

CHILDREN AND ELEPHANTS: A STUDY OF MENTALIZATION, EMPATHY,
AND ATTITUDES TOWARDS CONSERVATION IN PARTICIPANTS OF AN
ELEPHANT-BASED ENVIRONMENTAL INTERVENTION IN WEST AFRICA

By

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Abstract

Children and elephants: A study of mentalization, empathy, and attitudes towards conservation in participants of an elephant-based environmental intervention in West Africa.

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Recent research suggests that children's identification with animals and propensity to learn from animal experiences might make animal-focused interventions ideal for social and emotional development. A child's ability to understand their own and others' feeling states has been linked to emotional resilience and has been identified as a protective factor against the development of pathology later in life (Allen & Fonagy, 2006). This study examined the impact of an ongoing conservation-based intervention in Burkina Faso on conservation attitudes, mentalization and empathy. Participants were 106 Burkinabe students, 56 male and 50 female, ages 9-15. Participants were split into four groups, a direct exposure, indirect exposure in the field, indirect exposure in the classroom, and a control group. Primary outcome measures were modified versions of the Children's Environmental Attitude and Knowledge Scale (CHEAKS; Leeming, O'Dwyer & Bracken, 1995), the Mentalizing Stories test for Adolescents (MSA; Vrouva & Fonagy, 2009), and the Basic Empathy Scale (BES; Jolliffe & Farrington, 2006). Significant between-group differences in change scores were found on the modified CHEAKS. The group with direct exposure to elephants showed greater positive change scores than all three other groups. No significant between-group differences were found on the modified MSA or BES. Pre-post changes in qualitative data were also examined.

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Chapter 1

Introduction

The current study examined the psychological impact of an ongoing conservation-based intervention in Burkina Faso, West Africa. I came to this research through my work in conservation education with children in the U.S. and in West Africa. Work with these children led me to think about what is necessary in the development of a conservation ethic, and further, what is beneficial about this type of intervention for a child's development. I noticed that a critical component of developing a conservation ethic is the ability to think about others. Since conservation is linked to awareness of the other and even caring for others, I wondered if these capacities, an ethic of conservation and empathy, developed together. If this were the case, then conservation education would have more than a positive impact for the environment, but also a positive impact on a child's healthy emotional development.

In the present study, the intervention being looked at takes local school children out to the forest to meet and learn about their elephant neighbors. The organization *Des Elephants et Des Hommes* has been running this program for the past ten years. This study aims to examine whether animal interventions and this elephant-based intervention in particular, have an effect on the development of mentalization and empathy. One of the aims of this research is to investigate whether human-animal interactions translate to human relations.

Project Rationale

Recent research suggests that children's identification with animals and propensity to learn from animal experiences might make animal-focused interventions ideal for social and emotional development. The present research will examine the impact of an animal-focused intervention on two specific socioemotional capacities. The first is the development of the capacity to mentalize, or understand the thoughts and feelings in one's own mind and the mind of another. The second area is the development of empathy, the capacity to take another's perspective and share in another's feeling state. Both of these concepts will be further elaborated in Chapter 2.

I am interested in these two areas of affective development because they are critical to healthy emotional development. A child's ability to understand their own and others' feeling states has been linked to emotional resilience and has been identified as a protective factor against the development of pathology later in life (Allen & Fonagy, 2006). In a study of over 750 children treated at the Anna Freud Center in London, Fonagy and Target (1998) found that a lack of the capacity to mentalize was the common factor among children with emotional difficulties. Similarly, empathy towards others is a major deficit in children with conduct disorder. Antisocial individuals are known to lack empathic concern for others. Clearly, the development of these emotional capacities in children is an important area of study (Sharp, 2006).

Research Aims

The proposed study aims to investigate the affective development, specifically development of empathy and mentalization that takes place following this conservation-focused intervention that brings children to meet and learn about elephants and elephant behavior. This study will evaluate the efficacy of the intervention on changing children's attitude both towards conservation and their capacity for empathy towards elephants and humans.

Chapter 2

Literature Review

Overview

The present study examines the development of empathy and the capacity to mentalize seen in children who observe animals, specifically elephants. This literature review is presented in three sections, beginning with an overview of mentalization and empathy, the two areas of affective development emphasized in this study. This section will look at the development of mentalizing and empathic capacities and examine possible outcomes of a deficit in either or both of these areas. In the next section, research on the relationship between humans and animals is reviewed. This section will address the role of animals in children's development, learning, and therapeutic interventions using animals. In the final section the reasons for using elephants in an intervention designed to promote empathy will be reviewed, and characteristics of and assumptions about elephants will be discussed.

Mentalization and Empathy

A review of the terms.

A child's ability to understand their own and other peoples' mental states has been linked to emotional resilience and identified as a protective factor against the development of pathology later in life (Allen & Fonagy, 2006). This capacity to make use of an awareness of their own and other peoples' thoughts and feelings has been

referred to as “mentalization” or “the reflective function” by both cognitive developmentalists (Morton & Frith, 1995) and psychoanalysts (Fonagy, 1991; Fonagy and Target, 1995). Vrouva and Fonagy (2009) explain that mentalization is closely related to a family of concepts including “theory of mind, reflective functioning, mind reading, social cognition, social understanding, emotional intelligence, perspective-taking, and empathy,” (p. 1174). These capacities are part of what define humans as social creatures (de Waal, 2009), and are reflective of our need to interact with one another socially. Neurobiological findings support the idea that “our brains are hardwired to interact with other brains through our ability to mentalize,” (Sharp et al., 2009). Mentalizing can be done both consciously and unconsciously (Allen, 2003).

Mentalization is similar to the concept of “theory of mind,” which was developed by primatologists, Premack and Woodruff (1978). Theory of mind refers to the capacity to “interpret the behavior of others within the framework of the mind,” essentially, understanding the mind of an other. The importance of this basic ability in humans was first emphasized in work with autistic patients, as one of the primary deficits in autism has been described as an inability to adopt another person’s perspective (Baron-Cohen, Leslie, & Frith, 1985). Mentalization theory integrates developmental research on theory of mind with psychoanalytic concepts regarding object relations, self and other. Fonagy and colleagues pioneered much of the research on mentalization, expanding on the basic premise of theory of mind whereby, in addition to understanding that other people have separate minds one

must also be able to imagine an emotional mind, appreciating that mental states are distinct and interpretable, and that they exist in a mutual relationship with behavior (Fonagy et al., 2002; Slade, 2005). Sharp and colleagues' (2009) defined mentalizing, or theory of mind, "as the set of processes by which children and adults understand themselves and others in terms of how they think, feel, perceive, imagine, react, attribute, infer, and so on" (p. 314). Researchers have attempted to define this concept in various ways, but for the purposes of this paper, Fonagy and colleagues' (2002) definition will be used, where mentalization is an individual's capacity to envision mental states in the self or the other. The term mental state is meant to describe all mental experience: thoughts, feelings, desires, beliefs, and intentions (Slade, p. 639).

In the past decade, research has shown that mentalizing helps children to regulate their own mental processes, emotions, and behavior, thereby reducing the risk of psychopathology (Sharp, in Allen & Fonagy, 2006, p. 112). Slade (2005) illustrates how important this capacity is in a person's ability to engage in "productive, intimate, and sustaining relationships, to feel connected to others at a subjective level," but at the same time differentiate one's self from the other (p. 271). She explains how seeing the affect as internally generated, rather than a concrete external force, facilitates self-regulation. This in turn leads to greater autonomy and efficacy in highly charged situations. Furthermore, the ability to understand the mind of the other without feeling overwhelmed or engulfed makes a deeper sense of connection possible in interpersonal relationships. In this way, the

mentalizing capacity allows for clearer boundaries between self and other while augmenting the capacity for intimate relatedness. Sharp, Fonagy, & Goodyer (2008) linked the capacity to mentalize that humans to the ability to engage in activities such as family, friendship, love, cooperation, play, and community. Engagement in these activities is valued as markers of psychological health. Clearly, this capacity serves many functions. Research reviewing the link between mentalizing deficits and psychopathology will be discussed later in this chapter.

Mentalization and empathy are overlapping, though not entirely synonymous, concepts. While the Cambridge English Dictionary nearly defines empathy as mentalization, or “the ability to share someone else’s feelings or experiences by imagining what it would be like to be in their situation,” (Bates et al., 2008), they reflect distinct, but highly correlated constructs. Empathy is an affective response more appropriate to someone else’s situation than one’s own and suggests the existence of role taking on the part of the empathizer. Role taking requires the representation of another’s internal state, thus involving mentalizing (Sharp, 2006; citing Blair, 1995). Empathy is then the emotional response to the information gathered by mentalizing. Baron-Cohen (2003) divided mentalizing into two components: a cognitive component, or theory of mind and an empathizing component. This delineation is by no means accepted unanimously in the literature. Choi-Kain & Gunderson (2008) posited that in empathy the emphasis is on the other while mentalization focuses equally on self and other. Bischof-Köhler (1991) defined empathy phenomenologically as “the experience of participating in the

emotional state of another and thereby understanding it,” while Decety and Jackson (2004) defined empathy functionally as “a complex form of psychological inferences in which observation, memory, knowledge, and reasoning are combined to yield insights into the thoughts and feelings of others.” Garton and Gringart’s (2005), who developed a scale to measure empathy in younger children (ages 8 and 9), suggested that both an affective and cognitive component are necessary in the development of empathy, which encompasses both perspective taking and prosocial behavior. In her understanding of what leads to this type of prosocial behavior, Gordon (2009) emphasized seeing the other as like us, or identification with the other as a key component. In this study we will be looking across species for this identification.

Research confirms that empathy is a critical component of social functioning. The development of empathy is crucial for positive socialization (Hoffman, 2000). De Waal (2009) goes so far as to say that empathy, in that it contributes to peacemaking, is a crucial part of what holds societies together.

The development of mentalization and empathy.

“Empathy is an automated response over which we have limited control...Natural selection designed our brains so that we’re in tune with our fellow human beings, feeling distress at their distress, and pleasure at their pleasure,” (De Waal, 2009, p. 43).

The concept of empathy was first introduced into the psychological literature by Lipps (1907) under a German name of *Einfühlung* (feeling into). He argued that *Einfühlung* cannot be reduced to learning, association, or reasoning, as it offers direct access to the “foreign” self. As De Waal points out, we cannot feel anything that happens outside ourselves, but by unconsciously [or consciously] merging self and other, the other experience echoes within us (p. 65). Dimberg and colleagues (2000) studied the involuntary empathic response seen in humans and found that this response to another’s emotion occurs before the stimulus is registered consciously. Individuals of many species are distressed by the distress of an individual of the same species, and will act to end the other’s distress (Preston & DeWaal, 2002).

As humans, we are born with the capacity for empathy (Gordon, 2009). An ability to recognize emotions transcends culture, nationality, race, social class, and age (Ekman, Sorenson, & Friesen, 1969; Zahn-Waxler & Yarrow, 1982). However, age and gender differences have been found in the development of this capacity. Research has shown that baby girls exhibit an empathic response more frequently than baby boys, and two year-old girls exhibit more concern when presented with an other in distress than two year old boys (Sagi & Hoffman, 1976; Martin & Clark, 1982). There is some debate over when this capacity first develops in children. Bischof-Köhler (1991) examined the development of empathy in children ages 16-24 months. He found that children were able to recognize the distress of another and attempt to help in some way. There was some question as to whether this could be

considered “emotional contagion,” in which a feeling state of another is experienced as one’s own. However, as the children did not attempt to self-soothe, the observed behavior was considered distinct from emotional contagion. This study concluded that empathy develops in children simultaneously with self-recognition as seen in a mirror-recognition task. The results confirmed Hoffman’s (1976) hypothesis that empathy, distinct from emotional contagion, develops as early as the second year of life.

It has been theorized that the capacity to mentalize may develop later in children, based on studies of the false-belief task, a crucial component of theory of mind. Wimmer and Perner (1983) developed the first version of the false-belief task, which tests a child’s ability to attribute false belief, or recognize that others can have beliefs about the world that are different from their own. A meta-analysis of studies of the false belief task in children showed that those younger than three more often than not fail the false belief task (Sharp, 2006). Sharp concluded that the development of mentalizing abilities seems to be increasingly important around the age of four.

While these theorists present a biological model, there are several different models for the development of mentalization and empathy. Some theorists emphasize the link between the parents’ attachment status and capacity to mentalize in determining whether and how the child develops this capacity (Sharp and Fonagy, 2008). Fonagy and Target (2006) maintain that not only does mentalization promote better self-regulation, but also the arousal and dysregulation

created by activation of the attachment system actually serve to inhibit mentalization. The development of mentalization plays a central role in the consolidation of the self, a crucial psychic structure in both identity development and affect regulation. Psychoanalysts have emphasized the importance of the caregiver's capacity to reflect on the mental states of the other for the child's development of self (Bion, 1967; Winnicott, 1956; Kohut, 1977). One aspect of the self is the reflective self. The reflective self is how one represents interactions between self and other. These include mental experiences, feelings, perceptions and beliefs, as well as reflection on these various mental states. The full development of the reflective self may be associated with morality, empathy, and resilience, and may not fully emerge until late adolescence (Kolberg, 1976; Pellegrini, 1980; Cowen et al., 1990). Developing a reflective self is a major goal of psychotherapy (Fonagy et al., 1993).

In optimal development, mentalization is a skill that allows for greater life satisfaction and more effective coping in times of stress. Conversely, individuals with deficits in mentalization are vulnerable to a host of emotional and interpersonal consequences. Such deficits will be addressed in the following section.

