions tend to be more subdued and there were no observed trends in who initiated the interaction with the gibbons and their exhibit.

Second, outside of the GEC visitors tend to speak directly to the gibbons, attempting to get the gibbons attention and engage them in one-on-one interactions by mimicking their physical motions, facial gestures, and vocalizations, clapping their hands or making wild sounds or gestures, or manipulating the gibbons' environment[28] to get the gibbons' attention. While this is not always successful, the gibbons are highly social with visitors, and often these ministrations are successful in getting the gibbons' attention and/or drawing them closer to the viewing window. In times when attempts to draw the gibbons' attention are unsuccessful, young visitors will then begin to follow the gibbons and continue their attempts to engage them. For example when the gibbons were moving, whether it was swinging across the viewing window or traveling

[27] When interacting with the gibbons and their enclosure, many visitors mediated their experiences by engaging with media, such as taking photos or videos and interacting with the gibbon signage. This barrier may impact the experience visitors are having with the zoo animal, and this would be an interesting direction for future study in visitor/zoo animal relationships.

[28] This included pounding on the glass, trying to feed the gibbons, waving sticks and/or poking them through the enclosure, et cetera to draw the gibbons' attention and entice them to approach the visitors.

across their exhibit, young children often followed the gibbons by either running after them, pointing at the gibbons as they moved and following them with their hands, or yelling and narrating where they thought the gibbons were going. When gibbons were still and near visitors in the viewing window, visitors would touch the glass where the gibbons were; this is illustrated in Figure 6, where a young boy is touching the glass separating him and Mel the adult male gibbon after the boy had watched Mel swing across the window and sit on the window ledge. Thus visitors were attempting to create and maintain a personal connection with the gibbon by either getting the gibbon to acknowledge them or to force an interaction by following the gibbons.

Figure 5: A young boy meets "Mel," the adult male white-cheeked gibbon, through the glass of the enclosure at the San Antonio Zoo. Photo courtesy of Corey Torpie Photography©.

When visitors made a perceived connection with the gibbons this experience was memorable and visitors shared their excitement over it with each other. For example, I

overheard the following as a group of visitors left the gibbon enclosure area. This visitor group had attempted to engage one of the gibbons at the viewing window earlier in the day, and recounted their earlier experience with the gibbons upon passing their exhibit again:

> *Two adults (both over 50 years of age) pass by the exhibit with a young boy and a girl (~11-12). As they near the exhibit, the boy runs over to the viewing window and peers in, looking for the gibbons. The girl runs toward them as well, joining the boy and saying loudly to the adults "We saw a monkey and it was swinging and then we couldn't find it. But then it just popped up in front of us scaring us. It just popped up!" The adults catch up to the children and they walk away from the exhibit, still speaking about their experience with the gibbon enclosure from earlier in the day.* (Adapted from field notes, 11/10/2013)

This and other similar observations indicate that direct interactions and/or close proximity to the gibbons can create a lasting impression on visitors which then affect their future interactions with these animals. This indicates that these interactions are incredibly important to the creation of visitor empathy for and investment in zoo animal species.

These same behaviors occurred when visitors were present at the exhibit when the GEC was occurring, but were not actively participating in the program. However when visitors were participating, even peripherally, the amount of time in which visitors interact with gibbons directly was much more limited. Visitors arrived at the enclosure and would then stand quietly, positioning themselves along the enclosure in order to easily view the speaker and the gibbons simultaneously. However, visitors would not approach the gibbons in the enclosure and initiate direct interactions. In order to do so, visitors would have needed to ignore the speaker; while this did occur, and some visitors at the enclosure and try to interact solely with the gibbons when the GEC was happening, most visitors involved in the GEC did not. Instead, visitors were more subdued, did not often talk among themselves, and observed the gibbons passively during the GEC.

Visitors who participate in the GEC experience the gibbons passively with the Educational Interpreter acting as the mediator between the gibbons and visitor experience. Thus, even though visitors are getting "behind the scenes" information about the gibbons from the interpreter, by participating in the GEC visitors may not be able to make that personal connection with the gibbons that would guide their future interactions with and perceptions of this species.[29] This may further explain why these visitors were not more likely participate in the conservation action provided during this study that visitors who did not participate in the GEC.

Intragroup visitor interactions

In addition to seeing changes in the frequency and nature of direct gibbon interactions between visitors who did and did not participate in the GEC, the ways in which visitors interacted with one another was influenced by their participation in the GEC. Outside of the GEC, families and other visitor groups communicated freely during their visit to the gibbon enclosure. At the sight of the gibbons or gibbon enclosure, members of the group will share the location of the gibbons and/or other information which would ensure that the group has a joint attention on the same object. Once joint attention is established, members of the group will narrate what they perceive to one another, and this also becomes an opportunity for visitors to share related information with one another.

For example, when groups with both adults with children see the gibbons, they often used this time to teach or share their knowledge with one another. As seen above in Interaction A, after pointing and showing the rest of the group members where the gibbons were, the young girl narrated what she was seeing (*"Oh my gosh they came through to see us! They are hugging each other.")*, after which her teacher used the opportunity to question her about the animals ("*What*

[29] This is an interesting new avenue for future research. What is the effect of receiving "behind the scenes" information of the visitor experience of an IEP, and what is the influence of this "exclusive" information on visitor knowledge, attitude, and behavioral outcomes?

do you think they are doing?", "Why do you think he is doing it?", "Look how much larger their arms and legs are. What do you think they are doing?"). The girl responded to the questions, sharing what she believed to be the answers to her teacher's questions, as well as sharing her additional observations and questions about her interaction with the gibbons (*"I wonder if they hear us reacting to them.").* In Interaction B, the parents in this group directed the attention of their children to the gibbons. When the two girls and their father were watching the gibbons, each shared a piece of information they know and/observed about the gibbons (*"Gibbons are apes.", "They look like they are doing the monkey bars."*), and the parents confirmed these observations. This type of information sharing occurred in in most of the encounters I observed, even when groups did not contain children.

Most groups established joint attention at the beginning of the encounter, and information sharing was a ubiquitous part of the group experience during my observations. This indicates that families and other visitor groups are creating a shared experience through their encounters with the gibbons. Visitors encourage one another to share information, and this encouragement and open communication contributes to the positive zoo experience as a recreational activity for visitor groups. In addition to sharing information, visitor groups also share their direct encounters and passive learning experiences (i.e. reading signs or observing gibbon behavior) with the gibbons and gibbon exhibit by staying together in a single group for most of their encounters. While groups occasionally split up as they approached the gibbons and the gibbon enclosure, groups reunited quickly and remained together for most of the interaction.

When visitors participated in the GEC, visitors within the same group did not interact with one another as often or in the same manner as visitors experiencing the gibbons outside of this program. During the GEC visitors quietly listened to the Educational Interpreter and

watched the gibbons rather than speaking with one another. Visitors did establish joint attention with the gibbons and/or the Educational Interpreter, but they did so quietly and did not encourage intragroup discussion while the Educational Interpreter was speaking. Visitors did comment and reflect upon the information they learned during the GEC when they finished participating, but during the program there was no sharing of knowledge or narrated observations. As I mentioned earlier, visitor groups tended to split up when there a medium to large sized crowd had gathered to attend the GEC. Adults encouraged young children to approach the viewing window when the gibbons were active and/or easily visible, and were also encouraged to move toward the Educational Interpreter and the interpretive elements of the presentation while the adults stayed back.

Participation in the GEC led to a decrease in intragroup interaction during visitor encounters with the gibbons and their exhibit, as visitors stopped sharing information and observations with one another as they encountered the gibbons. While joint attention on the gibbons or the Educational Interpreter was established, the loss of the intimate group sharing that occurred may be problematic for conservation education programs that focus on creating perceived intimate connections to animals in order to influence conservation motivations in visitors. Though the full effect of this change in intragroup dynamics on visitor outcomes was not explored in depth in this study, this is an intriguing area for future research.

Summation

The results of the "Attitude and Knowledge" questionnaire discussed in Chapter 3 indicate that, while the GEC program increases visitor knowledge of gibbons and gibbon conservation, it does not significantly alter visitor attitudes towards these animals or positively influence future visitor conservation behavior. I observed changes to visitor behavior when they

were involved in the GEC and when they were not which may explain these results. First, visitor behavior is affected by the activity level of the gibbons, the presence of an authoritative staff member, and the number of additional visitors at the exhibit. When the gibbons are more active during the GEC, more visitors are attracted to the exhibit and the program but visitor attention is typically not on the information presented. Contrarily, when gibbons were inactive, fewer individuals were drawn to the exhibit and the GEC, which may have resulted in the conservation message being heard by fewer visitors. Both visitor distraction and nonattendance at the GEC would affect the degree to which visitors participating in the GEC are "getting" the conservation message, which may explain why participating visitors were not more likely to participate in a later conservation action. Second, while the presence of the Educational Interpreter attracted visitors to the exhibit and the GEC, the presentation may not have been captivating or attention holding for many visitors, especially those with small children, due to the lack of consistent use of interactive elements. This affects full participation in the program, and may also have contributed to the lack of significant change in visitor conservation oriented behaviors and attitudes toward animals. Visitor interactions with the Educational Interpreter, the GEC, and the gibbons were also affected by the number of visitors present. Medium to large groups of visitors had a less intimate experience with the Educational Interpreter and the gibbons, which likely affected their experience with and feelings toward the gibbons and the GEC. This also may have contributed to the lack of conservation behavior change I found in GEC participants compared to nonparticipants.

The degree to which visitors were able to directly interact with the gibbons and other group members likely played a large role in visitor affective and behavioral outcomes in GEC participants. Outside of the GEC visitors were free to interact with the gibbons directly, and did

so by mimicking gibbons, speaking at them, and endeavoring to draw the gibbons' attention to them during their interactions. However, during the GEC the visitor experience with gibbons is more limited and often mediated by the Educational Interpreter, and visitors do not exhibit the same information sharing behaviors and do not experience the gibbons together as they do outside of the GEC. This likely contributes to visitors having a less "up close and personal" experience with the gibbons, and a less cohesive experience with these animals. This may affect visitor investment in the conservation of gibbons and other animal species. While this does not fully explain why visitors outside of the GEC would also have low participation rates in the conservation action, it could be that visitors who participated in the GEC felt they received "exclusive" and "behind the scenes" knowledge that makes their encounter with these animals as meaningful to them as those made by visitors outside of this context. More research is into the relationship between the levels of direct visitor engagement with a species and their later investment in that species' conservation.

Human/animal or humananimal?

Visitor/zoo animal interactions are complex and multi-layered within the zoo settings; the affective, knowledge, and behavioral outcomes of these interactions in visitors are influenced by the degree of animal activity and charisma, the visitors' social network during their visit, and the presence of zoo staff members[30]. Zoo education programs, such as the GEC program and other IEPs at the San Antonio Zoo, attempt to positively influence visitor understanding, appreciation for, and behavior toward wild animals by "showcasing" specific animals in their collections during these programs. Changes in visitor behavior in the areas discussed above affect the information visitors are "consuming" about the gibbons and gibbon conservation at the zoo,

[30] While not examined in this study, visitors' previous experiences with and expectations of animals, specifically those housed within the zoo, also likely contribute to visitor understandings and perceptions of zoo animals. Examining this in future studies would help elucidate this relationship.

which subsequently influence the changes, or lack thereof, that we see in visitor attitudes and behavior towards these animals.

Traditional humanist ideologies, in which humans and animals are distinctly separate and where humans hold exclusive power over the animals with which they interact, have long been part of Western culture; most visitors who come to the zoo are familiar with the human/animal dichotomy and the relationships visitors have with zoo animals have long been considered quintessential examples of this framework. Yet while visitors may view themselves as distinct from animals, the post-humanist framework is a useful tool with which to examine visitor interactions with zoo animals; this research suggests that a post-humanist approach to human and animal relationships may be more appropriate when examining these relationships within the zoo setting, particularly when looking at the ways in which these relationships inform visitor environmental worldview.

As discussed in Chapter 1, the humanist paradigm has argued that the human/animal dichotomy is reinforced within zoos, and that "the incarceration and exhibition of animals in zoos can perversely increase the sense of human separation and alienation from wild animals, encouraging feelings of superiority and unalterable difference" (Kellert 1986 in Coe 1996:167). Yet many visitors feel they can emotionally connected to zoo animals during their visit, and exiting visitors were significantly more uncomfortable with the idea of animals "performing" or being "put on display" (see "Attitude" discussion in Chapter 3). This indicates that visitors may be more empathetic toward primates after interacting with them within the zoo, suggesting that visitors are forming strong connections with the animals they observe during their visit. Consequently, visitors may not be leaving the zoo feeling more *separated* from animals but more *connected* and empathetic toward them.

Additionally, visitors and the animals are both influenced by the encounters they have with one another within the zoo; that the gibbons react to and engage with visitors and visitor attempt to create and maintain a rapport with individual animals they observe indicate that animals may have significant power over the visitors' experience with them. When viewing visitor and animal interactions within the framework of the humananimal network, the consequences of this mutual influence on both entities can be explored in more depth. For example, examining visitor and zoo animals interactions within the humananimal framework helps us better understand why visitor behavior is influenced and altered by both an animals' activity level and quantity/quality of direct interactions visitors have with zoo animals; animals have significant power over the visit experience within the zoo, which can thus influence visitors' future knowledge, attitude and behavior toward animals and the environment.[31]

Finally, the ways in which visitors behave toward zoo animals is better understood within the post-humanist view rather than the humanist framework. Specifically, most visitors, especially children, attempt to engage and interact directly with gibbons through mimicry and attention-grabbing behaviors such as making stereotypical primate vocalizations or imitating gibbon body movements.

By mimicking animals, visitors not only attempted to gain and hold the attention of gibbons, but to also "become" the animals they were viewing by sharing specific behaviors. By mimicking these animals, visitors appeared to break down perceived species barriers so that they could form an intimate connection with the animals they were viewing. Children were especially affected by their encounters when they perceived the gibbons responding to and sharing their

[31] Many visitors interviewed (though most were members) said they try to plan time their zoo visits for when they knew animals would be active so that they would have a more exciting trip, indicating that even the anticipation of zoo animal interactions can influence and/or alter visitor behavior.

mimicking behaviors; this makes sense as children experienced these animals directly, without the cultural perception of human/animal dichotomy or separation dampening the effects of these interactions.

The use of anthropomorphism to describe observations of and interactions with gibbons can also be understood as a way in which visitors "become" a humananimal with the gibbons. In addition to visitors mimicking gibbons in order to "become" a gibbon, visitors also anthropomorphize gibbons in order to make them "become" human. Within the framework of the humananimal network, both mimicry and anthropomorphism can be understood as ways in which visitors deeply engage with nonhuman animals within the zoo. This is contrary to the traditional view of anthropomorphism as an expression of "speciesism," where humans fail to recognize animal behavior that is not their own and instead "force" their own behaviors on the animals they see. Instead, in this context anthropomorphism can be seen as a way in which visitors attempt to understand and connect with nonhuman animals, particularly when they are confronted with an animal behavior with which they are not familiar. For example, in Interaction A, the little girl viewed two gibbons grooming one another and said *"They are hugging each other."* The girl did not know what the gibbons were doing (grooming), so instead translated their behavior into something she understood and could describe ("hugging"). This can also be seen in Interaction B, where one of the girls observed the gibbons brachiating and noted "*They look like they are doing the monkey bars."* In both instances, these girls related the experiences of the gibbons to experiences they could share, thus allowing them to relate to these animals in a more intimate way. When examined within the post-humanist framework, visitors' use of anthropomorphism is not seen as an expression of human exceptionalism, but as a way in

which visitors try to break down the barriers of the human/animal to engage in a humananimal network.

Through anthropomorphism and mimicry, visitors are creating a perceived relationship with zoo animals. Donna Haraway conceptualizes the relationship between individual actors within the humananimal network as "companion species," particularly when discussing the relationship between humans and their non-human animal pets (i.e. companions). However, this term may not be useful when describing the relationship formed by visitors and non-human animals within the zoo, as visitor interactions with specific animals is generally brief. Though some visitors may visit the zoo to engage with specific animals, most visitors interact with a single animal or animal exhibit only once during their stay, and this interaction only lasts between 10 seconds to 5 minutes depending on their level of engagement with specific animals.[32] The results of this research indicate that the visitor and zoo animal interactions can be understood as a "humananimal network" because all actors influence one another during these visitor and zoo animal interactions, and these interactions can make visitors more empathetic to animals. Yet after interacting with gibbons visitors desired less physical contact with these animals (see Chapter 3); this indicates that visitors are not becoming "companion species," as they may not wish to have repeated contact with these animals (either in physical contact or geographical proximity). None-the-less, visitors are impacted by their brief interactions with these animals.[33] Visitors do not become "companions" with these animals, yet they engage with them as humananimals on a different, yet still intimate level. Visitors and zoo animals instead

[32] Visitors attending the GEC can stay at the exhibit for over 20 minutes, but in these interactions visitors are not directly engaging with the gibbons and visitor attention is split between the animal and the Educational interpreter.
[33] The brevity of visitors and zoo animal may contribute to the low-level of visitor participation in the mail-in response card conservation action I assessed. Even during the GEC, in which visitors are given more "personal" information about the animals, the rate of participation in conservation actions is not influenced. This indicates that the relationship between visitor perception of animals and their behavior is more complex than a correlation between knowledge and behavior.

become what I am calling "acquaintance" species, something in between "companion species" and the human/animal, where the lasting impacts of each interaction on the actors is small, but the effects of all the individual humananimal interactions are compounded to influence the visitor experience with and perception of their relationship with animals.[34]

When examining visitor and zoo animal interactions through the lens of the dichotomous humanist framework, the true nature of these relationships and the impact they have on the actors involved are lost. Instead, applying the post-humanist framework allows us to better understand the nuances of these relationships, and the ways in which these relationships impact visitors in the future. This is important when examining the ways in which visitor and zoo animal interactions influence visitor behavior, particularly when assessing changes to visitor conservation oriented behaviors. Additionally, the application of the post-humanist framework is also be beneficial for those planning and executing visitor conservation education programs. By understanding the ways in which visitors interact with and conceptualize their relationships with gibbons and other zoo animals, program leaders can create more effective programs.

For example, current political conditions within the state of Texas make the concept of evolution a contentious one, and therefore Educational Interpreters are discouraged from discussing the evolutionary and taxonomic relationship between humans and other primates, including gibbons (personal observation confirmed through informal interviews with Educational Interpreters). However, these policies may contribute to visitors' perceived separation from the animals with which they attempt to connect during their stay. Additionally, Educational Interpreters are discouraged from heavily anthropomorphizing gibbons and other animals during their presentations in order to discourage exotic pet ownership. However, the use of

[34] This may also be the case for the zoo animals' understanding and perception of their interactions with visitors. Though assess this was outside the scope of this study, this is an interest avenue of future research.

anthropomorphism in visitors allows them to form more enduring and intimate relationships with animals. Therefore, the use of some anthropomorphic examples or terms during the IEPs may encourage visitor to become more empathetic towards presented species because visitors would be able to intimately identify with these animals. In our interview Jean and Miranda noted that visitors are more interested in animal behaviors when they are described in terms which relate the animal to the visitor, resulting in visitors who are more interested in these animals after the presentation.

By applying the post-humanist framework to the study of the visitor and zoo animal relationship within the zoo, I was able to better understand how visitors behaved towards and learned about animals in different contexts, as well as how visitors were affected by their interactions with zoo animals. However, the results of this study indicate that, despite visitors believing they can form emotional connections with zoo animal during their stay, there may be no correlation with the acquisition of additional knowledge about these species. This indicates that the relationship between visitor perception of animals and their behavior in defense of this species may be more complex than previously assumed. Instead, there are additional factors which influence the ways in which affect visitors' motivation to change their behavior. The ways in which visitors perceive animals, environments, and conservation within the zoo contribute to the ways in which visitors understand animals, environments, and conservation on a global scale. Thus, the virtual realities visitors form about these areas within the zoo can have an effect on their future behavior and worldview.

Virtual reality in the zoo

Just as the post-humanist approach can help us better understand visitor and animal relationships in the zoo setting, the theory of virtualism can help guide the exploration of the

visitor experience within the zoo and visitor perceptions of zoo animals and environments. Additionally, virtualism is valuable when trying to understand the conflict between the representations of animals within the zoo context and the conservation education goals of zoological institutions and the impact of these conflicting representations on visitors' environmental worldview and pro-conservation behavior. Within zoos, visitor perceptions of an idealized view of the "natural world" are simultaneously reinforced by the institutions' representations of animals and environments and problematized through the implementation of conservation-oriented educational programs. Conservation education programs aim to alter the ways in which zoo visitors perceive of their relationships with animals and the environment with the hope that a visitor's experiences within the zoo and zoo education programs will make them more conservation oriented in their attitudes and behaviors. Yet the views and expectations, or "virtual realities," of zoo visitors, as well as some actions of the institutions, perpetuate the idealized image of animals living in harmony with a "pristine and natural" environment that is unblemished by human activities. This message directly contradicts the message of conservation education programs which may affect visitor learning within the zoo. Here I discuss the ways in which visitors understand animals, "natural" environments, and conservation within the zoo environment, and discuss the impact these views can have on visitor attitudes and behavior toward conservation.

"Natural" habitats and "wild" animals in the zoo

Visitor interactions with and perceptions of zoo animals and built "natural" environments are guided not only by visitors' prior relationships with animals and the environment, but also by visitors' "virtual reality" of what is "natural". Within the zoo setting, zoo animals are presented in an idealized scenario of nature, in which animals are living in harmony in pristine

environments. This virtual reality is in part created and reinforced by the ways in which zoo animals and their enclosures are presented to visitors within zoos, where built "naturalistic" enclosures are represented as accurate portrayals of natural environments.