Deficits in mentalization and empathy.

In a study of over 750 children treated at the Anna Freud Center in London, Fonagy and Target (1998) found that a lack of the capacity to mentalize was the common factor among children with emotional difficulties. The two childhood

disorders that are most clearly linked to impairments in mentalizing are autism and antisocial behavior disorders (Sharp, 2006, p. 102). This section will examine both of these disorders in more detail.

Autism.

According to the Autism Society of America, autism is a complex developmental disability that typically appears during the first three years of life and affects a person's ability to communicate and interact with others. Autism spectrum disorders (ASD) lie on a spectrum that ranges from mild to very severe (Grandin, 2011). A core neurological deficit in autism is difficulty relating to other people socially (Volkmar, Carter, Grossman, & Klin, 1997). In a severe case an individual remains nonverbal and must live in a supervised living situation for the rest of his or her life. Research has shown abnormal sensory systems, often hypersensitivity, in individuals with autism spectrum disorders (Grandin, 2011, p.183).

Autism researcher Baron-Cohen (1997) coined the term *mindblindness* to describe the social abnormalities observed in children on the autistic spectrum. Several observations of autistic children show lack of the development of mentalizing behavior. For example, autistic infants appear less interested in people (Volkmar et al., 2005), and those with a mental age below three were shown to be less likely to attend to an apparently distressed adult (Sigman, Kasari, Kwon & Yirmiya, 1992) and to have difficulties imitating facial displays of emotion

(Loveland & Tunali, 1994). Mentalizing not only refers to the ability to reflect on another's mind, but also on one's own mental state. Children with autism seem to have difficulties in monitoring their own intentions, desires and thoughts (Phillips et al., 1998). Interestingly, diminished attachment behavior observed in autistic children often leads parents to seek help for their children (Sharp, 2006).

A gender difference has been observed in autism, with an 8:1 male-female ratio (Wing, 1981). As found in the research on the gender differences in the development of empathy, Baron-Cohen (2003) found superior mentalizing skills in females as compared to males. These findings led to the development of the *extreme male brain* theory of autism (Baron-Cohen, 2002, 2003). These common gender differences may further support the link between mentalization and empathy and its importance for healthy social-emotional functioning.

A major deficit in children with Autism Spectrum Disorder (ASD) is theory of mind, or the capacity to mentalize. The fact that individuals on the Autistic Spectrum have shown improvements through animal-assisted therapies suggests that there is something in the child's interaction with the animal that helps to develop theory-of-mind, or mentalization. It has been suggested that individuals with ASD are better able to understand animals. The understanding of theory of mind and perceptual processing may be the two key components to understanding why animals may be easier for people with ASD to relate to (Papp, 2006).

Temple Grandin (2011), who has written extensively about her experience with autism, described herself as more easily processing visual rather than verbal stimuli. She suggested that like someone on the autistic spectrum, “an animal also lives in a sensory world that is not a world of verbal language,” (p. 188). She reported that an individual’s ability to understand animals is particularly strong because of common sensory-based thinking. Grandin and Johnson (2005) first examined the hypothesis that this is the reason that some children and adults with ASD relate especially well to animals. They suggested that animals do not think in words, and as such memory and experience are filled with detailed sensory information. For example, one elephant was known for its fear of diesel engines, but not gas, due to a frightening experience associated with the sound of a diesel engine. In non-verbal individuals with ASD, similar “fear memories” may occur that are linked with sensory stimuli (Grandin, Fine, & Bowers, 2010). Prince-Hughes (2004) learned to communicate despite her deficits through relating with gorillas at the zoo. Gruen (2009) wrote that Prince-Hughes’ experience is “a poignant lesson of self-discovery through recognition in the eyes of another.” She described her experience moving from homelessness to working with the gorillas in the zoo where she found a sanctuary away from, what was for her, a difficult social world.

Celani (2002) found that children with ASD appeared to prefer drawings of animals to illustrations of humans and interpersonal interactions. Prothmann (2009) hypothesized that animals, specifically dogs, might make their behavioral intentions more easily understandable to individuals with ASD because, unlike

humans, they do not communicate both verbally and non-verbally. Prothmann and Fine (2011) suggested that animals are well suited to therapy for ASD for the following reasons: (1) Newborn children prefer moving to static visual stimuli; (2) Children can identify animals as a separate category visually, before they are able to speak; (3) Animals are fascinating to children and offer stronger sensory stimuli than inanimate objects; (4) Animal behavior follows certain aims and inspires children to learn about animal, and later human, intentions; (5) In the presence of animals, children seem to have an intrinsic sense of well-being, safety, and security that leads to a learning-conducive atmosphere; and (6) Animals provide multi-sensory stimuli that does not overtax a child with verbal communication (p. 153). It is important to note, however, that animals do not have any expectation of reciprocal social exchange and do not communicate in line with human rules of social engagement. Therefore learning through animals does not translate directly to human communication. However, in related work, Guttman, Predovic & Zemanek (1985) found that children with pets are better at decoding human nonverbal emotional cues and are perceived more favorably than their peers.

Conduct disorder.

Antisocial behavior seen in children may include a diagnosis of conduct disorder. Conduct disorder refers to a group of behavioral and emotional problems seen in children and adolescents. Conduct disorder is a disorder with several subtypes, for example, relationally versus physically aggressive, and proactive versus reactive conduct disorder (Sharp, 2006). Conduct disorder and antisocial

behavior have not been as directly linked to deficits in mentalization as in autism, but inaccurate mentalizing are markers of this disturbance.

Research has shown that, unlike in autism, 6-12 year olds diagnosed with conduct disorder were able to mentalize, though at times the subject's mentalizing capacity was skewed (Happé and Frith, 1996; Sutton, Reeves, & Keogh, 2000). This research found that antisocial children have the cognitive capacity to read the mind of another, but they do so inaccurately. However, a particular subgroup of antisocial children showed impairment with regard to the empathizing component of mentalizing. This subgroup of children with impoverished empathizing was identified as those children who might be most at risk for more severe and pervasive antisocial behavior (Sharp, 2006, p.110). Hastings and colleagues (2000) hypothesized that a lack of empathy, perhaps located in the amygdala (Blair & Frith, 2000), leads to aggression. They explain that this is because in normal development, empathy provides immediate feedback that discourages both physical and relational aggression because the perpetrator is made aware of (by empathizing with) the pain suffered by the victim. This empathic deficit in children exhibiting antisocial behavior has been observed in those older than six years.

In a randomized controlled trial of a mentalization-focused anti-violence program, Fonagy and colleagues (2009) found that the school-wide intervention led to decreased aggression and improved observed classroom behavior relative to no intervention. The ability of this program to reduce children's experience of aggression and victimization supports the claim that aggression, and bullying in

particular, may be related to a deficit in empathy and accurate mentalization. The Roots of Empathy curriculum is an evidence-based program developed by Mary Gordon in 1996 in order to foster empathy and social-emotional literacy in children (Gordon, 2005). Gordon implemented this program with the goal of reducing aggression, antisocial behavior, and bullying.

Further intervention.

Other studies have been examined to look at the impact of empathic concern and awareness of the mental states of others. Garton (2004) found that an awareness of and sensitivity to others might be beneficial for learning. She specifically looked at school learning through collaboration. Mentalization-based treatment (MBT) programs have been developed for borderline personality disorder (Bateman & Fonagy, 2004) and autism (Baron-Cohen & the Human Emotions Team, 2003). While some school-based and autism focused programs have been developed for children focused on the development of mentalization and empathy, the majority of interventions have been developed for adults.

Further study of interventions at an early age is necessary in the development of these critical capacities. The proposed study aims to investigate the development of empathy and mentalization that takes place following a conservation-focused intervention that brings children to meet and learn about elephants and elephant behavior. Given this focus, the following section will

examine the relationship between humans and animals, children in particular, and why this type of intervention might be effective.

The Human-Animal Relationship

People and non-human animals.

The human relationship to animals cannot be characterized by any one perspective or theory. What animals mean to people and the way that animals have been involved in human lives has differed over time and across cultures. This section will examine our relationships to animals both in actuality and in fantasy, as both have influenced our development as humans.

Arluke and Sanders (1996) claim that the meanings of animals are fixed and enduring as social constructions widely accepted throughout a culture and passed down through generations. In Western culture, for example, consider the following statement, which examines what is considered “wild.”

At an early age, we learn by watching Disney movies, reading fairy tales, and listening to our parents that a “wild animal” can be a tiger in the jungle, an elephant in a zoo, a squirrel living in the backyard of a suburban home, an ownerless dog that roams the neighborhood, or a mean-spirited, raunchy person looking to pick a fight in a bar. (Arluke and Sanders, p. 10)

What makes these images wild to an American child and how might this perception differ cross-culturally? An animal’s context makes a difference in our perceptions and relationship to it as well. Compare the difference between human projections onto a pet dog and a racing dog. The same animal holds vastly different meaning,

one a loving companion and the other machine-like, both based on human social constructions.

Pet keeping is often considered a luxury associated with Western culture, affluence and materialism (Serpell, 1996). However, Serpell (2011) cited evidence from archeological digs that suggests that the practice of keeping animals as pets has been a part of human culture since the domestication of wolf-dogs in the Upper Paleolithic period (11,000-14,000 years ago). This practice has been seen across cultures in ancient Egypt, Greece, Rome, China, and Japan.

Although it has been found that people of all cultures have kept pets, it is unlikely that pet keeping has attained the prominence that it enjoys in North America. As of 2008, there were about 77.5 million pet dogs in America living in 45.6 million homes; 93.6 million cats in 38.2 million homes; 171.7 million freshwater fish in 13.3 million homes; millions of pet ferrets, rabbits, guinea pigs, hamsters, rats, mice, gerbils, various birds, and a wide assortment of reptiles and amphibians (American Pet Products Association, 2008). A majority, 62 percent, of U.S. households owns at least one pet and 45 percent own more than one (Serpell, 2011). Even animals such as monkeys, wolves, and large cats are smuggled into homes in the U.S. by the thousands (Melson, 2001, p. 31).

The attraction that humans feel to infants of our own and other species may be an innate response. Lorenz (1971) showed that similar facial profiles characterize human infants as well as the young of other species, such as dogs, cats,

and ducks. Humans are naturally attracted to this set of features and can even feel a “surge of disarming tenderness” when looking at the face of a baby animal (Gould, 1982). However, it is not only tenderness that characterizes our relationship to animals.

Representations of different animals vary widely among individuals. Attributes of a particular animal can be meaningful as a reflection of how we see ourselves. Sax (1990) suggests that animal symbols project our deepest fears, wishes, and conflicts. Humans see animals as mirrors of themselves. Melson (2001) puts it poetically: “humans are sketched in animal hues” (p. 145). Looking at modern metaphors such as, “chicken out,” “hog the food,” and “taking the lion’s share,” we see the ubiquity of animals in our minds. While this holds true for all humans, children are perhaps consciously more apt to make use of these identifications. As children’s author, Rosemary Wells (1990) states, “animals live in a world that children seem to climb right into.”

Animals in children’s lives.

Animals occupy a major role in a child’s imagination. Katcher & Wilkins (1998) found that children are able to keep images of animals in their minds for long periods of time. Animals dominate children’s dreams, a phenomenon which decreases with age (Van de Castle, 1983). Nightmares of children under seven frequently contain animals, and 18 percent of children under five reported that their biggest fear was of “wild creatures” such as lions, tigers, and wolves (Foster

and Aronson, 1936; Ames, 1964). Interestingly, Foster and Aronson found that only seven of the 398 studies reported any actual frightening experience with an animal. In 1945, Pratt studied children's reported worst fears. While many of these children had fathers who were at war, the overwhelming majority rated scary animals such as dogs that bite, bucking horses, scary bears, mean elephants, and biting tigers as their biggest fear. It would seem from this study that animals are safe places for children to project their fears. A study of Australian fifth-graders found 32 different animals fear arousing, the majority of which the children had never encountered (Lane & Gullone, 1999). A meta-analysis of childhood fears found that sharks, snakes, and spiders consistently top children's fear lists (Muris, Murkelbach & Collaris, 1997).

Along with aspects of fear and dreaming, animals occupy the imaginations of children in a myriad of ways. Most bestselling children's stories feature animal protagonists. Lystad (1980) found that animal characters appeared in more than 75 percent of a random sample of children's books published from 1916 to 1950. In a random sample of children's books published from 1988 to 1992, Black found that 89 percent mentioned animals (Melson, 2001). Similarly, McCrindle and Odendall (1994) looked at South African children's books and found that animals were the topic of three out of five stories. The most widely used third-grade texts in the U.S. in 1980 were about children's relationships with animals (Croghan & Croghan, 1980). Boyd and Mandler (1955) looked at third-grader's preferences for animals and found that 75 percent of children preferred stories with animal characters to

identical stories with human characters substituted for the animal characters. Among the first 50 words that most American toddlers say are *dog*, *duck*, *cat*, *horse*, *bear*, and *bird*, and more children say these words than any other, except *mama* and *daddy* (Arkow, 2010). Non-human animals dominate the media (Serpell, 1999). Children love zoos, aquariums, and natural history museums (Gee, 2011). Zoos, aquariums, and nature parks draw more children and their families annually than to any sports event in the U.S (Melson, 2001). There are over 100 zoos in the U.S. and 35 aquariums, which annually receive about 135 million and 10 million visitors, respectively (Kellert, 1997). Saloman (1981) found that in a sample of children in grades K-6, 97-98 percent reported desire for a pet, while 53-94 percent across the various grade levels already owned a pet. Serpell (2000) estimated that over 70 percent of children talk to and confide in animals. Melson (2001) argued that many cultures, along with American culture, are studying the natural attraction that children have to animals. Besides the cultural popularity of animals in children's lives, they appear in the internal world of children as well.