Naturalistic enclosures are built to meet the physical and psychological needs of zoo animals (Fabregas *et al*. 2012; Newberry 1995), but many of the aesthetic choices made during the design of these exhibits, such as the landscaping and type of restrictive barriers used, are largely chosen for the benefit of zoo visitors. Exhibit designers attempt to make exhibits seem accurate to visitors by including natural elements such as vegetation and water features, and excluding man-made features such as obvious man-made structures or enrichment items. By using natural elements and excluding obviously man-made items, zoo exhibit designers create an abstraction of the natural environment within the zoo in order to conform to visitors' preconceived virtual reality of where animals should live. Numerous studies have shown that animals that were viewed in in these types of "naturalistic" enclosures were perceived by visitors as more happy, playful, and healthy than their conspecifics housed in more traditional barred enclosures (Finlay *et al.* 1988; Reade and Waran 1996; Shea 2006; Shettel-Neuber 1988), which indicates that these types of enclosures closely mirror what visitors believe animals should live in. This was confirmed in this study; when asked to respond to the statement "Zoo animal exhibits accurately reflect the natural habitat and environments that these animals live in in the wild" on the "Opinion" questionnaire, only 14.3% of entering visitors and 5.7% of exiting visitors responded with disagree or strongly disagree. This indicates that visitors are likely to perceive of zoo exhibits as accurate portrayals of natural habitats when they are "naturalistic." Furthermore, when interviewed visitors felt that the naturalistic enclosures in the San Antonio

Zoo made the animals feel more comfortable and happy in the zoo, allowing animals to express behaviors that would be seen in their wild counterparts:

> Visitor C: "*I think the animals might change their behavior with more plants, and it makes animals more happy."*
> Visitor E: *"Yes, those enclosures make the animal areas are like their natural habitats, so the animals feel at home."*
> Visitor L: *"The zoo here does portray natural enclosures by putting in more plants and mud for the rhinos. It helps them feel more at home than on display…it makes it so it is not a show for humans but helps animals behave like they do in the wild."*

In order to examine how guests understand the accuracy of "naturalistic" enclosures, I asked visitors whether they believed zoos accurately portrayed animal habitats and explain their answer in interviews. Responses varied, but most visitors agreed that the San Antonio Zoo is either accurate in its portrayal of animal habitats within exhibits, or working to get there. Most visitors said that the incorporation of plants and lush landscaping into an exhibit made it more accurate:

> Visitor C: *"Yes, the plants in the habitat look accurate…I am glad they let the grass grow long."*
> Visitor D: *"The zoo is starting to portray the animals in their natural habitats, especially compared to 5 years ago. Now there are more plants in exhibits."*
> Visitor G: *"Yes, I think they do a good job, especially when [enclosures] have real plants from where the animals are from. But not if they use fake plants though."*
> Visitor J: *"I think the enclosures look natural. It's awesome that they do that too. They portray it through the landscape, like how there are different plants in each exhibit."*
> Visitor M: *"I think it depends on the plants that are in there. If there is not plants, then it isn't, but if it looks like a forest or like the animals home habitat than it probably is pretty accurate."*
> Visitor P: *"They are trying to incorporate plants in Africa live that are from the animals' native lands, so I think they are [accurate]"*

Even when visitors did not believe that the zoo animal environments were entirely accurate, they suggested the addition of plants as a way to make them more accurate in the future and felt that the exclusion of man-made or "unnatural" items contributed to whether exhibits were realistic:

> Visitor K: *"I think they are accurate to a degree. [The animals] are caged so that is not like in the wild, cause being caged isn't natural for them. I think to make them more*

> *natural they need more plants, like bamboo or something, and other natural products. There shouldn't be pools or canvas in the exhibits either, since that isn't natural."*
> Visitor F: *"I think that they are sometimes accurate. If they use things that animals would have in the wild, then they are accurate, but if it has air conditioning or something then it isn't. But I guess [animals] need those things sometimes, so I don't know."*

These statements indicate that visitors believe they are being shown an accurate representation of wild environments within the zoo setting, especially when enclosures were lushly landscaped and man-made structures were absent.[35] However, built environments within the zoo are heavily fabricated; the plants used in exhibits are typically non-native to animals' natural habitats, and every part of the exhibit is man-made, even if man-made items or structures are not obvious. Visitors are presented with environments which conform to their preconceived "virtual reality" of what different global environments look like, thus reinforcing and strengthening these preconceptions.

This is understood by some zoo visitors; while most visitors I interviewed believed that the zoo accurately portrays animal habitats, some visitors did not, citing the lack of space, the "confined" and "captive" nature of zoo animal life, or their own lack of expertise on what is or is not "accurate" for these animals:

> Visitor H: *"In zoos you see the ideal situation, not what is happening in the wild. You don't see the construction or poaching in the zoo. They are only made to look natural. I think it is good that [zoos] put in plants and other things from the [animals'] own habitat, but it is better when they have more space, like in the Dallas Zoo. They don't have as much space to roam like they would in the wild, so safari parks and other things like that are probably more accurate."*
> Visitor P: *"Somewhat. You don't really know unless you go to that place or see pictures of the area, but I [the exhibit habitats] look like what I believe they should look like."*

[35] However, the lack of man-made structures can be detrimental to animal well-being, as the prohibition on the use of obviously man-made structures or objects limits the number and variety of enrichment items that animal care staff can present to zoo animals. In these cases, the application of the idealized "virtual reality" of the environments in which animals should live is in direct contradiction to the reality of what is truly healthy for captive animals.

Visitor H and Visitor P understood that "naturalistic" environments are not true representations of the environment. Yet while these visitors did not feel that the zoo accurately represented natural habitats, they assumed that the zoo animals that lived in those enclosures were "wild" and had the same life experiences as non-captive individuals of the same species. This underlying assumption also influenced visitors' beliefs that the experience of the zoo animals is dependent upon the use of vegetation and exclusion of man-made structures in the exhibit, resulting in these animals being more comfortable in a "natural" setting (such as in the above statements made by Visitors E & L).

When visitors enter the zoo their perceptions of zoo animals are influenced by their previous knowledge about animals and the natural world. Visitors I interviewed said they learn about animals from many different sources, including formal settings such as schools, television nature programs[36] and the internet, the library, and "places where they have a lot of animals" such as animal rescue centers and zoos. These sources, particularly media sources, primarily focus on the lives and behaviors of wild or "exotic" animals situated within their natural habitats. Through exposure to animals in these and other contexts, visitors learn to differentiate between familiar "domesticated" animals and "exotic" or "wild" animals,[37] but in the zoo setting these ideas are challenged, as visitors are confronted with animals that do not "fit" the classic definitions of "wild" and "domesticated."

[36] Interestingly, one visitor I interviewed suggested that "The TV programs are better for learning about animals after zoo visits" when kids are interested in the animals they had seen. This suggests that visitor experience with specific animals in the zoo make them more interested in learning about these animals at a later date, and that a zoo visit can influence visitor interest in and motivation to learn about animals and their environments.

[37] Surprisingly, only one visitor I interviewed said they learn about animals through "hands on" interactions with them. This adult female visitor noted that she and her family learn about animals on their "deer lease" where they go hunting together; none of the visitors I interviewed said they learned about animals from interacting with their own pets or with animals in parks or other urban "wild" areas. This suggests that visitors do not feel they learn about animals through their direct experiences with common domesticated animals like dogs, cats, or other pets, and may indicate that visitors see these animals as something distinct and different from more "natural" or "wild" animals.

In order to examine the ways in which guests perceived of and categorized zoo animals, I conducted interviews and administered the "Opinion" questionnaire. When responding to the Opinion questionnaire, 72.5% of entering visitors and 66.3% of exiting visitors agreed with the statement "The animals living in the zoo are wild animals." Presented within built "naturalistic" environments, it is no surprise that many visitors perceive zoo animals to be "wild" based on their previous knowledge of these animals *in situ*. Surprisingly, when these visitors were asked whether "animals in the zoo have the same behavior of wild animals of the same species," answers were mixed; when I asked entering visitors, 41.8% disagreed, 30.5% felt neutral, and 27.7% agreed, and when I asked exiting visitors, 33.7% disagreed, 29.2% were neutral, and 37.1% agreed (see Table9 in Appendix H). To determine how visitors classified zoo animals and situated them within their preconceived worldview of "wild" and "domestic" animals, I asked visitors whether they believed animals in zoos were "wild" animals during interviews. Visitors who believed zoo animals were "wild" based their decisions on the ways in which zoo animals behaved, the degree to which humans could "tame" them, and where specific animals were born (i.e. in or outside of captive):

> Visitor B: *"Zoo animals are wild, since they act wild. I wouldn't get in there with them!"*
> Visitor C: *"Maybe, it matters where they were born."*
> Visitor I (kids): *"Yes, because of where they came from."*
> Visitor K (kids): *"They are found in the wild, like the rainforest. I think that if some of them are in the wild they are wild."*
> Visitor O: *"Zoo animals are wild. They are here so we can see them and learn about them, but they still have their instincts like wild animals."*

Additionally, visitors seemed to suggest that certain species of animal are more "wild" than others, and that if animals want to leave their enclosures and try to escape they are "wild":

> Visitor A: *"I am not sure. Some are wild…snakes are wild but animals born in zoos are not wild."*
> Visitor F (kids): *"Cheetahs and elephants are wild."*
> Visitor G (kids): *"Some are wild, like tigers and lions."*

Visitor L: *"They look tame, but man snakes sit really close to the door waiting and wanting to escape. If they are wild, they want to get out, and if they know what to expect from humans, then they are wild."*

The understanding of zoo animals as "wild" may explain why visitors who felt empathetic toward and able to emotionally connect with gibbons were less likely to desire further relationships (i.e. they were less likely to want a primate as a pet) or physical and geographical proximity with gibbons after visiting them within the zoo. Despite the fact that visitors and animals are able to connect within the zoo and form humananimal relationships, the presentation of these animals as being situated in natural habitats and "untouched" by human influence may contribute to visitors' desire for physical separation from these animals.

Yet these animals do not live "untouched" by humans, and the perception of the zoo animals as "wild" is in direct contradiction to the reality of the zoo animal life experience. Zoo animals exist in a space between wild and domesticated; most zoo animals are born and raised within zoos and have never experienced the natural habitats which zoos emulate. Many visitors realize this, and have difficulty classifying the nature of zoo animals. These visitors suggested that because zoo animals are raised by humans, are provided with food and shelter, and could not survive on their own if introduced into wild areas that they are not truly "wild", but are also not truly "tame" or "domesticated":

Visitor C: "*They aren't domesticated, but they still have the wild instincts. Animals in the zoo just don't need to behave like they would in the wild. The instincts are in the back of their mind, they just don't need to use them too feed and survive."*
Visitor F (adult): *"The species are wild, but the animals are not. They are still dangerous, but not the same as animals on, like, an African safari. They don't behave like wild animals."*
Visitor G (adult): *"On TV [tigers and lions] are wild. They kill to eat. The ones in the zoo could be too, but since you feed them they aren't wild."*
Visitor J: *"They are wild, they just don't act the same as wild animals. They are fed by humans, which makes them nicer, but in the wild they would not be as comfortable around people."*

> Visitors K (adult): *"If they can survive in the wild, they are wild, but if they could not be reintroduced and survive then they are not."*
> Visitor N: *"They are wild, but they would not be able to just be released back into the wild. They are not normal because of their behavior and not growing up in the wild. Their internal food clock works for when the food will come rather than when to hunt or not hunt."*
> Visitor P*: "No, because they were raised by people. If they are calm and don't care about people, then they aren't wild."*

These visitors recognized that zoo animals do not have the same life experiences as their wild counterparts, and that they exist in a space in between "wild" and "domesticated." Despite this, most visitors believed that the wild is the most appropriate place for these animals, and that these "semi-wild" animals are still happier in naturalistic environments which they perceive as accurate representations of these animals' natural environment.

Naturalistic enclosures are built to emulate a pristine wilderness in which zoo animals and their conspecifics should reside. Thus, even though many visitors recognize that zoo animals exist in a space in between "wild" and "domesticated," zoo animals are presented to visitors as living harmoniously with a nature that is unaffected by human activities or man-made impediments. By visiting the zoo and viewing what visitors perceive to be the "natural" habitat for zoo animals, the false "virtual reality" of these animal species eternally living within pristine environments is perpetuated. As noted by Visitors H and P, the naturalistic environments in which zoo animals are housed fail to represent the true state of the natural environment of these animals' wild counterparts, as these natural habitats are often heavily degraded or completely destroyed. This information is not presented to visitors within the animal exhibit and is often only abstractly available on zoo signage and during conservation education presentations.[38] Consequently, in instances where visitors are learning about or experiencing similar animals

[38] As images of habitat loss/destruction or threats to animal survival such as poaching are often considered too graphic for a family friendly leisure spot, any information presented about conservation is through verbal presentations or written on signage. This is likely not the most impactful way of conveying this information, and may contribute to general guest apathy toward conservation.

and/or environments, specifically during IEPs and other conservation programs, visitors' understanding of the conservation status of these environments conforms to their abstract model of it, and their "virtual reality" is reaffirmed as an accurate understanding of the natural world.

It is important to note that in this critique I am not advocating for a return to early barred enclosures or the presentation of zoo animals as "friendly" or "tame; there is no denying that these enclosures are beneficial for zoo animal physical and psychological well-being, which must be top priority for zoos when designing enclosures, and that zoo animals are not domesticated animals. However, the presentation of these animals and enclosures as reflective of their "natural" or "wild" states is misleading to visitors and has contributed to visitor misconceptions of conservation threats to these species and habitats. Within the zoo visitors are present with a sanitized and incomplete portrayal of natural environments and ecosystems, which skews their understanding of the complexities of natural environments and ecosystems and further disconnects them from the reality in which these animals and environments exist.

The presentation of the animals in isolation from other animal species as "naturalistic" skews visitors' understanding of the complexity of ecosystems, and thus the magnitude of the impact conservation threats to a single species or habitat can have on the system as a whole. When asked to respond to the statement "I think ecosystems, (i.e. the interaction between living organisms and non-living components in the environment) are accurately portrayed or explained in zoo exhibits" on the "Opinion" questionnaire, only 9.1% of entering visitors and 2.2% of exiting visitors responded with disagree or strongly disagree, indicating that most visitors believed that the naturalistic exhibits they see are true representations of the natural world. Yet when responding to the statement "Different animal species should be separated in zoos, even if they live in the same environment in the wild" on the "Opinion" questionnaire, visitor responses

were mixed, with both entering and exiting visitor responses being split between disagree, neutral, and agree.[39] Visitors believe they are seeing an accurate representation of ecosystems, but believe that species should be separated from one another within the zoo, even in cases where these species coexist in their natural habitats (this is especially true for predator-prey species).[40] These results indicate that visitors' "virtual reality" of the animal-environment relationship is simplified and sanitized as a result of their interactions with zoo animals and built environments within the zoo, and reinforced during future visits.

When taken as a whole, questionnaire and interview results indicate that visitor perception of zoo animals is heavily influenced by visitors' previously acquired information about animals, specifically from sources that show how wild animals should behave and where they should live. This knowledge has shaped visitors' worldviews, i.e., their "virtual reality" of how animals should and do interact with their environments, as well as the visitors; perception of the health and conservation state of natural environments. These virtual realities are reinforced during their visit to the zoo as visitors view animals presented as living in pristine natural environments untouched by human influence. The reinforcement of the idea of the "wild" animal living in harmony with their environment, as well as the presentation of an environment that is unaffected by habitat loss or destruction as natural and accurate, has contributed to further visitors misconceptions about the status of natural environments, the fragile state of ecosystems as a whole, and the pressing need for conservation of animals and the environment due to rapid environmental degradation and/or loss. These misconceptions, coupled with the modern

[39] Entering visitor responses: 28.9% disagree or strongly disagree, 31.5% neutral, 39.6% agree or strongly agree; exiting visitor responses: 40.4% disagree or strongly disagree, 22.5% neutral, 37.1% agree or strongly disagree.
[40] When asked to respond to the statement "I think that predator and prey species, such as snakes and rodents or lions and gazelles, should be separated in zoos even if they live in the same environment in the wild" on the Opinion questionnaire, visitors answered as follows: entering visitors responses: 21% disagree or strongly disagree, 28.7% neutral, and 50.3% agree or strongly agree; exiting visitor responses: 28.9% disagree or strongly disagree, 21.1% neutral, and 50% agree or strongly disagree (see Table 9 in Appendix H).

environmental disconnect seen people living in urban areas, make it challenging for visitors to accept the conflicting reality that is offered by conservation IEPs.

The impact of virtualism on visitor conservation learning

Zoo visitors are presented with a simplified and sanitized view of nature, where animals are kept separated from other species, ecosystems are not portrayed accurately, and graphic conservation messages about predator-prey relationships are taboo. Visitors are asked to believe that the "naturalistic" enclosures which house zoo animals are true and accurate representations of the external natural environment, thus reinforcing visitors' "virtual realities" in which wild animals exist in environments that are unaffected by human activity. Yet the presentation of this situation and the subsequent reinforcement of this "virtual reality" in visitors are in direct contradiction with the conservation message zoos convey through signage and conservation education programs. The success of these conservation education efforts rely on the program's ability to convey the true fragile and perilous state of natural environments and alter visitor worldview by making visitors understand and care about the threats to animals, environments, and ecosystems.

By visiting to the zoo and participating in the GEC, visitors increased their knowledge of animals and conservation (see Chapter 3), and most visitors I surveyed and interviewed expressed a desire to learn about animals and conservation. Yet despite this increase in knowledge and desire to learn about conservation during their visit, results from the mail-in response card activity suggested that there may be little or no corresponding change in medium-term conservation activism by visitors after their visit and/or participation in the GEC. This may be due to fact that many urban visitors are disconnected from their environment because their "virtual realities" founded in abstracted and "dis-embodied" (Carrier and Miller 1998)

representations and understandings of the natural world. This makes it difficult to connect visitors to an "abstract" and contradictory conservation message. Jean noted this during our interview:

> *And lots of kids and lots of adults period, don't' realize that banana's aren't grown here. You know, if you buy a banana it came from somewhere. They don't get all those connections, they don't understand that. They don't' even… the kids in my neighborhood…, I planted carrots in the front yard so that the kids could pick them and eat them, and they were shocked, I mean I had to pick them and hang them on the fence because they didn't realize that there was that green part on the top and that was what was going to be underneath. I mean they had never even seen that they don't' have any concept of that. So they don't get how those things are connected together.*

Having lost the knowledge and intimate understanding that comes with an intimate connection to an environment, visitors to the zoo are not able to fully understand the true conservation state of animals and environments around the world. This prevents them from understanding conservation messages within the zoo, whether they are communicated directly to visitors via the IEP or indirectly through zoo signage. Jean and Miranda both argued that the *Education Connection* programs and other IEPs may not be as effective as possible because it is difficult to make conservation "real" to visitors with little concept of how people, animals, and the environment are all connected. Miranda noted that, in her experience, very few people even know what the word "conservation" even means:

> *A lot of people don't know what conservation means. Every time I said 'would you like to help conservation' no one knew what that word meant. I had people who did know and I had people who looked at me like 'what are you talking about'. So 'would you like to help save the planet,' that's what I kept saying. And when I said it in simpler terms I got a better feedback than I did [before]. So I think that people don't even realize [the definition]. Generally I tell people "thank you for coming, you are helping us try to save them, save the komodo dragons, the tigers" all that stuff, and then [visitors] feel like they are doing their part but I think that you have to explain it in a little simpler terms.*

When I asked them if they felt visitors wanted to know what conservation meant, both Jean and Miranda said that they believed "visitors would walk away from that." Miranda explained that in

the end, they often have to focus on information that people find interesting, specifically information on animal behavior and life history information:

> *At the end of the day…people would come, get the information, and leave. Come get the info, and leave, you know. They are on a schedule or they have a birthday party to attend and so that is why we try to say as much as we can in the time that we can just so that way we can, at least they leave with monkey versus ape, how to tell them apart. At least they leave with, you know, just because he looks cute at the window doesn't mean that he is cute if you actually get in the room, you know…My main goal when I do it is to show [visitors] the exhibit and to have them do that to each animal they visit. Look at the exhibit, how do [animals] live, and look at their behaviors. Are they displaying? Are they showing you their teeth, or are they running up to you or jumping around? [Visitors] are more interested in the animal's behaviors than they are what is endangered and what is not.*

Jean agreed, commenting that they don't even use the word conservation in the presentations:

> *We usually say these animals are endangered, here is why they are endangered, so I don't even know that we use that word. It is just too abstract for them, it just doesn't….it is so not what they are looking at, you know. It is just…it's not concrete for them.*

Jean and Miranda both agreed that visitors wanted to know more about the gibbons and other animals within the zoo, but that conservation is not something that many people in their audience understood very well. Both Miranda and Jean noted that the conservation portion of the talk is the "least well attended portion of [the presentation], that is the part [visitors] are not paying the most attention to." In noting that conservation is an "abstract term" and "just not what they are looking at," Jean observed that visitors are seeing and experiencing an animal within a habitat that does not show the need for conservation or conservation action. She explained this further:

> *I mean that is definitely the least attended part, the conservation piece and I have been trying to think what would make that more real. I mean, the animal is right there, you have this cool biofact, so that sort of information all seems to go together and fit together, and the conservation piece is this pieces that you are sort of tagging on at the end and you don't necessarily have "here is their habitat," "here is something that goes with that that connects to those animals and connects to the conservation pieces" other than the [palm oil shopping guide] card. And when you are doing the gibbons, the gibbon picture isn't even in the card! So I hand it to them and say "it has a nice picture*

> *of a tiger but that is not what you are looking at right now." So I always try to say you are not only helping the gibbons and I run through the other animals because then it makes more sense that you are getting this card without a gibbon picture on it.*

Because "naturalistic" environments are abstracted from the true conservation threats to those environments, and thus not something that visitors can immediately see within the exhibit, Jean and Miranda believed that visitors were less likely to be interested in this portion of the GEC and other IEPs. Instead, visitors ask the Educational Interpreters questions about natural history information, and only when they are asked about the animal's habitat can they try to "pitch the conservation piece". Jean and Miranda both believed that visitors would be more receptive to the conservation messages of the Education Connections if they could find a way to make conservation more relatable to the visitors. Jean explained:

> *If we could find a way to go "this is how this animal is connected to you" I think that would sell if there was some way that you could say…because you know the reality is that we are all connected, so if there was a way we could say that "this is how we are all connected, here is how this animal is relevant to your life." I think that… I think people would listen to that. Not everybody, but I think that a lot of people would.*

Miranda agreed, saying that in all of her presentations she tries to tie the conservation message back to how animal or habitat conservation will benefit the visitors because "it is sad to say but a lot of people, not just here in the zoo, but in general, what is in it for me and unless they can tie it to them, whether it is visually or by example, then it is just going to go over their heads." Interviewed visitors seemed to echo this statement, with many visitors saying they felt that conservation education would be more effective if they were told something that they could actually do to contribute to conservation efforts or see conservation in action. Visitors want to learn about conservation, and many suggested that they are not getting enough information about conservation during their visit.

The lack of "action step" information presented within the zoo exhibits, as well as the false representation of wild animals living within natural and pristine habitats in the zoo and in situ, has influenced the degree to which visitors are influenced by conservation education programs like the GEC. Because the representations of animals and environments within the zoo simultaneously conform to and reinforce the virtual realities of visitors, visitors are not challenged to see these animals and environments as threatened or endangered in a concrete way. Consequently, visitors are not motivated to alter their behaviors to become more conservation-oriented, as conservation threats are not "real" or tangible. If conservation education programs are to be successful, program creators and presenters must find a way to significantly alter visitor worldview on the reality of animal and habitat conservation when visitors explore the zoo and participate in conservation programing.