Projective tests for children are full of animals. The identification of movement on the Rorschach test represents how one is managing internal drives and impulses. Rorschach theorists have differentiated between animal movement (FM) and human movement (M) on the Rorschach test. Levitt and Truuma (1972) explain that seeing human movement (M) reflects emotional adjustment, and specifically, capacity for empathy, self-awareness and the ability to use fantasy as a defense mechanism. Rorschach theorists interpret animal movement (FM)

responses as more impulsive, less deliberate, and less safely identified with than *M* responses (Ames et al., 1974, p. 59). Schachtel (1950) claimed that animal movement responses on the Rorschach represent drives that are unacceptable to the self and projected onto the environment. The capacity to produce *M* responses has been positively correlated with age (Levitt & Truumaa, 1972). Few, if any, *M* responses would be expected in the preschool years (Ames et al., 1974). Using animals to project inner feelings that are as yet conflictual or unintegrated is expected on the Rorschach. In sum, in children a greater number of *FM* responses are expected as desires, feelings, drives, emotions and impulses are not yet fully integrated, and therefore projection onto the animal is more likely. Ames and colleagues found that children's responses on the Rorschach Inkblot test consistently show animals more frequently than in adults. Animal imagery on the Rorschach typically subsides after age ten; though by no means disappear entirely. A study of 650 children aged two to ten found that half of all inkblot responses involved animals (Ames, Learned, Metraux & Walker, 1952).

Bellak and Bellak (1961) proposed that using the childhood propensity to see animals was the best way to gain insight into a child's inner conflicts and most important relationships. They then developed the Children's Apperception Test (CAT) based on the belief that animals are the preferred identification figures from the ages of three to ten. Another projective test, the Animal Preference Test (APT; Van Krevelen, 1955) tests children's identification with animals. In this test a child is asked which animal you would most like to be and which animals you would most

not like to be, given the caveat that you could not be a human. Baez Rojas and Tuber (1991) correlated animal preferences (as measured on the APT) and behavior (as measured on the Childhood-Behavior Checklist; Achenbach & Edelbrock, 1986) in Black and Hispanic 6-12 year-olds. They found rejected animals to be most relevant to behavior ratings, where children who rejected nurturing and/or beautiful animals correlated with aggressive or depressed symptoms. This suggests that children's representations of animals speaks to their own internal state and can even be a way for them to describe their internal experience.

Freud (1916) was struck by children's fascination with animals and noted how frequently animals appeared in children's dreams. For him animals represented projections of powerful adults, too threatening to the child to appear undisguised in dreams. In relating children to animals themselves, he believed that children are closest to the instinctual or "animal" drives of the id, which for him explained the kinship that children and animals hold. He wrote that,

The child does not yet show any trace of the pride which afterwards moves the adult civilized man to set a sharp dividing line between his own nature and that of all other animals. The child unhesitatingly attributes full equality to animals; he probably feels himself more closely related to the animal than to the undoubtedly mysterious adult, in the freedom with which he acknowledges his needs. (Freud, 1916, p.242)

While animals can stand in for a child's conflicted or unacceptable feelings, they also provide a way of talking about, understanding, and communicating many aspects of oneself (Melson, 2001). Part of the work of childhood is developing a sense of self (Kohut, 1977). This is done partly through the dreams, stories, fantasies, and

play involving animals. Kellert (1997) has extensively studied the relationship between people and animals, specifically looking at childhood and adolescence. He proposes a relationship between contact with animals and development of the self. As Melson aptly writes, "*Animal characters are the raw material out of which children construct a sense of self,*" (p. 150). Mimicry of animals and animal motion can be seen in children at the zoo. For example, Melson noticed children rocking back and forth with their toes turned out and elbows made to look like wings in front of the penguins at the New England Aquarium, and a boy who turned to roar at his startled sister in front of the lion cage at the Lincoln Park Zoo. For children, the emotions and personalities of animals, real and symbolic, are immediate in the same way that human emotions and personalities are (p. 19).

In exploring why this connection with animals exists, evolutionary hypotheses are useful. E. O. Wilson's (1984) Biophilia Hypothesis explains human's natural interest and investment in life and life-like forces in evolutionary terms. Mutual dependence between animal species and humans has existed throughout evolution. Humans have been alert to the rhythms of animal and plant life around them to remain alert to safety and danger and the presence of food and shelter (Kahn & Kellert, 2002). This theory proposes that the presence of a calm and friendly animal became associated with safety and induced relaxation in humans. Humans had to be exquisitely attuned to the natural world for survival and this imprint still exists within our species, manifest in the fact that children typically become quiet and alert in the presence of animals. Attunement to animals

throughout evolution led early humans to imagine themselves within the mind (and skin) of an animal (Melson, 2001). In his longitudinal research on the relationship between children and animals, Kellert (1997) found that through encounters with animals, children learn to know and understand others minds and think about how the mind is related to action.

Animals and Theory of Mind.

The ability to attribute mental states to oneself and others and to understand that individual thoughts and minds may differ from one's own is a developmental achievement. As discussed above, this cognitive ability has been identified as theory of mind. Researchers of theory of mind have typically studied our understanding of human minds. One noted difference between children and adults in the employment of theory of mind is that humans don't typically attribute beliefs or intent to trees, cars, or most non-human animals. However, children readily do this (Siegler, 1998)

Melson (2001) suggests that animals have certain qualities that may make them especially effective conveyors of theory of mind ideas (p. 93). Children can more easily connect mental states to behavior with animals because the pathway is often less convoluted and complex than in a human. Essentially, animal minds are "simpler to read." Human relationships are complex and intricate, and young children may identify more readily with animals than adolescents or adults because of a fundamental emotional immaturity (p. 158). Even when making inaccurate conclusions about an animal's state or anthropomorphizing, the child is gaining

practice in developing the capacity to mentalize. Animals are particularly useful objects of projection for children as they are represented as having one, and only one, feeling. The sly fox, the ferocious lion, are seen in an all or none way, and therefore children can relate to them in this singular, black and white way. The child can project his or her all or none fantasies onto a particular animal in useful ways.

Animals not only help children make sense of the mind of another, but also may help them to express what is in their own mind. For example, a child might be able to express his shyness by acting like a turtle pulling its head and arms into its shell than by putting it into words. Katcher and Wilkins (1998) found that children were able to reflect on their own minds using the animal as an intermediary. They noticed that children began thinking about their own feelings through conjecturing and reasoning about an animal's feelings and relationships. By thinking about what the animal wants or needs, a child may be more able to express their own needs and desires.

Learning from animals.

Anthropologist Lévi-Strauss (1966) wrote, "Animals are good to think." Other anthropologists have observed the utility of animals as highly variable cultural symbols (Douglas, 1966; Evans-Pritchard, 1956; Leach, 1964). Wild animals have been used as a mirror against which humans have defined themselves for over 60,000 years (Lévi-Strauss, 1963). The animal acts as a visible embodiment of

characteristics otherwise invisible in human beings. For example, Katcher (2002) explains, “cowardly and brave human beings may look alike in the supermarket, but lions and jackals always look different,” (p. 192). Observing animals can lead people to reflect on their own behavior as “animals are living demonstrations of diverse ways of eating, reproducing, communicating, and perceiving – some similar to, others different from, human behavior,” (Blue, 1986).

Melson (2001) suggested that animals may function as a meaning making system through which children make sense both of themselves and their surrounding environments (p. 15). Children also use animal characters as visible manifestations of invisible human feelings and relationships (p. 151). Katcher (2002) made a similar point, noting that children learn new patterns of social behavior by first reasoning about real animals and then applying those insights to people. Thus, in morality tales and fables the ambiguous world of grown-ups can be better understood when different types of behavior and affect are linked to different types of animals (Katcher & Wilkins, 1998). Unlike human characters, animals in fairy tales and children’s stories impart the essence of the issue without the value judgments associated with age, ethnicity, gender, etc. (Beck, 2011).

As discussed above, animals are omnipresent in the lives of children. They appear in movies, stories, ads, video games, dreams, and thoughts. Animal attributes are useful for children because they are simple and speak to some part of the child that can be isolated and deeply felt. For example, the brave lion, the sly fox, the faithful dog, the busy bee, the beautiful butterfly, and the wise owl are all

animals that have been categorized and clearly represent facets of being with the advantage of avoiding conflicting or opposing emotions or attributes in one person. Stories in which small children save large animals may encourage the development of a child's sense of mastery through a special bond to a large, usually wild animal. This could play out not only in story, but also in the real life messages conveyed about saving "charismatic mega-fauna" such as panda bears, elephants, and whales (Garland, 2008).

Direct exposure to animals

There are a number of factors that influence an individual's relationship to animals. Prior experience is one of those factors. Meyers (1998) proposed that early experiences with animals are of the most predictive of the ways individuals care for animals as adults (2010). It has been found that life-long attitudes and behaviors towards animals are based in a large part on childhood experiences (Magnuson-Martinson & Page, 1986; Kidd & Kidd, 1989).

Kellert (1997) tried to determine whether proximity to wildlife impacted knowledge of animals. He found, in a study of 267 second- through eleventh-graders, that widespread misperceptions persist through adolescence, but that proximity to wildlife assists in learning. Children living in the inner city had the lowest knowledge scores, while children in rural areas rated highest. He concluded that when children grow up around animals, they are likely to absorb more accurate knowledge about them. Serpell (1999) found that children who have direct

experience with living animals showed the highest ecological/moral/naturalistic attitudes and lowest avoidance/dominance/exploitative perspectives. Finger (1994) found that environmental behavior was most highly correlated to environmental experiences. His study further supports the idea that we care about what we know.

Kahn (1999) studied the impact of culture on attitudes towards animals. He proposed that moralistic attitudes towards animals are not limited by culture or prior experience. He found that first-, third-, and fifth-grade African-American students from inner city Houston were equally sensitive to issues of animal-welfare as children their age living in the Amazon region of Brazil and in the Prince William Sound region of Alaska.

Several researchers have suggested the importance of direct or personal interaction with animals as a catalyst for change in developing caring attitudes and behaviors (Meyers & Saunders, 2002). Dettman-Easler and Pease (1999) found that experiential programs resulted in significantly more positive attitudes towards wildlife than those with in-class education. Memorable life-events are often related to animal activity or proximity (Saunders et al., 2000). Arluke and Sanders (1996) wrote that sympathetic understanding is acquired through interacting directly with those who are studied (p. 43). In other words, it is our direct exposure to the animal that helps to develop concern and understanding. Is this because we begin to think about and better understand the experience of the other, in this case, the animal?

Direct exposure to animals, through observation, has incredible impact on children. The impact of animal observation is an underlying dynamic behind the present study. Observing animals in zoos and nature parks allows children to understand them as living beings. Watching animals provides the opportunity for experiences of self in relation to an other. However, Meyers and Saunders (2002) claimed that observing animals is not as immediate and potent for development of the self as interacting with them. Melson (2001) suggests that any involvement with animal life confronts a child with their morality and leads them to consider their own place as humans within the ecosystem, and biological knowledge and understanding may be accelerated through living in proximity to animals in the natural environment.

Age and the human-animal relationship.

Age is another important factor that influences one's relationship to animals. Myers (1998) observed that as children develop, a strict division between human and animal attributes develops, which he calls "the categorically human self." Researchers have identified at least nine distinct orientations towards animals: (1) Appreciation for the ecology of wild species and their habitats; (2) moral concern for proper treatment of animals; (3) "naturalistic" enjoyment of wildlife; (4) dislike, fear, or avoidance of animals; (5) need to dominate and control animals; and (6) interest in animals for their material benefit (Serpell, 1999). The first three increased with age, and the second three diminished with age.

Perceptions of animals seem to shift in consistent ways after the age of ten. Children under ten have been found to separate animals into dichotomous categories of “all good” or “all bad.” For example, Rost and Hartmann (1994) found that children under ten almost unanimously described wasps, crocodiles, wolves, rats, cockroaches, and spiders as “yucky,” “slimy,” and “scary.” On the other hand, the best-liked list was made up of dogs, cats, horses, rabbits, dolphins, panda bears, and chimpanzees. Cultural stories influence these “good” or “bad” conceptions. For example, lions are kings and crocodiles “tick tock” as a warning to those who might walk the plank.

Particular ages have been marked as milestones in children’s impressions of animals. Piaget (1929) found that children go through a developmental stage in which they ascribe human traits to animals. In a study of 102 children ages 3-10 years, Kidd and Kidd (1996) found significant age differences in attitudes towards animals. Three to five year olds were most egocentric in their focus on animal appearance, behavior and what they enjoyed most about animals. Six to eight year-olds began to demonstrated elements of empathy and perspective taking showing concern for animal endangerment, while nine to twelve year-olds clearly expressed empathy with their concern about helping, protecting, and caring for wildlife and opposition to killing animals as trophies. These stages applied to both attitudes towards familiar pets and wild animals (p. 124). Another study by Kellert and Westervelt (1983) found significant age differences in the attitudes of 250 children in both urban and rural environments. They found similar age related

developmental stages in the way that children relate to animals. Six to nine year-olds showed increases in their affective relationship to the animals. Ten to thirteen year-olds showed an increase in cognitive understanding and knowledge of animals. Thirteen to sixteen year-olds showed an increase in ethical concern and ecological appreciation of animals. Myers (1998) observed that as children develop, a strict division between human and animal attributes develops, which he calls “the categorically human self.” As children develop, adults emphasize the treatment of animals as separate from themselves.

As children are fed all sorts of contradictory messages about animals, they grapple with understanding the complicated mix of social codes regarding animals and their treatment. Isaacs (1930) writes, “There is probably no moral field in which the child sees so many puzzling inconsistencies.” For example, one animal can be raised to be eaten (cows) while others need to be protected but distanced from (bears) and yet others are kept as home as friends (dogs). Meyers (1998) found that instances of harm to animals were the most commonly reported event to parents by preschool children. When children harm animals, the behavior draws a lot of attention. Mead (1964) suggested that certain taboos regarding cruelty to animals are tempting to break for children. Melson (2001) hypothesized that children’s cruelty to animals may point to this complicated cultural mix of messages about animal treatment (p. 185).

Animal-Assisted Interventions.

A brief history.

There has long been interest in the impact of animals on human well-being. The earliest documented system of spiritual belief, which is still in existence today, is animism. Animists believe that animals have spirits or souls, and can protect humans as “guardian spirits,” or cause illness or death when offended (Melson, 2001, p. 106). In 1699, John Locke suggested that “dogs, squirrels, birds or any such things” should be given to children to look after to encourage the development of “tender” feelings and responsibility towards others (Serpell, 2011, p. 13, citing Locke, 1699/1964). In the 19th century, pets were common in mental institutions in England.

In the 20th century, however, animals were essentially eliminated from hospital settings due to the advent of scientific medicine (Allderidge, 1991). Over the next 50 years, animals emerged in medical literature mostly in discussions of diseases transmitted from non-human animals, and in Freud’s (1959) discussion of animals as symbolic referents for the origins of mental illness. In much of psychoanalytic theory of this time animals were “flexible symbols taking myriad shapes to express a wide range of instinctual feelings and ideas” (Melson, 2001, p. 149).

Child analyst Boris Levinson is credited with the revival of using pets therapeutically. He introduced the idea that an animal, in this case his dog, Jingles,

could be used as a “co-therapist” in providing the child with a “relatively neutral medium through which to express unconscious emotional conflicts, worries, and fears” in the therapeutic environment (Levinson, 1962/1969). Levinson (1972) also discussed the role of an animal as a “social-lubricant,” in which a child with disturbed object relations could, through the relationship with the pet, re-learn to relate with people, or “return to the world of interpersonal relationships.” He wrote that the animal became the medium through which the child began to converse. It is important to note, however, that most documented incidences of the therapeutic use of pets have been with dogs, and not other animals.

Animal-assisted therapy programs today.

Therapists have been making use of animals in therapeutic settings through programs like Green Chimneys Children’s Services in New York and the Devereux Foundation in Pennsylvania. At both of these facilities, children who have emotional and or physical difficulties are treated through a number of modalities, one being the caretaking of animals. At Green Chimneys, animals are the modality through which much therapeutic communication occurs. Theoretically, the animal connection becomes a “stepping stone” to rebuilding ties to humans. Animals don’t judge, talk back, or represent potentially traumatic interpersonal early relationships as a therapist might. Many children confide in the animals and form strong attachments to particular animals (Mallon, 1992). D.W. Winnicott (1955) described the importance of “holding” as a place of absolute dependence in which the infant understands love as physical holding and protection. Later, it is in the

holding environment, when the infant is sure of being held, that the first moment of understanding himself as separate from the mother. Because this places the child in an extremely vulnerable position, to be separate, the child can only fully make this proclamation of self if he or she is sure of being held (Tuber, 2008). While first physical, this idea of the “holding environment” can also be emotional holding. In the milieu described above, the animals appear to serve as a holding environment for the children and adolescents living at the facility.

Ross (1981, 1983, 1989) has written extensively about the therapeutic effects of the integration of children and animals at Green Chimneys. In one major study of these youth, Ross and his colleagues found that animals used in therapeutic and educational intervention influence participants to become involved and develop a rapport with therapists and can be the agent for therapeutic change (1984, p. 129). Psychologists at Green Chimneys have written about their understanding (and hope) that experiences with the texture of a sheep’s wool, curling up with a loving dog and other animal connections might begin to make up for a lack of “good-enough” parenting experiences that many of these children have experienced. Observation of animal caretaking is another therapeutic aspect of the program. Ross described one child, previously closed to discussions of his early history, being moved or shaken by watching a rabbit take care of her babies, stating, “My mother never took care of me like that!” This observation can encourage a child to think about or acknowledge their own depriving early experience and stimulate access to early memories as well. One further step that is taken at Green Chimneys is the

role of the child as caretaker. Children watch good parenting in the animal, and then take on the role as good-parent themselves. In this environment, even children who are closed to nurturing or caring feelings towards other people can be nurturing across species and explore this role with less conflict. For many of the children who have been abused, horses are a favorite animal, and riding a favorite activity. Melson (2001) hypothesized that the horse may symbolize something big and powerful that the child can control. The animals are potent symbols in many ways, mirroring a child's experience. The healing of injured birds is an important part of the program, and not so subtly, part of the graduation ritual for children at Green Chimneys is to release a rehabilitated bird as a symbol of healing and freedom for both bird and child (Mallon, Ross, & Ross, 2000).

The Companionable Zoo, developed by Animals-Assisted Therapy researcher Aaron Katcher (2002), is composed of over 100 animals including chinchillas, rabbits, guinea pigs, iguanas, turtles, finches, doves, goats, and Vietnamese pot-bellied pigs. This "zoo" is located at The Devereux Foundation, a residential facility in Philadelphia for boys with severe conduct disorder and ADHD. In an experiment comparing the effects on behavior of the animal focused program and a non-animal focused wilderness program, Outward Bound, the Companionable Zoo (CZ) was more popular with the boys than Outward Bound (OB). CZ decreased aggression, which OB did not. CZ participants were significantly less aggressive in the classroom than OB boys. At the CZ, behaviors including nurturing, affection, play, lowered aggression, peer cooperation, accepting responsibility, teaching others, and

respecting adult authority were all observed. Focus and attention were improved in the presence of animals in the CZ such that learning could occur (Katcher, 2002). From this study, Katcher concluded that sustained contact with animals in the CZ was as effective as Ritalin (even outside of the zoo environment) in focusing attention in children with ADHD. Over the past decade, this model has expanded to work with children with severe developmental disorders such as autism, learning disabilities and emotion regulation difficulties (Melson, 2001). However, outcome studies of these types of treatments are still rare.

While a wide variety of Animal-Assisted Interventions have been developed, few have been empirically tested. Several examples of these interventions will be discussed in this section. The first is an addition to psychodynamic play therapy that VanFleet (2009) introduced as Canine-Assisted Play Therapy (CAPT). CAPT uses a dog to facilitate attachment, empathy, self-regulation, problem-resolution, and self-efficacy. Next is an addition to Bibliotherapy, the guided reading of written materials in gaining understanding or solving problems relevant to a person's therapeutic needs (Riordan and Wilson, 1989), in which animals are used as main characters to help children absorb difficult information (Burns, 2001). The use of stories in child therapy has been shown to be therapeutic (Bettelheim, 1977; Mills & Crowley, 1986). Reichart (1998) hypothesized that the child's ability to identify with characters and themes is so powerful that the child will make unconscious connections to heroes and conflicts. Reichart used animals in her treatment of sexually abused children to connect with children about very difficult themes of

abuse. In the Animal Attribution Story-Telling Technique (Arad, 2004), family members assign an animal counterpart to each member of the family and then tell a short story about the animal protagonists. A similar technique, My Family as Animals, was designed by Rio (2001) to help facilitate the sustained attention of children in the family therapy room.

Violent behavior continues to be a significant problem in many societies (World Health Organization, 2004). Programs that have had success at prevention of violence in children and adolescents have been aimed at the improvement of social, emotional, and cognitive skills of targeted at-risk groups (Beelmann et al., 1994; Schneider & Byrne, 1985). There have recently been programs using animal-assisted activities that have shown some success at the development of these skills and in violence prevention (Kruger and Serpell, 2006). Specifically animals are used because of their unique ability to appeal to children and adolescents (Arluke, 2004), to be highly responsive to participants and provide many opportunities for interaction (Myers & Saunders, 2002).

Drugs are indispensable in treating psychosis and schizophrenia, but have been found to be less effective for socially relevant symptoms such as anhedonia, listlessness, or lack of empathy. Many patients lose their interest in social interaction. The goal of animal-assisted interventions in this case is to rebuild interest in social contact (Prothmann & Fine, 2011). Beck, Seraydarian, & Hunter (1986) found, in a randomized trial, that for patients with acute and chronic psychotic disorders, the presence of a cage of finches made the hospital atmosphere

less frightening and alarming. They also found that in the therapy room, when animals were present, children participated significantly more in group therapy, and displayed social animosity significantly less than without animals present.

In the presence of an animal.

Recent research has shown that in the presence of an animal, significant, and potentially therapeutic, psychological, physiological, and social changes occur (Heimlich, 2001; Mansfel, 2002; Odendaal, 2000). In a Viennese elementary school, Kotrschal and Ortbauer (2003) found an association between the presence of a dog and a decrease in aggressiveness and hyperactivity. They also found an increase in social cohesiveness and attention paid to teacher, relative to a classroom with no animal present. Friedmann and colleagues (1983) found that the presence of a friendly animal reduced blood pressure and heart rate in children, which are both observable signs of anxiety. Allen and colleagues (1991) looked at the differences in stress level in the presence of a friend as compared to a pet. When asked to perform “stressful” tasks, adult females in the condition where a pet was present showed significantly less physiological reactivity than those with a human friend or no companion. It has also been found that anxiety is reduced in children who are asked to read aloud when there is a pet present (Friedmann, Thomas, & Eddy, 2000; Jalongo, Astorino, & Bomboy, 2004). Data suggests that conducting education in the presence of animals or natural settings is more likely to result in acceptance of the values of the educators and facilitate behavior change (Katcher, 2002). In a study of children with Down’s syndrome, Limond, Bradshaw, and Cormack (1997) found that

the presence of a real dog increased and sustained focus for positive and cooperative interactions with the dog as well as the adult participant relative to the presence of an imitation dog.

In the presence of benign animals, highly aggressive children behave more cooperatively, become less antagonistic, and display greater social competence (Kaye, 1984; Ross et al., 1984; Katcher & Wilkins, 1993/2000). Katcher (2002) proposes a theoretical understanding of this phenomenon, which combines anthropologist Victor Turner's idea of *liminality* (1982) with psychoanalyst D. W. Winnicott's idea of the *transitional object* (1951). Turner (1982) developed the concept of liminality to describe a stage in transition or rite of passage. Liminality is the stage in which there is an intensification of the feeling of community or connection ("lateral bonds") where authority is accepted, differences between participants are accepted and meaningfulness of and engagement in the task increases as distance from the role one is playing decreases. In liminality "*people play with the elements of the familiar and defamiliarize them. Novelty emerges from unprecedented combinations of familiar elements,*" (Turner, p. 26). Therefore, the presence of unfamiliar animals (novel stimuli) suggests a suspension of the rules of daily life that a child is used to and opens up space for change in ideas and behavior (Katcher, 2002). Winnicott (1971) described the transitional object as some thing or phenomenon that emerges out of an experience, is created by the child because of the feeling that it evokes in him or her, and represents that experience in a real enough way. The transitional object is the first form of transitional phenomenon.

Transitional phenomena exist in the overlap between inner and outer reality, and are simultaneously separate from both (Tuber, 2008). The child takes the attributes of a purely subjective experience and projects them on some real entity in the external world. An animal as transitional object, in this sense, cannot reject the attributes projected onto it, and can serve to be what a child imagines it to be. One objection to this theory however, is that the transitional object as Winnicott defines it, must be able to withstand mutilation, hating, and aggression. As this would be a problematic way for a child to treat an animal, a live animal might not serve fully as a transitional object in the sense that Winnicott described. Rosengrant (2002) takes this into account, criticizing a romanticized view of the child-animal relationship, and giving further weight to the idea of a child's bond with an animal as similar to that of a transitional object for exactly the reason that the animal can be the object of both love and hate (p. 1326). Given this caveat, Katcher (2002) proposes that the presence of animals in the therapeutic space may create a leveling of the playing field, a space for new experiences to occur, and an object onto which the child can project feelings, desires and wishes that might not occur as readily in the human to human relationship. Melson and Fine (2006) hypothesized that animals play a special role in the therapy room as they have the ability to pass by the defenses and gain access to the unconscious.

When in the presence of an animal, much more happens for a child than a simple cognitive distinction between animal and person. The experience of seeing an animal evokes an emotional reaction in a child. It is the emotional engagement

that fuels curiosity and fascination. This emotional response is a catalyst for learning in children (Melson, 2001). Part of what sustains the attention of a child is the changing state of an animal. *“Animals are predictably unpredictable,”* (Inagaki & Hatano, 1996). The cognitive incongruity and novelty of being confronted with a living thing, unique and reactive, is enough to trigger learning (Piaget, 1969).