Looking to the future of conservation education

The visitor experience within the zoo environment is influenced by visitors' relationships with animals and environments; these relationships, coupled with visitors' virtual reality through which they understand animals and the environment, then influence the ways in which visitors learn about, understand, and act toward conservation. By understanding the nature of these relationships and the construction of visitor worldview, more successful conservation education programs can be created and implemented in the zoo.

In this study I explored the ways in which visitor and animal interactions could be understood within the framework of post-humanism. Through interviews and observation I found that the visitor experience with animals can be understood through the use of humananimal network theory, not as interactions that strengthen the perceived divide between humans and animals. The application of this framework to visitor and animal interactions within

the zoo is valuable for zoo employees who create and implement conservation education programming and offers new insight into the ways in which visitors interact with and are influenced by visitors. By creating programs that attempt to connect visitors with animals, rather than subtly enforcing notions of human exceptionalism and separation from non-human animals, conservation education programs can be made more affective and conducive to visitor learning and appreciation of animals.

The novel application of virtualism to visitor studies in zoos allowed me to explore the relationship between visitor perception and worldview, the portrayal of animals and environments within zoos, and visitor conservation learning during and outside of IEPs. The portrayal of zoo environments as accurate representations of natural habitats affects visitor understanding of natural habitats on a global scale, reinforcing visitor preconceptions of the existence of wild and pristine natural areas that are unaffected by human activities. Consequently, when participating in conservation programs visitor' understanding of the conservation status of animals and habitats conforms to their abstract model of these areas, and their virtual reality continues to be reaffirmed as an accurate understanding of the natural world. This makes it more difficult to inspire pro-conservation attitudes and behaviors in visitors, even when visitors are acquiring fact-based knowledge about conservation.

Both post-humanist theory and the theory of virtualism are valuable tools with which to study the visitor experience within the zoo, and can help us understand how these experiences affect visitor knowledge, attitude, and behaviors. Implementing programs and learning opportunities which understand visitor experiences in these frameworks, conservation education programs within zoos can be made more effective and not only inspire visitors to learn about

animals and the natural world but empower them to create a more sustainable future through pro-conservation actions.

CONCLUSION

As ecosystems worldwide continue to be threatened by human activities, zoos are becoming increasingly important in mediating human-animal relationships, educating the public about animals, environments, and conservation and inspiring the public to contribute to conservation initiatives that are crucial to the survival of endangered species and habitats. Many informal education setting such as natural history museums, nature centers, and botanical gardens contribute to public conservation education efforts, but few draw as many visitors as zoological institutions (Falk *et al*. 2007). No longer simple animal tourist destinations (Beardsworth and Bryman 2001; Desmond 1999), modern zoos are major centers of public conservation education (Falk et al. 2007; Knowles 2003; Rabb 2004), and informal education programs (IEPs), such as the *Gibbon Education Connection* program (GEC), are widely implemented with the goal of improving public animals, ecosystems, and conservation knowledge and inspiring conservation action.

Given that IEPs are ubiquitously implemented by zoos worldwide (despite the fact that studies of the effectiveness of these programs have not been conclusive) it was important that this and other lines of research examine how zoo-visitor, visitor-animal, and animal-environment interactions influence the ways in which the public learns about zoo animals, global conservation. In this study I addressed these issues by exploring (1) how zoo visitors interacted with and perceived of a zoo animals species (e.g. White-Cheeked Gibbons); (2) how zoo visitor perceptions of animals were influenced by visitor-animal interactions in various zoo contexts (e.g. within and outside of IEPs); (3) what zoo visitors were learning about animal and conservation within these various contexts; and (4) the effectiveness of the GEC program in inspiring zoo visitors to actively participate in conservation initiatives. I framed my inquiry in

current theories of human-animal interactions, virtualism, and informal education programing, resulting in a novel view of visitor experience and learning within the zoo setting.

The results of this study indicate that, while participation in the GEC program increased visitor knowledge of gibbons and gibbon conservation when compared to a zoo visit alone, it did not significantly alter visitor attitudes towards these animals nor positively influence future visitor conservation behavior. This may be explained by the brevity and indirect nature of visitors' direct interactions with the gibbons during the GEC, which may make making the formation of empathetic and emotional bonds with these animals more challenging for visitors. However, this could also be the result of a conflict between visitors' worldview or virtual reality of animals and the environment (reinforced by the representation of animals and habitats within the zoo itself) and the conservation messages presented to visitors during the GEC.

In addition to examining visitor knowledge, attitude, and behavior outcomes after both a zoo visit and participation in the GEC, I explored the ways in which visitors interact with zoo animals through the lens of post-humanist theory, specifically humananimal network theory. My results suggest that visitor and animal relationships, as well as their impact on visitor learning, attitude, and behavior outcomes within the zoo can be better understood within the post-humanist framework than through humanist ideology, as the visitor experience is heavily dependent upon the quality and quantity of their interactions with zoo animals. Furthermore, I examined the ways in which visitor environmental virtual realities were challenged and/or reinforced within the zoo setting. This line of research can help us understand why IEPs such as the GEC may affect visitor knowledge but not promote future pro-conservation attitudes or behavior, as well the complex relationship between zoo representations of environments, previous visitor knowledge, and humananimal relationships within the zoo.

Research limitations

As with any study, there were limitations to this research that should be addressed in future studies. As I discussed in previous chapters, recruitment was a challenge in this study. Not only was recruiting survey participants a challenge, especially when recruiting exiting visitors who had participated in the GEC, but the number of visitors who participated in the behavior assessment portion of this project was low. Therefore, future studies into visitor learning, affective, and behavior outcomes should seek larger representative sample sizes for all categories of visitor participation, which would allow for the use of more robust statistical analysis of difference in visitor outcomes after a zoo visit and/or participation in an IEP. The recruitment of more interview subjects would also add to the robustness of future studies. Additionally, in order to confirm that an increase in knowledge does not correlated to changes in visitor conservation-oriented behaviors in other IEPs, future studies examining this should endeavor to recruit a larger number of study participants in the behavior change portion of their study to ensure their results are more robust. Furthermore, the use of a mid-term behavioral assessment tool (i.e. the mail-in response cards) may not have been the best tool for assessing the full impact of an IEP on visitor behavior. Researchers conducting similar studies should include additional behavioral assessment tools that would allow them to assess short-term changes in behavior (such as petitions) or conduct more long-term studies to elucidate the relationship between zoos, participation in IEPs, and changes in visitor knowledge, attitude and behavior.

I relied heavily on True/False and Likert-type questions in my questionnaires, which made up a large portion of this study. Due to my recruitment challenges I was not able to switch the answers to the T/F questions halfway through the study in order to eliminate the possibility of answering bias, but this should be attempted in future studies. Additionally, future researchers

should explore different Likert-scales to determine which scale is the most able to eliminate answering bias. Additionally, the untour method that I attempted in this study was not successful, as establishing a rapport to facilitate recruitment was a challenge. I believe this method has valuable and interesting applications within anthropological studies, and I encourage other researchers to try to integrate this method into their own studies.

Finally, this study was of limited in both length and scope. In order to get a true understanding of the ways in which visitor experiences in the zoo affect visitor worldview, relationships with animals and the natural world, knowledge, attitudes, and behavior, researchers conducting similar studies should endeavor to undertake projects on a larger scale, increasing both the length of the study, the number of participants, and exploring the possibility of multi-institutional collaborations.

Future directions

As with any line of research, this study has raised many new questions that can direct future research. In this study I examined the result of participation in an IEP on short-term attitude and mid-term behavior in visitors. Using additional behavioral assessment tools to examine changes to visitor short term, midterm, and long term attitudes and behavior would be a valuable area of research. To gain a better understanding of the role of IEPs in changing visitor knowledge, attitudes, and behaviors, future scholars could investigate the role of additional IEP formats and explore the impact of more formal paid programs on participant outcomes. This effort could also be expanded in a cross-institutional and/or multi-regional assessment to gain a more in depth understanding of the impact of zoo programs on visitors.

When examining how visitors interacted with one another, I found that many visitors shared information with others in their groups when viewing the gibbons outside of the GEC,

and establishing joint attention was an important step on the intragroup interaction with the gibbons. It would be interesting to examine the experience of young children and adults in the zoo through the lens of both traditional ecological knowledge theory and conservation psychology literature to determine how these early experiences in the zoo are impacting and/or reinforcing western cultural understanding of animals and the environment. I was not able to examine this in children and this would be an interesting avenue for future research. Additionally, additional research on the ways in which intragroup dynamics when viewing animals influence visitor outcomes during and outside of an IEP would help assess how the role of group dynamics in informal learning. Work in these areas would be complimented by research on place-making and the role of environmental (dis)connectedness in visitors understanding of their zoo experience and their relationships with animals and the natural environment.

The visitor experience with zoo animals should also be studied more in depth. In this study I examined the ways in which visitors interacted with a single species; future scholars should examine visitor relationships with multiple species within the zoo, and examine how these relationships change in various contexts within the zoo and visitor experience. An analysis of the impact of visitors' prior experience with animals on their understanding of and relationship with zoo animals would help better determine whether zoo visits alter or reinforce visitor understanding of the "animal". Additionally, the application of the post-humanist humananimal network theory should continue to be applied in studies on visitor and zoo animal interactions, which have traditionally been framed within humanist theory, particularly as these relationships affect visitor learning and behavioral outcomes within the zoo. Scholars of animal

behavior could also investigate the influence visitors have on zoo animals within this context as well, which would expand our understanding of the total humananimal experience within zoos.

Finally, the application of virtualism theory to understand urban people's understandings of the natural world, and the ways in which these worldviews are created and reinforced in "natural" areas within the city environment, is an exciting area for future studies building on this work. Extending this line of inquiry to the experience of people in other environmental tourist destinations and "natural" areas, as well as an expanded research into the ways in which humananimal networks shape and/or alter visitor environmental virtual realities within the zoo, would be an incredibly interesting avenue of future research.

Assessing the impact of a zoo visit and participation in conservation programs in conjunction with the application of both post-humanist and virtualism theories is an incredibly valuable framework through which future scholars can investigate many aspects of the zoo visitor experience. The results of this research can inform the creation and implementation of future conservation education programs in zoos and other conservation oriented institutions, as well as guide the design of future exhibits for maximum impact on visitors. This study and others like it are essential to our understanding of the ways in which urban people situate themselves within the natural environment on a local and global scale. This is especially critical when considering what motivates (or demotivates) people to change their behavior and promote animal and environmental conservation in their own lives. As environmental degradation and species extinctions continue at an alarming rate, it is my hope that this and similar studies can make help make conservation education programs more effective, and through these programs inspire and empower people to act sustainably.

APPENDIX A: IRB 13-207E Approval Letter

UTSA. The University of Texas at San Antonio™

Office of Research Integrity

Notice of Exempt Determination

Date: June 13, 2013 FWA 00003861

IRB#: 13-207E

Study Title: "The Influence of Interactive Informal Education Programs on Zoo Visitor Attitudes and Conservation-Oriented Behaviors at the San Antonio Zoo and Aquarium" (Funding Source: None)

To: [illegible]
[illegible], Ph.D., Department of Anthropology

From: Judith W. Grant, Ph.D., CIP, Director, Institutional Review Board [illegible]

Determination Date: June 13, 2013 Expiration Date: June 12, 2016

The above referenced protocol was reviewed and determined to be exempt in accordance with federal regulations (45 CFR 46.101(b) and all applicable subparts). This protocol was determined to be exempt under category 1.

No modifications (changes) may be made to the consent plan, methodology, or any other aspect of the study without prior evaluation from the IRB in order to determine if the research continues to satisfy the criteria for exemption.