Novelty is a major factor impacting response to being in the presence of an animal, also employed in the present study. The animal is in many cases a novel stimulus and novel stimuli have been found to make more lasting impressions on children (Beck & Katcher, 1984). It is for this reason that researchers are recommended to test changes in response to animals over a period of time (Mallon, 1992). It must be remembered, however, that in all of the discussed interventions it is given that a fear of the animal or other negative response could occur and thus the interventions are not suitable in all cases. Overall, however, it has been found that the presence of animals in the therapeutic setting, either directly or indirectly through story or fantasy, may help open a dialogue or a therapeutic interaction.

Animals and the development of empathy.

Many theorists hypothesize that empathy development has its roots in early infancy and is dependent on the quality of early relationships (Eisenburg, 1992; Golemann, 1995; Winnicott 1960). Magid and McKelvy (1987) found that children with disturbed attachment styles might be more likely to lack empathy and abuse animals. Hastings and colleagues (2000) documented the relationship between empathy and lowered likelihood of violence towards others. However, empathy

towards people and empathy towards animals are not identical. That being said, the ways in which they are correlated suggest a significant overlap (Ascione, 2005). In a sample of 514 adults, Paul (2000) found a significant, though small, correlation between measures of empathy towards people and empathy towards animals. It is worth noting that in the humane movement for the last 150 years it has been assumed that “children who are taught to respect animals will develop empathy, compassion, and grow up to be kinder to their fellow human animals,” (Arkow, 1990/2010, p. 457). However, researchers are only just beginning to explore the human capacity for empathizing with other species (Wesbury & Neumann, 2008).

Melson (2001) explores how encounters with animals affect developing capacities for empathy and sympathy and whether moral reasoning reaches across species lines. Contrasting Piagetian (1929) views of the development of empathy from a cognitive perspective with psychodynamic perspective of the development of empathic concern through “good-enough” parenting (Winnicott, 1960), she points out that these are both distinctly anthropomorphic perspectives on the development of this capacity (p. 96). Paul (2000) found that empathic concern was heavily experience based. Those participants who had pets currently or in childhood rated higher on the empathy towards animals scale than those who did not. Wood (2011) credited animals with contributing to the development of a range of life skills, including “empathy, learning to care and nurture, take on responsibility, and deal with grief and death,” (p.30). The capacity for cooperation, social trust and shared goals can be helped or hindered by the way in which people relate to others and are

able to see the world from another's perspective (Wood, 2011). Anthropomorphic reasoning may be a key component of the development of these capacities in children (Katcher & Wilkins, 1998).

Gee (2011) agreed with developmental theorists who state that empathy can be viewed as a learned behavior (Richardson & Norman, 2000), and for this reason its development can be facilitated. Several programs have been developed with the idea of using animals to facilitate affective development. In adults, prison inmates rescue abandoned horses and are trained to "gentle" them so they can be adopted, with the goal of developing empathy and reduction of recidivism in prisoners (Strimple, 2003; Fournier et al., 2007). For example, Soutar-Freeman's (2003) program, in which children care for an animal, is aimed at teaching empathy, compassion, and respect for life. In a study of a similar, year-long intervention for first-, second-, fourth-, and fifth-graders, it was found that animal-related attitudes and animal-oriented empathy did generalize to human-directed empathy (Ascione, 1992).

Gender differences have been noted in empathic concern in children. In her study of empathy towards animals and humans, Paul (2000) found that females and younger participants showed significantly higher baseline levels of empathy in all conditions. Caring for an animal as a pet or otherwise can have particularly meaningful influence on a young boy, as caretaking and nurturing are still primarily seen as acceptable roles for women. Caring for pets however, is free of this

gender-role association and provides the opportunity for this developmental skill to grow in boys (Melson, 2001).

Questions, controversy, and future research.

There are many who question the validity of animal-assisted therapies and caution against their use in the absence of rigorous empirical studies. There are other concerns as well. Fraiburg (1967) cautions that in using a therapeutic animal, children may bond with the animal as a defense against expressing feelings towards humans. She suggests that the child may transfer affection away from humans onto animals. Similarly, Melson (2001) wonders whether children couldn't form a pathological tie to an animal, substituting humans with animals. It is also possible that in animal assisted interventions, like any form of psychotherapy, the therapist is more effective due to his or her belief in the use of the animal (Frank & Frank, 1991).

There is also a paucity of research in the field of human animal interactions and atypical child development (Melson, 2001). Arluke (2004) calls for research looking at the connection, if any, between children's concern for animal well-being and prosocial behavior. Griffen and colleagues (2011) call for researchers to communicate across disciplines in order to further our understanding of Animal-Assisted Interventions and the Human-Animal Relationship.

Why Elephants

As the current study will examine the efficacy of an elephant-based intervention, this section will address the use of elephants, and their meaning as figures of identification or learning for children of different cultural backgrounds. In this intervention the mechanism at play is identification. Observing animals provides the opportunity for experiences of self in relation to an other. In this study, development of the self will occur through observation and identification with the elephants. Therefore, it is crucial that elephants exhibit or represent the behaviors we are hoping to foster in children.

Animal emotions and anthropomorphism.

Any kind of emotional attribution towards animals has been looked down on in the scientific community, and has thus made it difficult to study or learn about empathy in elephants and other species. “Science considers anthropomorphism toward animals a grave mistake, even a sin,” (Masson & McCarthy, 1995, p.32). Nevertheless, they suggest, there is a strong case to be made for the existence of emotions in animals, and to a great degree in elephants in particular. Observations of elephants both in captivity and in the wild have provided evidence for the capacity to feel a range of emotions including empathy, grief, and joy.

Elephants and empathy.

Few animal species are as likely to be described as empathic as elephants (Bates, et al., 2008). Like humans, African elephants live in coherent, coordinated

social groups, where individuals have both reason and opportunity to model the behavior, emotions, and mental states of others (Bates et al., 2008). Elephants are long-lived, slowly developing, large brained mammals that live in closely bonded societies (Bates, Poole and Byrne, 2008). Elephants are known for their close relationships (Bradshaw et al., 2005). It is typical of elephants to comfort and seek physical contact with calves every few minutes and protect and assist each other on a daily basis (Bates et al., 2008).

Scientists have documented the existence of empathy in elephants. Elephant researcher Poole (1996) defined empathy as “the imaginative projection of one’s own consciousness onto that of another living entity,” p. 162. She observed evidence of this in African elephant populations in Kenya. She observed elephants, both kin and nonrelatives, coming to the aid of injured elephants. She hypothesized that these elephants have some capacity to know what it means for another to feel pain. Male elephants have been known to carry young branches to an old bull elephant who is too sick to forage for his own food (Masson & McCarthy, 1995). Elephants assist injured elephants both in the same family group and from other groups. Hamilton and colleagues (2006) found that elephants have a generalized response to suffering and death of other elephants that is not restricted only to kin.

It is well documented that elephants assist injured humans as well. Poole wrote of elephants watching guard over an injured person and chasing away animals that might do harm until someone came to rescue the injured. Poole writes that “I have no doubt that elephants have conscious thoughts and a sense of self,” p.

165. The ability to recognize oneself in a mirror has been linked to the capacity for empathy (Gallup, 1982). While the claim remains contentious, Plotnik, de Waal and Reiss (2006) found that elephants were able to pass mirror self-recognition tests. Another well known elephant researcher, Moss (1988), described African elephants expending substantial amounts of energy to avoid hurting a human, even when provoked. African herds will slow down to accommodate an injured member or even an adult female who is carrying a calf who has been dead for several days.

Bates and colleagues (2008) carried out a longitudinal study in which they documented behaviors observed in African elephants that can be seen as components of empathy. These included forming coalitions, protecting, comforting, babysitting, retrieving lost individuals, assisting in mobility, and removing foreign objects. They found that elephants recognize characteristic aspects of normal elephant behavior and have expectations about outcomes of those behaviors. They are able to accurately recognize and respond to a range of emotions of other elephants, especially those to whom they are related. Elephants were observed showing what de Waal (2008) termed 'sympathetic concern,' where elephants offered protection and comfort to the calves of others or retrieved them from harm. De Waal described the "highest level of empathy as 'empathic perspective taking,' characterized by 'targeted helping' towards needy individuals. Bates and colleagues found that elephants exhibited this type of empathy in their assistance in overcoming mobility problems in calves. They also documented that elephants are very sensitive to the distress of others, and remarkably capable of anticipating and

preventing distress. Furthermore, as adult elephants sometimes help individuals who are not related to them, it was inferred that not all empathic behavior was linked to kinship and may represent a more generalized response to distress (p. 223).

The elephant's demonstration of compassion across species is astonishing. In one example in Kenya, a rhino calf got stuck in the mud and an adult elephant worked for days to assist in lifting the rhino out every moment that the mother rhino, who didn't seem to understand and charged the elephant every time she saw it approach, went to forage in the forest. The elephant clearly would gain no genetic benefit from helping the rhino, and elephants have not been known to confuse rhinos with their own species. Masson and McCarthy (1995) hypothesized that the elephant may have recognized the youth of the rhino and "felt a generous impulse to help," p. 155. Of course, elephants are not always empathic or compassionate and can be quite aggressive towards other species. However, humans show a similar range of behavior and it does not discredit their capacity for altruistic behavior. Chadwick writes of his time spent in observing elephants that,

If I learned anything from my time among the elephants, it is the extent to which we are kin. The warmth of their families makes me feel warm. Their capacity for delight gives me joy. Their ability to learn and understand things is a continuing revelation for me. If a person can't see these qualities when looking at elephants, it is only because he or she doesn't want to. (1992, p.432)

Grief and joy in elephants.

Grief is another emotion seen in elephants. Researchers (Moss, 1988; Poole, 1996) have found that elephants appear to have some concept of death. Elephants recognize and linger over one of their own species carcasses and skeletons. Moss observed one seven year-old calf who recognized and stayed with the jaw of his deceased mother turning it over and touching it with his feet and trunk. Elephants also bury the carcasses of their own by kicking up dirt and carefully placing branches on the carcass. Moss (1988) hypothesized that the lethargic behavior seen in females whose young calves have died who have shown no signs of illness before the calf died as akin to depression seen in humans (p. 271).

Separation has been found to deeply impact elephants. Their attachment bonds are said to be especially strong due to the long gestation period (22 months). Zoo-keepers have described “sudden-death syndrome” or “broken-heart syndrome” when elephants (most often young) have died suddenly upon being separated from their social group or put into a new enclosure by themselves. Despite attempts to explain the behavior as rewetting of ducts in the eyes, it has been observed with near certainty that elephants weep. Darwin (1872) reported this finding in Indian elephants. It has been seen at zoos, circuses, and observations in the wild that elephants cry in situations where one would expect sadness, grief and remorse (Masson & McCarthy, 1995)

Bradshaw and colleagues (2005) found that wild elephants display symptoms of Post-Traumatic Stress Disorder including abnormal startle response, depression, unpredictable social behavior and hyperaggression, as a result of culling, poaching and habitat loss. Bradshaw and Schore (2007) demonstrated the effects of human imposed trauma on a range of elephant behaviors. They used abnormal behavior in wild elephants caused by disrupted attachment bonds to conclude that animals do in fact experience and express trauma on both a physiological and psychological level.

Moss (1988) describes elephants as “intelligent, complex animals who may simply enjoy the social stimulation of a great gathering of relatives, friends, acquaintances and members of the opposite sex,” p.220. In her observation of reunion with other family members, Moss writes, “I have no doubt even in my most scientifically rigorous moments that the elephants are experiencing joy when they find each other again,” (p.116).

Cultural assumptions about elephants.

Melson (2001) writes, “...The sensitivity with which children can do this [understand animal minds and feelings] is basic to their humane regard for animals. Attunement to animal bodies and minds speaks to how well children can feel with and for animals and their environments” (p.94). However, attitudes towards animals are very much shaped by the culture in which a child is raised and can range drastically in their positive or negative valence.

Many species of wild animal are characterized by opposing attributes as some individuals see them as assets and others as pests (Tisdell & Xiang, 1998). The same is true for elephants. Beliefs and attitudes towards elephants differ vastly among various groups. For example, Western views of elephants seen in zoos and picture books and those of Africans who live with wild elephants vary widely. The perspective of urban and rural inhabitant's attitudes towards elephants in those in elephant-inhabited countries are significantly different as well. While there is a dearth of literature on this subject, it appears that, as might be expected, those who have most to lose from elephant conflict have most negative views towards elephants (Bandara & Tisdell, 2002).

Conservation attitudes towards wildlife also differ because the creation of a national park is likely to have a much greater impact on those who have previously earned their livelihood from the natural resources of the land no longer allowed to be used by local populations. This phenomenon in which the alienation of key subsistence resources and ritual sites leads to clashes between local subsistence farmers, hunters and park officials and administration exists in much of Africa where land is conserved for elephants, including Burkina Faso (Garland, 2008). In the U.S., elephants are one of the most popular and visited exhibits at zoos (Lehnhardt, 2005). The reconciliation of these varying cultural beliefs about elephants is a challenge, and will be taken into consideration in the present study.

In conclusion, given the literature reviewed above, it was expected that elephants will be the ideal animal to foster empathy in children and that this

elephant-based intervention will lead to increased capacity to mentalize about elephants and development in empathic concern.

Chapter 3

Methods

Sample and Setting

Location.

Burkina Faso (formerly Upper Volta) is a landlocked country in the West African Sahel that shares borders with six nations. It lies between the Sahara Desert and the Gulf of Guinea, south of the loop of the Niger River. The land is green in the south, with forests and fruit trees, and desert in the north. Most of central Burkina Faso lies on a savanna plateau, 650–1,001 feet above sea level, with fields, brush, and scattered trees. Burkina Faso is a former French colony that received its independence on August 5, 1960. French is the official language. Dioula and Mooré are the most commonly spoken languages. Burkina Faso is a politically stable, but incredibly poor country with the majority of the population living on less than one U.S. dollar per day. Burkina's poverty rate is estimated at 43.9 percent, and the country ranked 161th out of 169 countries in UNDP's Human Development Index in 2010. The population is estimated at 17.7 million. Life expectancy is 53 years and the literacy rate is 28.7%. (World Bank, 2010)

The Children and Elephants program takes place in the Deux Balé national forest in Burkina Faso, West Africa. Southwest of the capital, the forest is adjacent to the town of Boromo. The Deux Balé Forest in Western Central Burkina Faso is the most well preserved wildlife reserve of the Mouhoun complex (See Figures 1&2

in Appendix A for maps of the study location). A population estimated at 300-350 elephants resides in this forest.

Culture.

The Burkinabé, people from Burkina Faso, live in a collectivist society. A clear delineation has been made between collectivist and individualistic cultures. According to Hofstede's (1991) definition, "individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family." Drechsler (1995) defined an individualistic culture as a modern Western and democratic society that places ultimate value on the individual person, which he sees as creating "an intrinsic and irresolvable tension between the individual and society." Collectivism, on the other hand, "pertains to societies in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty" (Hofstede, 1991, p. 51). Hofstede also claimed that industrialized, wealthy, and urbanized societies tend to become individualistic, whereas traditional, poorer, and rural societies tend to remain collectivistic.

In a collectivist culture like in Burkina, cooperation, empathic concern, and mentalization are crucial to keeping society running. However, in a country made up of immigrants, such as the U.S., individual achievement is paramount. Understanding how another person thinks and feels is something that an American may be able to get away without knowing. Though biased by the time and place in

which he wrote, French politician Alexis de Tocqueville, described this phenomenon stating, “In Europe we habitually regard a restless spirit, a moderate desire for wealth, and an extreme love of independence as great social dangers, but precisely these things assure a long and peaceful future in the American republics,” (1835). In American culture, individuality and concern for oneself over others are valued traits. These cultural differences may impact baseline levels of empathy.

The Burkinabé are known for their film, music, and art. Despite the high poverty level in the country, there is a vibrant artistic community in Burkina Faso. Oral traditions of storytelling and performance are a major part of the culture.

Human-Elephant Conflict.

The program in Burkina Faso was implemented in order to mitigate the conflict between humans and elephants over land and resources. The pressures on this particular elephant population are tremendous. Habitat loss is by far the most important threat, as elephant poaching is very rare in Burkina-Faso. Specifically, the habitat degradation and loss results from the following processes: (1) Illegal herding within the forest; cattle are the most numerous mammals of the forest and herders take their cattle to the forest, as the lands around the forest are entirely used for agriculture; (2) Agricultural fields are encroaching on the boundaries of the forest; fields have also been spotted inside the forest; (3) Illegal fishing and poaching of the remaining small sized game; (4) Illegal wood collection for firewood and woodcarving production; (5) Illegal fires are used to foster production of grazing

ground. Consequences of these pressures during the past century include: (a) The local extinction of all predators (lions, hyenas, leopards) that were present in the area less than 50 years ago; (b) The local extinction of buffalo and Buffon's koba; (c) The serious decrease in roan antelopes, redunca antelopes, patas (red monkeys), grivets, baboons and hippopotamus populations; (d) The probable (although not well documented) decrease of elephant populations.

The Mouhoun complex wildlife areas are under growing pressures, as West Africa is known to have the fastest growing human demography in all of Africa. It is very likely that the degradation process will increase if drastic changes do not occur. Under these conditions, the Mouhoun elephant population may become extinct by 2050.

The Des Elephants et Des Hommes educational program raises awareness about the degradation of the forest among the young generation and their teachers, which it is expected will raise awareness among parent of participating children and schools. The elephant is the flagship species, which needs the most habitat and area for its conservation. Therefore promotion of elephant conservation in turn promotes the protection of the forest. The benefits of conservation for the elephants, local biodiversity, and for the local inhabitants themselves include: (1) The forest, if sustainably used, can provide long term ecological services such as rain regulation in this region which borders the Sahel and currently faces the heavy consequences of climate change; (2) The forest can also provide river rims protection and

sustainable sources of wood and medicinal plants; and (3) Ecotourism, although limited, will also benefit the community.

Perceptions of elephants in Burkina Faso vary considerably. As might be imagined, elephants are in competition for land with farmers in rural areas. Historically, elephants have been killed for meat or for ivory, although this is now illegal in the Deux Balé National Forest. Myths about elephants abound. Certain family groups hold the elephant and their totem, or spirit animal, and as such will not harm the elephant or even walk in its footprint. Some say that the elephant is large but unintelligent, and others hold that elephants are wise protectors of the forest. It is acknowledged that elephants can harm people and that it is not wise to cross an elephant. Some Burkinabé hold the belief that one should not look an elephant in the eye.

Nature class and the Children and Elephants program.

The organization running the interventions is called Des Elephants et Des Hommes (Elephants and People), an NGO that currently runs two programs focused on exposing local children to elephants in Africa. The first is the Elephant Outreach Program, which began in 2001 in the Okavango Delta in Botswana through the Living with Elephants Foundation. Enfants et Eléphants (Children and Elephants) des Deux Balé is the second site, which began in 2006 in the Boromo region of Burkina Faso. The current study will focus on the site in Burkina Faso.

This program is described by the NGO as an extra-curricular elephant activity targeting children from 20 schools located around the forest in Burkina

Faso's Deux-Balé forest region. In Burkina Faso, the program's stated goal is to allow neighboring children to meet elephants in the wild and better understand their rich heritage with the future hope of mitigating the human-elephant conflict and leading towards the peaceful coexistence of people and elephants. It is also part of the philosophy of the organization that "the opportunity for the children to encounter elephants in this way is a captivating and unforgettable experience that will have a deep and lasting impact."

In the Deux-Balé forest region, the organization is working with 20 schools located around the forest. Each of the school has one CM1 level class (standard 6, 4th grade equivalent in U.S.). Each class is made up of 30 to 110 pupils. All of these classes are offered the educational program. Depending on the number of pupils within the class, the organization takes 2 to 3 groups of pupils, each of which consists of 10 children and one teacher. For logistical and safety reasons it is not possible to take more than 10 children at one time. The selection of the pupils is the choice of the teacher. The organization asks to have 5 girls and 5 boys in each group. The program is run in close partnership with the local authorities including the Department of Education, the Department of Environment, as well as teachers and parents associations. Insurance covers the entire program.

On the day of the nature class, students are collected from their school, along with an accompanying teacher, and brought to the Deux Balé National Forest in a program vehicle. Each group is taken to a safe place within the forest where elephants can be easily observed. The main objective of the excursion is to expose

the children to their natural heritage (the elephants and surrounding forest). The educational program consists of a set of educational games and wildlife observation sessions. Educational games teach the children about the fauna and flora of their forest, the positive and negative uses of the forest, the benefits of ecotourism, and what makes up the ecological network of life and the role of elephants, elephant behavior. During and after the observation of elephants, the participants have unlimited opportunity to ask questions and discuss what they saw.

After the program in the bush, the educational team goes to the classroom to teach the students who did not participate in the excursion. This is the indirect exposure group. This intervention is organized around the *My Elephant Neighbor* book. The booklet included a culturally appropriate educational story about the human-elephant conflict, as well as a section about elephants in the surrounding region, with several color photos of local elephants. Children in this group were given the opportunity to read and discuss the book. The indirect exposure condition was developed because it is not possible for all students to participate in the nature excursion.

In 2011, 50 groups, including 500 children and their teachers participated in the intervention program and approximately 1000 additional pupils were educated in their classroom. I began my collaboration with *Enfants et Eléphants* in 2005. I have lived in West Africa and am fluent in French, the national language of the participating country. The organization, *Enfants et Eléphants*, has given their full support of the proposed research study.

Subjects.

The sample was made up of 106 students in the CM1 level class (4th-5th grade equivalent, typically 10 to 11 year old students). Six different schools were used out of the 21 participating in the My Elephant Neighbor Program in the Deux-Balé forest region (see Figure 3 in Appendix A for map of the region). Two participating schools were from rural villages, Koho (n=18) and Ourobonon (n=17); and four schools were within Boromo, Boromo “A” (n=17), “B” (n=18), “C” (n=18), and “D” (n=18).

As shown in Figure 1, participants ranged in age from 9-15 years. One student out of the 106 did not know her age. The average age of the sample was 11.1 years with a standard deviation of 1.1. There were 56 females and 50 males who participated in the study. As shown in Figure 2, maternal and paternal ethnicities were distributed across 18 different cultural groups. For both parents, the majority of the sample was Mossi, the principal ethnic group of Burkina Faso, which makes up about 40 percent of the population.

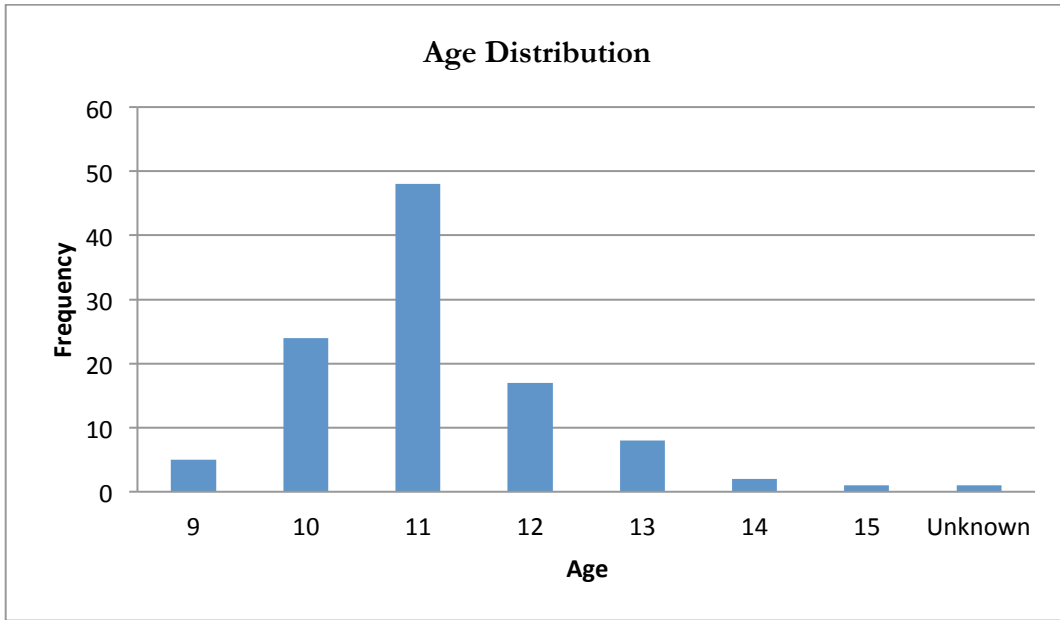


Figure 1: Age distribution of sample.

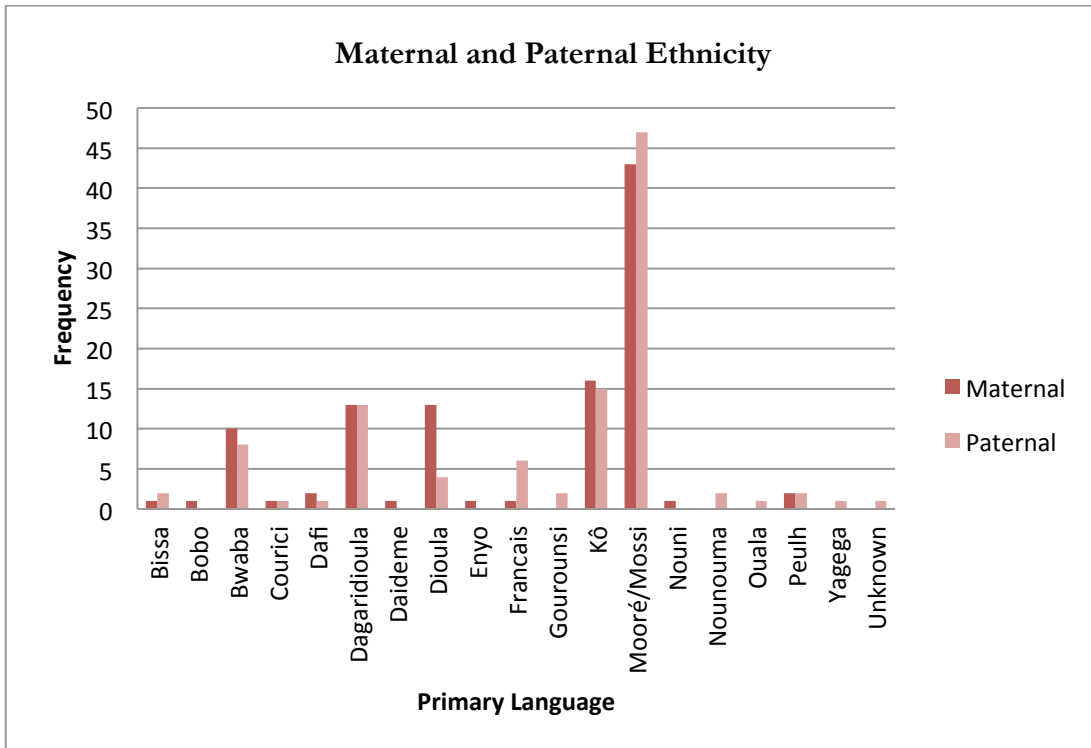


Figure 2: Frequency Distribution of Ethnicity by Parent.