This exempt determination is only valid for three years. If you wish to continue the project beyond the expiration date you are required to reapply for a determination through the submission of an IRB application and protocol.

Please note that the UTSA institutional policy for the retention of research records requires you to retain data and documentation related to the protocol for a minimum of three years following the completion date. Other requirements may be longer.

Should you have any questions regarding this letter, or need further assistance, please contact the IRB office at [illegible] or send an email to [illegible].

Items Approved: Protocol (v.initial.6/13/13), Four consent scripts (v.consentscripts.6/13/13), Five recruitment scripts (v.recruitment.6/13/13)

Study Sites: UTSA, San Antonio Zoo and Aquarium

[illegible] | [illegible] | [illegible] | Fax [illegible]

Please retain this document for your study file.

APPENDIX B: Sample Interview Questions for Zoo Visitors

The following questions were used as a guide during semi-structured interviews.

1. How often do you visit zoos (visits per year)?
2. What is your age?
3. Who did you come to the zoo with today? Who do you normally go to zoos with?
4. Why did you come to the zoo today? Is this usually the reason you visit the zoo?
5. When you come to the zoo, what do you expect to see or do?
6. What is the best place to learn about wild animals? Can you see wild animals at the zoo?
7. What animals do you look forward to seeing the most? Why?
8. Are you interested in learning about or being active in conservation? Why or why not?
9. Do you like to read the signs? Participate in education programs like the Education Connections or Keeper Connections? Why? How do you think animals should be exhibited to visitors?
10. Do you think that zoo visitors should be able to touch or interact with zoo animals? Why?
11. What is a natural habitat for zoo animals? Why?
12. Are animals in zoos "wild" animals? Why/why not? What is the difference between a zoo animal and a wild animal?
13. Do animals in the zoo behave the same way as their wild counterparts? Why are why not? Why do you expect them to be similar/different? What are the differences?
14. Show picture of animal: How does this animal behave in the wild? What does it eat? Does it interact with other species?
15. Do you believe that zoos accurately portray animal habitats? Why/why not?
16. Do you think the environments that zoos portray (animals, plants, conservation, etc.) reflect the conservation status of or threats to an animal species or environments that you have heard about in the news/read about, etc.?
17. How do zoos portray conservation needs (threats to animals and habitats, etc.) to visitors?
18. Animal species that live in the same environment are often kept separately in zoos. Do you think that this is a good practice? Should zoos put these animals together or keep them separate? What about species with predator/prey relationships, such as lions and gazelles? Why?
19. Do you feel that you get an accurate view of the environment by viewing zoo exhibits and learning about conservation in the zoo?
20. Would you visit an exhibit in a zoo that represented habitat destruction, poaching, or other threats to animals or environments? Why or why not? Should zoos have exhibits like this?
21. Do you feel that your knowledge of conservation and threats to animals/environments is increased by visiting the zoo? Why or why not?
22. If no, what would help you learn about these things more in the zoo? If yes, what about the zoo/in the zoo increases your knowledge in these areas?
23. How should the Zoo get more people to be excited about conservation?

APPENDIX C: Sample Interview Questions for GEC Creator

These questions were used to guide the interview with Lacy M., the Curator of the *Education Connection* IEPs at the San Antonio Zoo

1. How did you come up with the GEC program?
2. Where do you see this program going?
3. How would you deem it successful with your overall conservation messaging mission?
4. What is the goal of the Education and Keeper Connections?
5. How do you feel that the guest experience is enhanced through these programs?
6. How are the Education and Keeper Connections approached differently? How are they developed and who develops them?
7. How old is the EC program?
8. What do you hope guests will take away from these interactions?
9. What types of training does staff receive to deliver the Education Connections? How do you see this changing in the future?
10. What is "conservation messaging"? What does it mean to the zoo? To the Education Department?
11. When did the push for conservation messaging begin? How have changes in conservation messaging influenced your approach to the Education Connections?
12. Do you think EC participants are getting the conservation message? How can you improve visitor understanding of the conservation messaging?
13. Who is the intended audience for the Education Connections and the GEC in particular?

APPENDIX D: Sample questions for Education Interpreters of the GEC

1. How long have you been doing the educational interpretation at the SA Zoo? How long have you worked at the Zoo?
2. What type of training did you receive to do the ECs?
3. How do you feel visitors respond to ECs and to different parts of it specifically, i.e. natural history information, conservation messaging, interactive elements, et cetera?
4. Who most often approaches you, children or adults?
5. Do you change the information you are giving based on the age of your audience? If yes, how so?
6. What are some of the most common questions you receive from children? Adults? Are they mostly questions regarding natural history information or conservation information?
7. How do you integrate the conservation message into your talk?
8. How do you think the message is received by different age groups?

APPENDIX E: Attitude and Knowledge Questionnaire

Date: _____ Quest. Admin: _____ Entrance/Exit Volunteer/Recruited

Demographic Information

1. What is your age?
18-25 26-35 36-45 46-55 55-65 66+

2. What is your gender? M F Prefer not to answer

3. Why did you visit the zoo today?
Recreation Education Other: _____

4. Are you a member of The San Antonio Zoo? Yes No

5. Is this your first time visiting the San Antonio Zoo? Yes No

5. How many times do you visit a zoo each year?
Once Between 2-4 times Monthly Weekly

6. I am visiting the zoo today with my: (*please circle all that apply*)
Parent(s) Children/Grandchildren Friend(s) Spouse/Significant other Other N/A

7. Have you ever participated in the gibbon *Education Connection* Program at The San Antonio Zoo? (*Please ask us if you do not know what this is*.) Yes No

8. *If yes:* When did you participate in the gibbon *Education Connection* program?
Today Less than one year ago More than one year ago

Attitude Questions

You will now be asked to respond to some statements about primates (such as monkeys and apes). You will be asked to agree or disagree with these questions. Please take your time and answer each question using the following scale:

Disagree Neutral Agree
1 2 3 4 5

1. I would enjoy learning about the habitat of wild primates.
1 2 3 4 5
2. I want to see primates act on TV commercials.
1 2 3 4 5
3. I think primates should be trained to do tricks.
1 2 3 4 5
4. I would like to have a monkey or ape as a pet.
1 2 3 4 5
5. I am afraid of primates.
1 2 3 4 5
6. I am, or could become, very emotionally attached to some of the animals I see at the zoo.
1 2 3 4 5

7. I am interested in learning about wild gibbons and other primates.
1 2 3 4 5
8. I do not like the smell of animals.
1 2 3 4 5
9. I believe animals are safer and healthier in zoos than in the wild.
1 2 3 4 5
10. I would prefer to watch a TV program about wild gibbons or other primates than travel to see them in the wild.
1 2 3 4 5
11. I would like to live near wild primates.
1 2 3 4 5
12. I think love is an emotion that people should feel for other people, not for animals.
1 2 3 4 5
13. I think it is good to keep primates in zoos as long as they are treated properly.
1 2 3 4 5
14. I am interested in how different primate species are related.
1 2 3 4 5
15. I believe that the animals at the San Antonio Zoo are well cared for.
1 2 3 4 5

Gibbon Questions

You will now be asked to determine whether statements about gibbons, a primate species, are True or False. Please take your time and answer each question.

1. The image on the table is that of white-cheeked gibbons.	T/F	Do not know
2. Gibbons are apes.	T/F	Do not know
3. Gibbons spend most of their time on the ground.	T/F	Do not know
4. Monkeys have tails, but apes do not.	T/F	Do not know
5. Gibbons move through the trees using brachiation, i.e. hanging from their arms and swinging hand over hand.	T/F	Do not know
6. Palm oil production is a threat to gibbon habitat.	T/F	Do not know
7. Most gibbon species are listed as endangered or critically endangered.	T/F	Do not know
8. In the wild, gibbons are found in South America.	T/F	Do not know
9. Mated gibbon pairs vocalize together.	T/F	Do not know
10. Male white-cheeked gibbons are a different color than the females.	T/F	Do not know

APPENDIX F: Opinion Questionnaire

Date: _____ Quest. Admin: _____ Entrance/Exit Volunteer/Recruited

Demographic Information

1. What is your age?
18-25 26-35 36-45 46-55 55-65 66+

2. What is your gender? M F Prefer not to answer

3. Why did you visit the zoo today?
Recreation Education Other:_____

4. Is this your first time visiting the San Antonio Zoo? Yes No

5. Are you a member of The San Antonio Zoo? Yes No

6. How many times do you visit a zoo each year?
Once Between 2-4 times Monthly Weekly

7. I am visiting the zoo today with my: (*please circle all that apply*)
Parent(s) Children/Grandchildren Friend(s) Spouse/Significant other Other N/A

8. Have you ever participated in the Gibbon *Education Connection* Program at The San Antonio Zoo? Yes No

9. If yes to #8, when did you participate in the Gibbon *Education Connection* program?
Today Less than one year ago More than one year ago

Opinion Questions

You will now be asked to respond to some statements about animals and zoos. You will be asked to agree or disagree with these questions. Please take your time and answer each question using the following scale:

Disagree		**Neutral**		**Agree**
1	**2**	**3**	**4**	**5**

1. I enjoy reading some of the educational signs and plaques in front of exhibits with information about the animals.
1 2 3 4 5
2. I enjoy talking to zoo keepers and zoo staff about animals that I see in the zoo.
1 2 3 4 5
3. When I visit the zoo I want to learn about the animals and/or their habitats.
1 2 3 4 5
4. The animals living in the zoo are wild animals.
1 2 3 4 5

5. Different animal species should be separated in zoos, even if they live in the same environment in the wild.

1 2 3 4 5

6. I want the zoo to give visitors information about animal and environmental conservation.

1 2 3 4 5

7. Zoo animal exhibits accurately reflect the natural habitat and environments that these animals live in in the wild.

1 2 3 4 5

8. Animals in the zoo have the same behavior of wild animals of the same species.

1 2 3 4 5

9. I think that predator and prey species, such as snakes and rodents or lions and gazelles, should be separated in zoos even if they live in the same environment in the wild.

1 2 3 4 5

10. I think ecosystems (i.e. the interaction between living organisms and non-living components in an environment) are accurately portrayed or explained in zoo exhibits.