The sample was split into four groups. This year, because of improved park management and more space for the herds to safely inhabit, the consistency of elephant sightings on the Nature Class excursions was decreased. This led to the creation of a fourth group, nature class no observed elephants group (NOE), those who went to the park, participated in the nature class, but had no direct exposure to elephants.

The observed elephants group (n=39), or direct exposure group, was made up of those who participated in the nature class in the reserve and did get to observe the elephants. The in-class education group (n=26), or indirect exposure group, was made up of those who were given in classroom education through the My Elephant Neighbor book. The book included a culturally appropriate educational story about the human-elephant conflict, as well as a section about elephants in the surrounding region, with several color photos of local elephants. This was the first year that the My Elephant Neighbor booklet was implemented and as such both the booklet and its classroom implementation will be improved based on this year's findings. The control group (n=22) was made up of students in the same class who did not participate in either intervention. Finally, the NOE group (n=19), as mentioned previously, was made up of those students who participated in the nature class in the Deux Balé reserve, which included educational games and activities, but did not have the opportunity to see elephants (no direct exposure).

Almost all participants, 97 percent of the sample, were in the top 25 percent of their respective classes. Three percent of the sample ranked between the 25th and

40th percentile. All interviews were conducted in French, the subjects' second or third language. A local colleague accompanied the researcher to assist in translation. Participants were interviewed at their school one to two days before the intervention, and again immediately following the intervention.

Procedures

For each participating class, the teacher was informed of the research ahead of time and asked whether or not they were willing to participate. When consent was granted, the teacher attained written consent from the parents, and on the day before the nature class, or several days before, the researcher and translator went to the school and asked for assent from study participants.

For the pretest, the researcher met with each participating class in a private area of the school for one hour. Participants were each given one piece of blank paper and one sharpened pencil. The participants were then asked to draw a person and an elephant. Next the researcher asked all pretest questions while the translator assisted in making sure that there was good comprehension from each participant. Participants were given the pretest measures orally, as reading levels varied across subjects. Response time to questions was not limited. The measures were given to all groups on the same day.

The indirect group participants were given the educational booklet separately from the other students and told not to share the book with any other classmates until the following evening. The following afternoon or several days following, after participation in the nature class, all study participants, including the control group

were given the posttest. The procedure for posttest data collection was identical to the pretest procedures, except that demographic data was not gathered in the posttest. It was again emphasized that participation was entirely voluntary and neither they nor their student should feel any pressure at all to take part in the study.

This procedure was carried out at all six participating classrooms. All identifying information was removed from the data in order to assure subject confidentiality. Data was entered by the researcher into an excel file while in Burkina Faso in order to make sure that study data was not lost.

Measures.

Pre- and post- test measures used were identical save for a demographic form gathering identifying information and a consent and assent form that was used at baseline and not at follow up. The measures included the demographic questionnaire; open-ended questions which asked about prior experience with elephants, elephant knowledge, perceptions of and attitudes towards elephants; a modified version of the Children's Environmental Attitude and Knowledge Scale (CHEAKS; Leeming, O'Dwyer & Bracken, 1995); a modified version of the Basic Empathy Scale (BES; Jolliffe & Farrington, 2006); a modified version of the Mentalizing Stories for Adolescents (MSA; Vrouva & Fonagy, 2009); and a pencil and paper drawing of a person and an elephant.

Demographic form: A simple form describing basic demographic information (including name, age, gender, race/ethnicity of both mother and father, school,

ability to identify an elephant, and previous exposure to elephants). This information was gathered verbally by the researcher.

Consent forms: Written informed consent was obtained from the parent of every participating student and written informed assent was obtained from every individual participating in the study. The form was reviewed with each participant – and, if he or she was voluntarily willing to participate, signed – before the interview took place. Examples of the different kinds of measures were given at this time. The interviews and assessments took place in a private area located at the school of the participant.

Open-ended questions: The open-ended questions were included in order to assess participant's attitudes about elephants without any sort of suggestion. As there have been no previous studies of children's attitudes towards elephants in Burkina Faso, an open-ended model was useful in order to hear the participants own words, and gather as much original data as possible.

CHEAKS: In order to measure change in attitudes and behaviors a modified version of the Children's Environmental Attitude and Knowledge Scale (CHEAKS; Leeming, O'Dwyer & Bracken, 1995) adapted to address elephant knowledge and conservation issues was used. The CHEAKS is a valid self-report measure of commitment to environmental causes measured across four domains: verbal commitment, actual commitment, affect, and knowledge. It is made up of 36 questions using a 5-point likert-type scale ranging from very true to very false that measure environmental attitudes, feelings and behavior, as well as 30 knowledge

questions with 5 multiple choice answers. The modified CHEAKS used in this study was adjusted for linguistic difficulty, cultural differences and the availability of time. The questions were also modified to focus more on elephants than the original measure. It was made up of ten questions rated on a Likert-type scale from 0-2, total scores from 0-18.

BES: The Basic Empathy Scale (BES; Jolliffe & Farrington, 2006) is valid multidimensional measure of empathy. The self-report measure consists of 40 items rated on a 5-point Likert scale ranging from 0 (Strongly disagree) to 5 (Strongly agree) with eight items reverse-scored. All responses are summed for a total score; high scores reflect high empathy, with 9 items measuring cognitive empathy and 11 measuring affective empathy. In Burkina Faso, a shortened version of the French language counterpart adapted and validated for use with French speaking population was used (D'Ambrosio et al., 2009).

MSA: The Mentalizing Stories for Adolescents (MSA; Vrouva & Fonagy, 2009) is a written, self-administered, scenario-based inventory that asks the participant to read twenty vignettes or stories in which the main character interacts with another person. The MSA stories are not entirely imaginative or highly fictional, but describe relevant everyday situations. In each story, a negative interaction takes place between the protagonist and another person, who is usually the protagonist's friend, classmate, sibling, or parent. This interaction elicits feelings such as sadness, anger, disappointment, jealousy, or shame to the protagonist, who does or says something as a result of this negative state. After reading each vignette,

respondents are asked to answer briefly, in a few sentences, why the central character behaved in the story as he or she did. For example, one story stem reads: “Helen enters her bedroom and there she catches her younger brother holding her mobile phone and reading her text messages. Once Helen’s brother notices her, he immediately apologizes and begs her to forgive him but Helen is staring at him without saying a word.” The question asked is: “Why does Helen do that?” There are three possible justifications given which are rated on two dimensions: whether they involved explicit and accurate identification of the emotional state of the protagonist, and whether they involved explicit and accurate identification of the intentional state of the protagonist. The range of possible total scores for the twenty MSA items is zero to forty. A modified Mentalizing Stories for Adolescents (MSA; Vrouva & Fonagy, 2009) was used that employed culturally appropriate narratives to assess children’s capacity to mentalize in both elephant and human related scenarios. This modified version of the MSA was also administered verbally, while the participant held a paper copy, in order to account for the varied reading levels of participants. Images of each scenario were given to assist in comprehension.

Drawings: Children were asked to draw a person and an elephant before and after the intervention in order to address potential difficulties in verbal expression given the language barrier. Several researchers have argued for the use of drawings in research with children. For example, Alerby (2000) carried out a study of children’s drawings of the environment and concluded, “A drawing can tell us something.” Vygotsky (1971) argued that thinking is closely connected to art and thus, art

constitutes an advanced way of thinking. Much has been written on the diagnostic utility of children's drawings. Arneheim (1969) wrote that visual arts are a sort of visual thinking. Several researchers have used empirical material consisting of drawings (Alerby, 1996; Aronsson & Andersson, 1996; Palmberg & Kuru, 1998; Wenestam & Wass, 1987). Maureen Cox (1992) wrote about how children can have local art traditions and geographically located artistic conventions. These issues will be explored in the qualitative analysis of pre-post drawings in this sample.

Study Aims and Hypotheses

The proposed study assessed participants of the Children and Elephants education program in Boromo, Burkina Faso. Participants were assessed at baseline (before the intervention) and immediately after participating. The proposed study compared four groups: The observed elephants group, those who participated in the nature class in the reserve and did get to observe the elephants; The in-class education group, those who were given in classroom education through the My Elephant Neighbor book; the nature class no observed elephants group (NOE), those who went to the park, participated in the nature class, but had no direct exposure to elephants; and the control group, students in the same class who did not participate in either intervention.

The proposed study aims to investigate the affective development (specifically development of empathy and mentalization) that takes place following this conservation-focused intervention that brings children to meet and learn about elephants and elephant behavior. This study will evaluate the efficacy of the

intervention on changing children's attitude both towards conservation and their capacity for empathy towards elephants and humans. The following are this study's hypotheses:

1) It was hypothesized that changes in attitudes, knowledge, feelings, and beliefs about elephants as measured on the modified Children's Environmental Attitude and Knowledge Scale (CHEAKS; Leeming, O'Dwyer & Bracken, 1995) will be greater in all three intervention groups than in the control group, and further, that changes on the CHEAKS in the observed elephants group will be greater than in the in-class education group and the NOE group.

2) It was hypothesized that changes in mentalization as measured by responses to culturally appropriate narratives on the modified Mentalizing Stories for Adolescents (MSA; Vrouva & Fonagy, 2009) will be greater in all three intervention groups than in the control group, and further, that changes on the MSA in the observed elephants group will be greater than in the in-class education group and the NOE group.

3) It was hypothesized that changes in empathy as measured by the modified Basic Empathy Scale (BES; Jolliffe & Farrington, 2006) will be greater in all three intervention groups than in the control group, and further, that changes on the BES in the observed elephants group will be greater than in the in-class education group and the NOE group.

Participants' pre- and post- test drawings as well as open-ended qualitative questions will also be analyzed in order to ascertain changes in attitudes, emotions

and knowledge that may occur over the course of the study. It was also proposed as an exploratory hypothesis that qualitative changes will be seen in the observed elephants group. Specifically, increased caring and empathic attitudes and knowledge towards elephants, and shift in the direction towards greater thinking about the experience of the elephant and understanding of the self and other in this relationship, or metalizing, is expected. Differences in participants' responses by gender and age will be examined as well.

In the long term, this research will allow us to learn more about the impact of elephant interventions on children's affective development. Finding ways in which children's interactions with the natural environment are beneficial may in turn promote conservation and lead to further exploration of animal-based interventions.

Data Analysis Plan

All data was entered into SPSS Statistics 17.0. The data was analyzed using a between groups analysis of variance looking at participant's change scores across a number of quantitative measures. Change scores from baseline to posttest were compared. Qualitative measures, including drawings and open-ended questions were analyzed looking for themes and changes by group.

Chapter 4

Results

Baseline Descriptive Data

Ninety percent of the sample (95/106 participants) reported never having seen an elephant in person on the pretest. Ninety nine percent of the sample (105/106 participants) were able to name an elephant when shown its picture during the pretest. Nearly half of the sample thought that there was a risk of elephants disappearing from the region; 64 percent reported that there were elephants in the region; and 82 percent reported that they like elephants. Baseline data are presented in Table 1, which shows the frequency of responses to questions regarding basic elephant experiences and attitudes at baseline.

In examining differences in attitudes and knowledge based on age, gender, ethnicity and region, a significant difference was found on the response to the question “Do you like elephants?” Of the 17 participants who reported that they did not like elephants, 100 percent were from rural villages as opposed to one of the schools in the town of Boromo. This does not appear to be correlated with whether or not a child had seen an elephant previously, as only three out of the eleven who had seen an elephant previously were from rural villages, and the other eight lived in Boromo.

There were no significant differences between males and females on their attitudes towards elephants, nor was there a significant difference based on age of participants on the pretest.

As shown in Table 1, the majority of participants expressed feelings of pride, protection, and care towards elephants on the pretest; however, most also did not report conservation behaviors or knowledge about elephant conservation.

Table 1

Modified Children's Environmental Attitudes and Knowledge Scale Responses at Baseline

Question	Yes/ Correct	No/ Incorrect	I Don't Know
When you grow up will you keep your cattle near the village to leave the forest for the elephants?	53	49	4
I am proud to live in a region where there are elephants.	87	19	0
I planted a tree.	67	39	0
I have asked my parents how to protect animals.	40	66	0
I am afraid of elephants	78	28	0
I am angry when people hunt elephants for their meat or ivory.	89	15	2
I will be sad if elephants disappear from the region.	73	33	0
Elephants take care of their families.	92	11	3
Among the elephants, who is the leader of the group? (Matriarch)	4	99	3
What do elephants need to live? (Looking for at least food, water, space)	37	68	1
What will happen if there are no more elephants? (Looking for ecologically minded response)	70	36	0

Quantitative Findings: Change Scores

Hypothesis 1: Changes in attitudes, knowledge, feelings and beliefs about elephants.

Change scores on the CHEAKS were found by calculating difference scores (Posttest– Pretest scores) for each participant and then averaging the change scores for each group. Average change scores by group are shown in Table 2.

Table 2

Average Children’s Environmental Attitudes and Knowledge Scale (CHEAKS) Change Scores by Group

Group	AVG Change Score on CHEAKS
Observed Elephants	2.667
In Class Education	2.22E-16
Control	.955
Nature Class, NOE	.579

Using a one-way Analysis of Variance to measure change in performance on the CHEAKS, a significant difference was found between groups at the 0.05 alpha level, $F(3,102)=3.69$, $p=0.014$ (see Table 3). Subsequently, pairwise comparisons were carried out. The direct exposure group had significantly higher change scores than all three other groups, $p<0.1$ (see Table 4). The direct exposure group improved significantly more than the indirect group on the CHEAKS at the 0.01 alpha level, $p=0.003$ (see Table 4).