1 2 3 4 5

APPENDIX G: The white-cheeked gibbon exhibit and signage

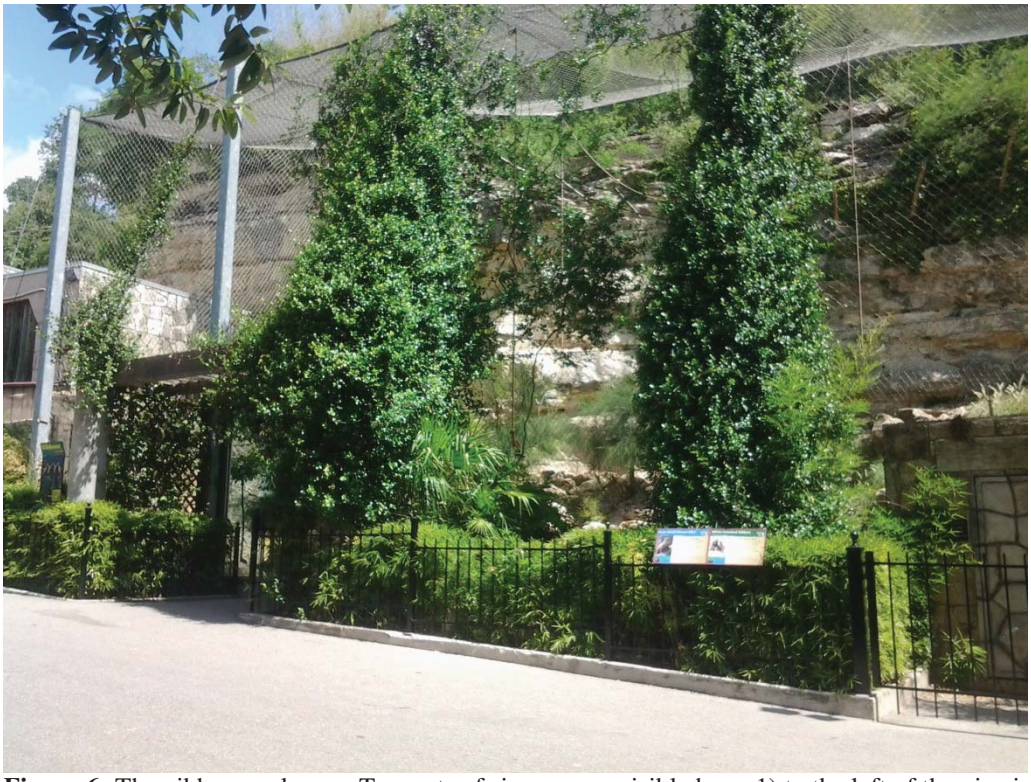

Figure 6: The gibbon enclosure. Two sets of signage are visible here: 1) to the left of the viewing window the Gibbon Locomotion signs are visible; 2) center right the animal ID signs for the white-cheeked gibbon and the Asian small clawed otter (which share the exhibit) are visible.

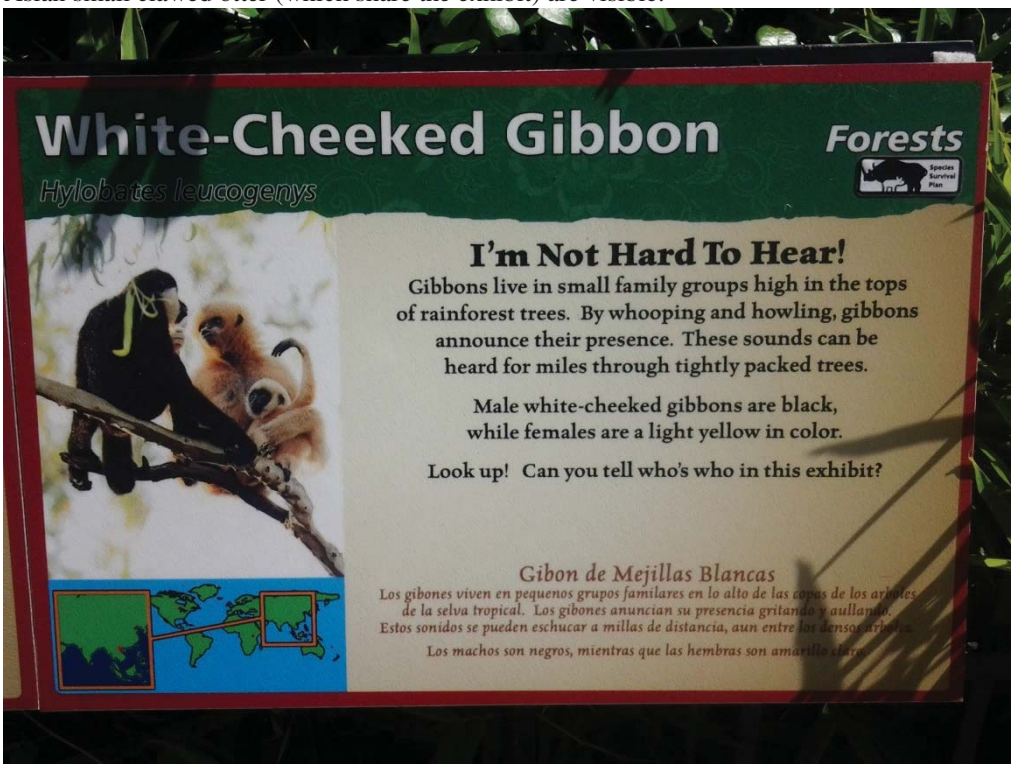

Figure 7: The white-cheeked gibbon animal ID sign. Two are available at the enclosure.

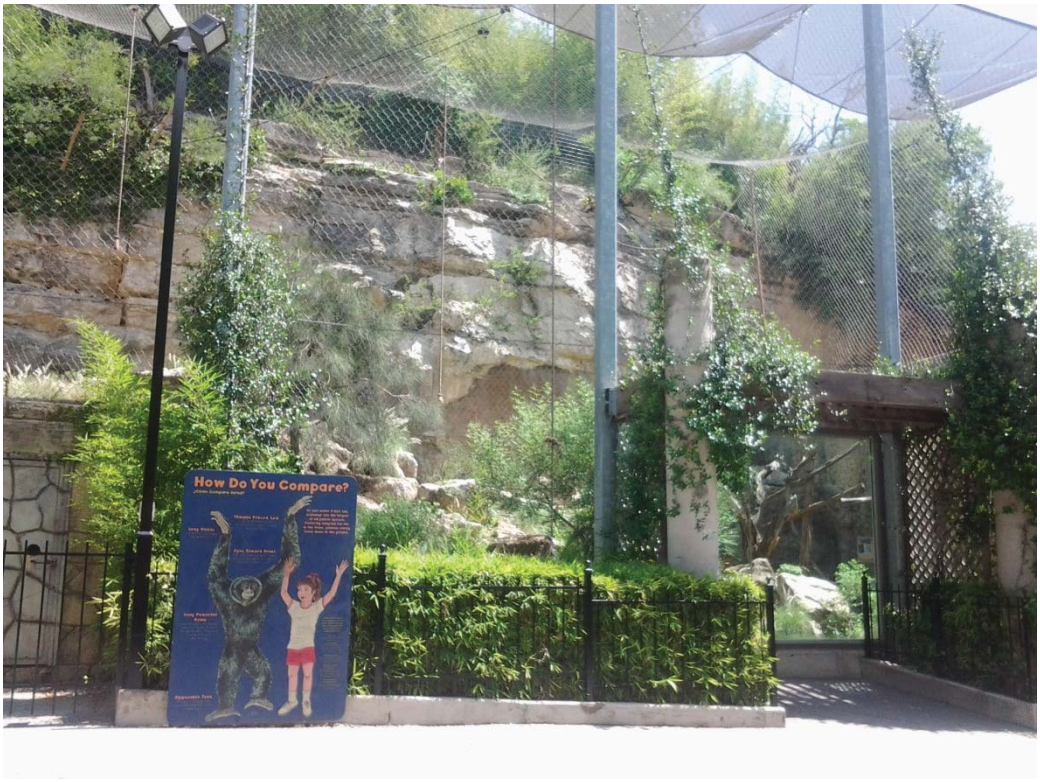

Figure 8: A view of the right portion of the gibbon enclosure. The "How do you compare?" sign and the right most viewing window are visible.

Figure 9: The right viewing window into the white-cheeked gibbon exhibit. Two of these windows offer visitors a different view of the animals inside.

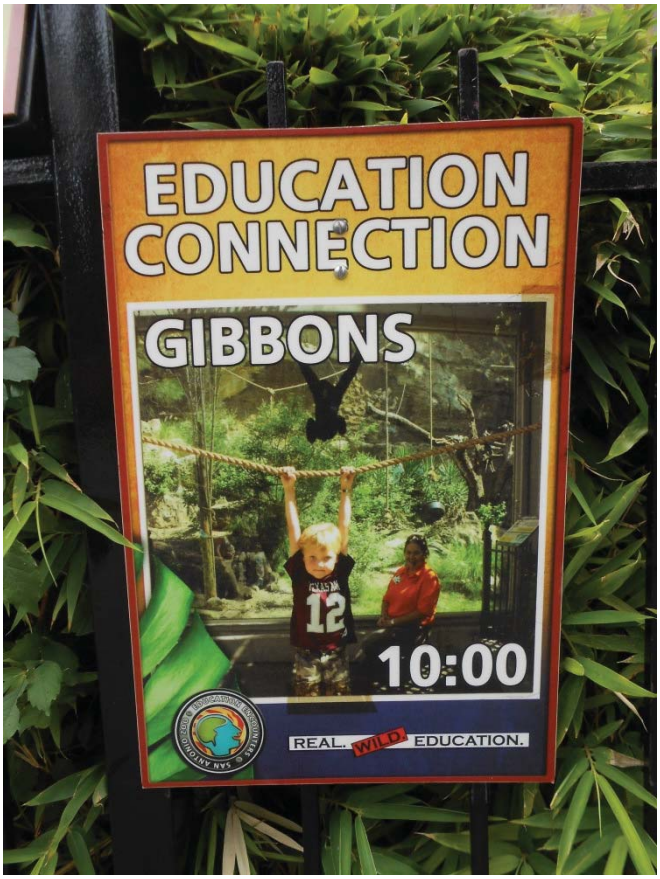

Figure 10: Sign advertising the Gibbon Education Connection, showing a participant using the rope swing.

APPENDIX H: Attitude Question Results

Table 5: Attitudes of visitors entering the zoo for the first time versus those returning

Statement	First Time Visitors			Returning Visitor		
	% D	% N	% A	% D	% N	% A
1. I would enjoy learning about the habitat of wild primates.	2	15.7	82.3	0.9	14.5	84.5
2. I want to see primates act on TV commercials.	26.9	26.5	58.2	31.1	31.5	37.4
3. I think primates should be trained to do tricks.	44.7	32	23.4	47.7	33.5	18.8
4. I would like to have a monkey or ape as a pet.	63.7	10.9	25.4	76.1	8.7	15.1
5. I am afraid of primates.	66.6	17.8	16.2	65	22.1	12.9
6. I am, or could become, very emotionally attached to some of the animals I see at the zoo.	25.2	25.2	49.6	22.4	29	48.6
7. I am interested in learning about wild gibbons and other primates.	10	23.8	66.3	4.8	24.6	70.5
8. I do not like the smell of animals.	44.7	34.8	20.5	36.9	43.5	19.6
9. I believe animals are safer and healthier in zoos than in the wild.	30.9	41.1	28	29.7	40.2	30.1
10. I would prefer to watch a TV program about wild gibbons or other primates than travel to see them in the wild.	53.3	22.7	24	46.5	19.7	33.8
11. I would like to live near wild primates.	41.6	30.6	27.8	49.1	32.5	18.4
12. I think love is an emotion that people should feel for other people, not for animals.	74.4	12.6	13	73.2	16	10.8
13. I think it is good to keep primates in zoos as long as they are treated properly.	10.3	28.4	61.3	9.5	28.9	61.6
14. I am interested in how different primate species are related.	7.4	20.5	72.1	5.2	25	69.8
15. I believe that the animals at the San Antonio Zoo are well cared for.	2.9	21.3	75.7	1	11	88.1

Table 6: Entering versus exiting visitor attitudes

Statement	Entering Visitors			Exiting Visitors		
	% D	% N	% A	%D	% N	% A
1. I would enjoy learning about the habitat of wild primates.	1.5	15.2	83.3	2.1	12.7	85.2
2. I want to see primates act on TV commercials.	28.9	28.9	42.2	34.6	26.5	38.9
3. I think primates should be trained to do tricks.	46.1	32.7	21.1	51.7	30.4	17.9
4. I would like to have a monkey or ape as a pet.	69.5	9.9	20.6	71.7	9.7	18.6
5. I am afraid of primates.	65.5	19.8	14.7	64.3	23	12.7
6. I am, or could become, very emotionally attached to some of the animals I see at the zoo.	23.9	27	49.1	20	28.3	51.7

Table 6: Continued						
7. I am interested in learning about wild gibbons and other primates.	7.6	24.2	68.2	5.2	22	72.8
8. I do not like the smell of animals.	41	38.9	20.1	33.7	44.8	21.5
9. I believe animals are safer and healthier in zoos than in the wild.	30.3	40.7	29	28.6	46.4	24.9
10. I would prefer to watch a TV program about wild gibbons or other primates than travel to see them in the wild.	50.1	21.3	28.6	49.8	26.5	23.7
11. I would like to live near wild primates.	45.1	31.5	23.4	48.4	32.3	19.3
12. I think love is an emotion that people should feel for other people, not for animals.	73.9	14.2	12	77.1	13.6	9.3
13. I think it is good to keep primates in zoos as long as they are treated properly.	9.9	28.6	61.5	9.5	22.2	68.3
14. I am interested in how different primate species are related.	6.4	22.6	71.1	3.7	20.2	76.1
15. I believe that the animals at the San Antonio Zoo are well cared for.	2	16.5	81.5	0.6	9.1	90.3

Table 7: Attitudes of first time visitors versus exiting visitors

Statement	First Time Visitor			Exiting Visitors		
	% D	%N	%A	%D	% N	% A
1. I would enjoy learning about the habitat of wild primates.	2	15.7	82.3	2.1	12.7	85.2
2. I want to see primates act on TV commercials.	26.9	26.5	58.2	34.6	26.5	38.9
3. I think primates should be trained to do tricks.	44.7	32	23.4	51.7	30.4	17.9
4. I would like to have a monkey or ape as a pet.	63.7	10.9	25.4	71.7	9.7	18.6
5. I am afraid of primates.	666	17.8	16.2	64.3	23	12.7
6. I am, or could become, very emotionally attached to some of the animals I see at the zoo.	25.2	25.2	49.6	20	28.3	51.7
7. I am interested in learning about wild gibbons and other primates.	10	23.8	66.3	5.2	22	72.8
8. I do not like the smell of animals.	44.7	34.8	20.5	33.7	44.8	21.5
9. I believe animals are safer and healthier in zoos than in the wild.	30.9	41.1	28	28.6	46.4	24.9
10. I would prefer to watch a TV program about wild gibbons or other primates than travel to see them in the wild.	53.3	22.7	24	49.8	26.5	23.7
11. I would like to live near wild primates.	41.6	30.6	27.8	48.4	32.3	19.3
12. I think love is an emotion that people should feel for other people, not for animals.	74.4	12.6	13	77.1	13.6	9.3
13. I think it is good to keep primates in zoos as long as they are treated properly.	10.3	28.4	61.3	9.5	22.2	68.3
14. I am interested in how different primate species are related.	7.4	20.5	72.1	3.7	20.2	76.1
15. I believe that the animals at the San Antonio Zoo are well cared for.	2.9	21.3	75.7	0.6	9.1	90.3

Table 8: Attitudes of visitors who did participate in the GEC and those that did not

Statement	Non-participant			GEC Participant		
	% D	%N	% A	%D	% N	% A
1. I would enjoy learning about the habitat of wild primates.	2.6	13.1	84.3	1.2	11.9	86.9
2. I want to see primates act on TV commercials.	34.1	27.5	38.4	35.5	24.7	39.8
3. I think primates should be trained to do tricks.	53.3	28.6	18.1	48.8	33.7	17.5
4. I would like to have a monkey or ape as a pet.	71.2	9.5	19.3	72.5	10.2	17.4
5. I am afraid of primates.	64.1	22.9	13.1	64.9	23.2	11.9
6. I am, or could become, very emotionally attached to some of the animals I see at the zoo.	24	26.7	49.3	12.7	31.3	56
7. I am interested in learning about wild gibbons and other primates.	5.8	24.1	70.2	4.3	18.3	77.4
8. I do not like the smell of animals.	32.2	47.2	20.6	36.4	40.6	23
9. I believe animals are safer and healthier in zoos than in the wild.	29	46.1	24.9	28	47	25
10. I would prefer to watch a TV program about wild gibbons or other primates than travel to see them in the wild.	48.2	27.4	24.4	52.7	24.8	22.4
11. I would like to live near wild primates.	49.8	29.4	20.8	45.7	37.8	16.5
12. I think love is an emotion that people should feel for other people, not for animals.	73.8	14.9	11.3	83.2	11.2	5.6
13. I think it is good to keep primates in zoos as long as they are treated properly.	11.6	21.5	66.9	5.6	23.5	71
14. I am interested in how different primate species are related.	3.7	22.1	74.2	3.7	16.7	79.6
15. I believe that the animals at the San Antonio Zoo are well cared for.	0.7	8.9	90.4	0.6	9.3	90.1

APPENDIX I: Opinion Questionnaire Results

Table 9: Opinion of visitors entering the zoo and those exiting

Opinion Statement	Entering Visitors			Exiting Visitor		
	% D	% N	% A	%D	% N	% A
1. I enjoy reading some of the educational signs and plaques in front of exhibits with information about the animals.	0.7	8.1	91.3	0	8.8	91.2
2. I enjoy talking to zoo keepers and zoo staff about animals that I see in the zoo.	2	12.1	85.9	4.5	15.9	79.5
3. When I visit the zoo I want to learn about the animals and/or their habitats.	0.7	4.7	94.6	0	6.6	93.4
4. The animals living in the zoo are wild animals.	8.1	19.5	72.5	10.1	23.6	66.3
5. Different animal species should be separated in zoos, even if they live in the same environment in the wild.	28.9	31.5	39.6	40.4	22.5	37.1
6. I want the zoo to give visitors information about animal and environmental conservation.	0.7	14.7	84.6	0	16.7	83.3
7. Zoo animal exhibits accurately reflect the natural habitat and environments that these animals live in in the wild.	14.3	30	55.7	5.7	42.5	51.7
8. Animals in the zoo have the same behavior of wild animals of the same species.	41.8	30.5	27.7	33.7	29.2	37.1
9. I think that predator and prey species, such as snakes and rodents or lions and gazelles, should be separated in zoos even if they live in the same environment in the wild.	21	28.7	50.3	28.9	21.1	50
10. I think ecosystems (i.e. the interaction between living organisms and non-living components in the environment) are accurately portrayed or explained in zoo exhibits.	9.1	30.1	60.8	2.2	36.3	61.5

APPENDIX J: Demographic Information Tables

Table 10: General demographic data for entering and exiting visitors

		Entering		Exiting	
		Count	*N %*	Count	*N %*
Age in years	18-25	77	*16.9*	56	*0.12*
	26-35	157	*34.4*	187	*0.4*
	36-45	122	*26.8*	130	*27.8*
	46-55	55	*12.1*	57	*12.2*
	56-65	37	*8.1*	29	*6.2*
	66+	8	*1.8*	8	*1.7*
Gender	Female	339	*74.3*	353	*75.9*
	Male	117	*25.7*	111	*23.9*
	Other				
	Prefer not to answer			1	*0.02*
Reason for Visit	Education	16	*3.5*	25	*5.3*
	Recreation	373	*81.6*	389	*82.6*
	Both Ed. and Rec.	32	*7*	39	*8.3*
	Other	35	*7.7*	17	*3.6*
Member	Yes	156	*33.8*	197	*41.6*
	No	304	*65.9*	274	*57.9*
Visits per Year	Once	211	*46*	138	*29.4*
	Between 2-4	152	*33.1*	191	*40.7*
	Monthly	78	*17*	105	*22.4*
	Weekly	17	*3.7*	35	*7.5*

Table 11: Group information for entering and exiting visitors

		Entering		Exiting	
		Count	*N %*	Count	*N %*
Visiting with parents	Yes	52	11	64	13.6
	No	422	89	404	86.1
Visiting with children	Yes	367	77.4	358	76.3
	No	107	22.6	111	23.7
Visiting with significant other	Yes	152	32.1	136	29
	No	322	67.9	332	70.8
Visiting with friends	Yes	60	12.7	58	12.4
	No	414	87.3	441	87.6
Other	Yes	53	11.2	39	8.3
	No	421	88.8	430	91.7
Visiting alone	Yes	6	1.3	6	1.3
	No	468	98.7	463	98.7

Table 12: General demographic data for all visitor categories

		Entering Visitor				Exiting Visitor			
		First Time Visitor		Returning Visitor		Non-Participant		GEC Participant	
		Count	*N %*	Count	*N %*	Count	*N %*	Count	*N %*
Age in years	18-25	62	*25.5*	15	*7*	34	*11.3*	22	*13.3*
	26-35	62	*25.5*	95	*44.6*	116	*38.5*	71	*42.8*
	36-45	62	*25.5*	60	*28.2*	84	*27.9*	46	*27.7*
	46-55	36	*14.8*	19	*8.9*	43	*14.3*	14	*8.4*
	56-65	18	*7.4*	19	*8.9*	18	*6*	11	*6.6*
	66+	3	*1.2*	5	*2.3*	6	*2*	2	*1.2*
Gender	Female	172	*71.1*	167	*78*	227	*75.2*	126	*77.3*
	Male	70	*28.9*	47	*22*	74	*24.5*	37	*22.7*
	Other								
	Prefer not to answer					1	*0.3*		
Reason for Visit	Education	8	*3.3*	8	*3.7*	16	*5.3*	9	*5.4*
	Recreation	196	*81*	177	*82.3*	256	*84.2*	133	*79.6*
	Both Ed. and Rec.	16	*6.6*	16	*7.4*	26	*8.6*	13	*7.8*
	Other	22	*9.1*	1	*0.5*	1	*1.6*	12	*7.2*
Member	Yes	12	*4.9*	144	*66.7*	136	*44.6*	61	*36.3*
	No	232	*94.7*	72	*33.3*	167	*54.8*	107	*63.7*
Visits per Year	Once	197	*82.1*	14	*6.4*	84	*27.7*	54	*32.5*
	Between 2-4	37	*15.4*	115	*52.5*	128	*42.2*	63	*38*
	Monthly	5	*2.1*	73	*33.3*	66	*21.8*	39	*23.5*
	Weekly	0	*0.4*	17	*7.8*	25	*8.3*	10	*6*

Table 13: Group information for all visitor categories

		Entering Visitor				Exiting Visitor			
		First Time Visitor		Returning Visitor		Non-Participant		GEC Participant	
		Count	*N %*	Count	*N %*	Count	*N %*	Count	*N %*
Visiting with parents	Yes	46	*18.5*	18	*8.1*	36	*11.8*	16	*9.5*
	No	202	*81.5*	202	*91.4*	270	*88.2*	152	*90.5*
Visiting with children	Yes	160	*64.5*	198	*89.6*	240	*78.4*	127	*75.6*
	No	88	*35.5*	23	*10.4*	66	*21.6*	41	*24.4*
Visiting with significant other	Yes	83	*33.5*	53	*24*	87	*28.4*	65	*38.7*
	No	165	*66.5*	167	*75.6*	219	*71.6*	103	*61.3*
Visiting with friends	Yes	38	*15.3*	20	*9*	38	*12.4*	22	*13.1*
	No	210	*84.7*	201	*91*	268	*87.6*	146	*86.9*
Other	Yes	25	*10.1*	14	*6.3*	34	*11.1*	19	*11.3*
	No	223	*89.9*	207	*93.7*	272	*88.9*	149	*88.7*
Visiting alone	Yes	3	*1.2*	3	*1.4*	3	*1*	3	*1.8*
	No	245	*98.8*	218	*98.6*	303	*99*	165	*98.2*

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