Table 3

Between Subjects Analysis of Variance (ANOVA) for Change Scores on the CHEAKS

Source	SS	Df	MS	F	Sig
Group	129.257	3	43.086	3.686	0.014
Error	1192.253	102	11.689		
Total	1496.000	106			

Table 4

Pairwise Comparisons of CHEAKS Change Scores using Least Significant Difference

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Significance
Control	Elephants Observed	-1.712*	.912	.063
	In Class	.955	.990	.337
	NOE	.376	1.071	.726
Elephants Observed	Control	1.712*	.912	.063
	In Class	2.667*	.866	.003
	NOE	2.088*	.957	.031
In Class	Control	-.955	.990	.337
	Elephants Observed	-2.667*	.866	.003
	NOE	-.579	1.032	.576
NOE	Control	-.376	1.071	.726
	Elephants Observed	-2.088*	.957	.031
	In Class	.579	1.032	.576

*. The mean difference is significant at the 0.10 alpha level. Not sure what this means?

It was also found that whether the participant lived in a rural village or a town had a significant impact on their attitudes, knowledge, feelings, and behavior toward elephants. On the CHEAKS, the participants from the town of Boromo

scored significantly higher than those participants from rural villages both on the pretest $t(104)=3.691$, $p<0.05$, and on the posttest, $t(104)=2.997$, $p<0.05$. On the pretest the average CHEAKS score from village participants was 8.8 and from town of Boromo participants the average score was 11.18. On the posttest the average CHEAKS score from village participants was 10.25 and from town of Boromo participants the average score was 12.38. Despite this difference in village and town respondents, there was no significant interaction between the participants' village status and group, $F(2,98)=.763$, $p=0.469$. Therefore being in the direct exposure group led to stronger change scores in both village and town participants. While not a significant difference, the in-class education through the booklet showed more impact in villages than in the town, while the control remained stable in the village, but showed some improvement on the CHEAKS in the town. Figure 3 presents the CHEAKS change scores by group and participant locale.

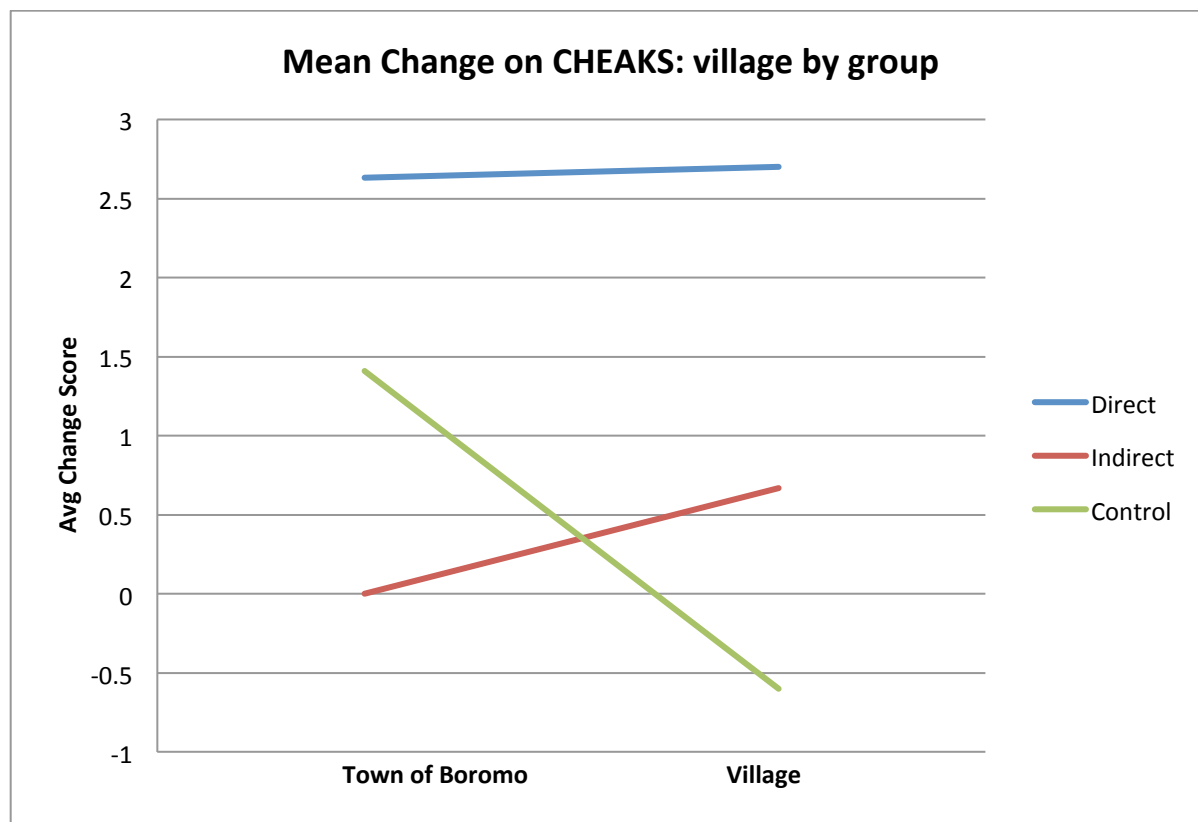


Figure 3: Average change score on CHEAKS by locale (village or town) and by group

Responses to the question, are you proud to live in a region where there are elephants, increased in “yes” responses significantly more both in the observed elephant group and the in-class education group than in the NOE group and the control group, with change scores significantly higher in the observed elephant group than in the in-class education group, $p < 0.01$.

Fear of elephants decreased significantly more in those participants who went on the nature class (both the observed elephant group and the NOE group), regardless of whether or not they saw elephants, when compared to the in-class education group and the control, $p < 0.05$.

Hypothesis 2: Changes in mentalization.

Significant age differences were found at baseline on responses the Mentalizing Stories Test about elephants. It was found that participants ages 9 and 10 were more likely to identify with elephants and understand their feelings and behaviors than those ages 11-15, as shown by significant age differences found on the modified Mentalizing Stories Test for elephants with greater scores in children 10 and under, $t(99)=-2.066$, $p<0.05$.

Change scores on the Mentalizing Stories Test were found by calculating difference scores (Posttest– Pretest scores) for each participant and then averaging the change scores for each group. Average change scores by group are shown in Table 5.

Table 5

Average change scores on the modified Mentalizing Stories Test by group

Group	Mean Change MSA People	Mean Change MSA Elephants
Elephants Observed	0.27	-0.237
In Class	-3.47E-17	-0.125
NOE	-0.263	0.526
Control	-0.1	-0.091

Using a one-way Analysis of Variance to measure change in performance on the MSA, no significant difference was found between groups for the Mentalizing Stories Test about people, $F(3, 97)=.791$, $p>0.05$, or for the Mentalizing Stories Test about elephants, $F(3, 99)=1.128$, $p>0.05$.

Hypothesis 3: Changes in empathy.

Change scores on the BES were found by calculating difference scores (Posttest– Pretest) for each participant and averaging the change scores for each group. Average change scores by group are shown in Table 6.

Between groups comparison of change scores on the modified Basic Empathy Scale showed no significant differences at the 0.05 alpha level, $F(3,101)=.256$, $p>0.05$ (See table 9). However, as shown in Table 6, the only group with a positive direction of change was the elephants observed group.

Table 6

Mean Change score on modified BES by group

Group	Average Change
Elephants Observed	0.103
In Class	-0.080
NOE	-0.211
Control	-0.182

A baseline gender difference in empathy on the question, “Do you feel sad when you see someone crying?” was also found. As shown in Table 7, 91.1% of females responded “yes” compared to 74% of males. A chi square comparison found this to be a significant gender difference, $\chi^2 (2)=7.053$, $p<0.05$.

Table 7

Frequency table: "Do you feel sad when you see someone crying?" by gender

Gender	Sometimes	Never	Always	Total
Total Females	0	5	51	56
Percent of females	0%	8.9%	91.1%	100%
Total Males	4	9	37	50
Percent of males	8%	18%	74%	100%
Total	4	14	88	106
Percent of total	3.8%	13.2%	83%	100%

Qualitative Findings: Open-ended Questions and Drawings

Participants were asked open-ended questions in order to ascertain their perceptions about the human-elephant conflict, the role of elephants, and the needs, behaviors and qualities of elephants as well as to draw an elephant and person. The following section will present selected qualitative findings.

Draw a person and an elephant.

Themes emerged in the pre and post drawings of a person and an elephant in the observed elephant group that were distinct from the other three groups. Significantly, in the posttest only, there was more interaction such as touching, communicating, and waving, between the elephant and the person than in the other groups. Figures 4 and 5 show a pre- and post- test example from an 11-year-old female in the observed elephants group. In the pretest drawing the person is the focus of the drawing and much larger than the elephant. The person looks angry and the elephant appears to be running away. In the posttest drawing the boy is

excited to see this large creature, and stands waving at the elephant who is peacefully drinking at the watering hole.

Another theme that was found in the observed elephants group posttest drawings was people drawn with similar features or body movements as the elephant in the drawing. This theme occurred in the observed elephants group only and could potentially be evidence of identification with the elephant on the part of the participant. There was a clear difference between pretest drawings that did not show this similarity and posttest drawing where the similar features were apparent. Figure 6, a posttest drawing from a 10-year-old boy in the observed elephants group, is presented here as an example of the body posturing and apparent motion of the person mimicking that of the elephant. Figures 7 and 8 show a pre and a posttest drawing by a 10-year-old girl in the observed elephants group in which this theme was apparent as seen by the similar nose on the person and elephant in Figure 8, while in Figure 7 there is no resemblance.

Notably, on all post tests in the elephant observed group there were no elephants drawn in captive situations, on leashes, or working, unlike the other three groups. Figures 9 and 10 show a pre and posttest from a girl in the no observed elephants (NOE) group. The elephant in the posttest is on a leash. The drawings seen in Figures 11 and 12 are from two different female participants on the posttest. Figure 11 is a drawing by a girl in the in-class education group where she wrote, "She is working/driving the elephant." Figure 12 was drawn by a girl from the observed elephants group where she wrote, "She's looking at the elephant."

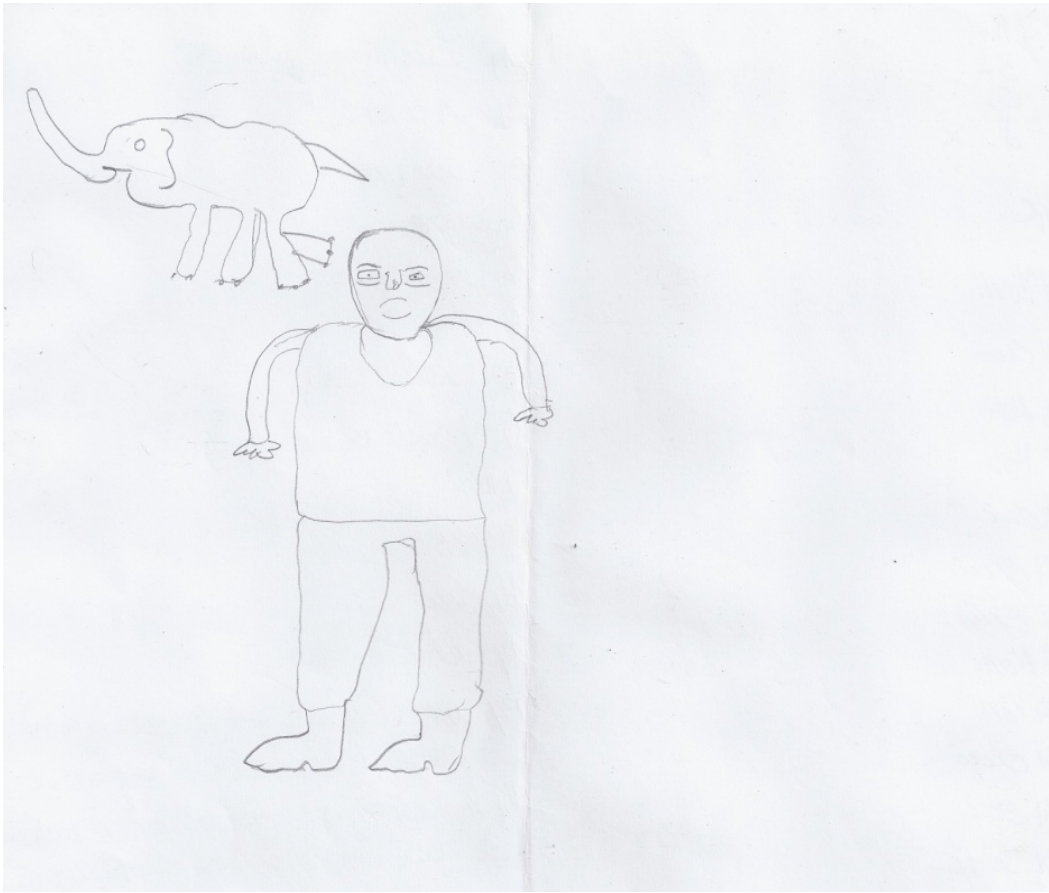


Figure 4: Pretest drawing by subject #3, an 11 year-old female from Boromo in the observed elephants group.

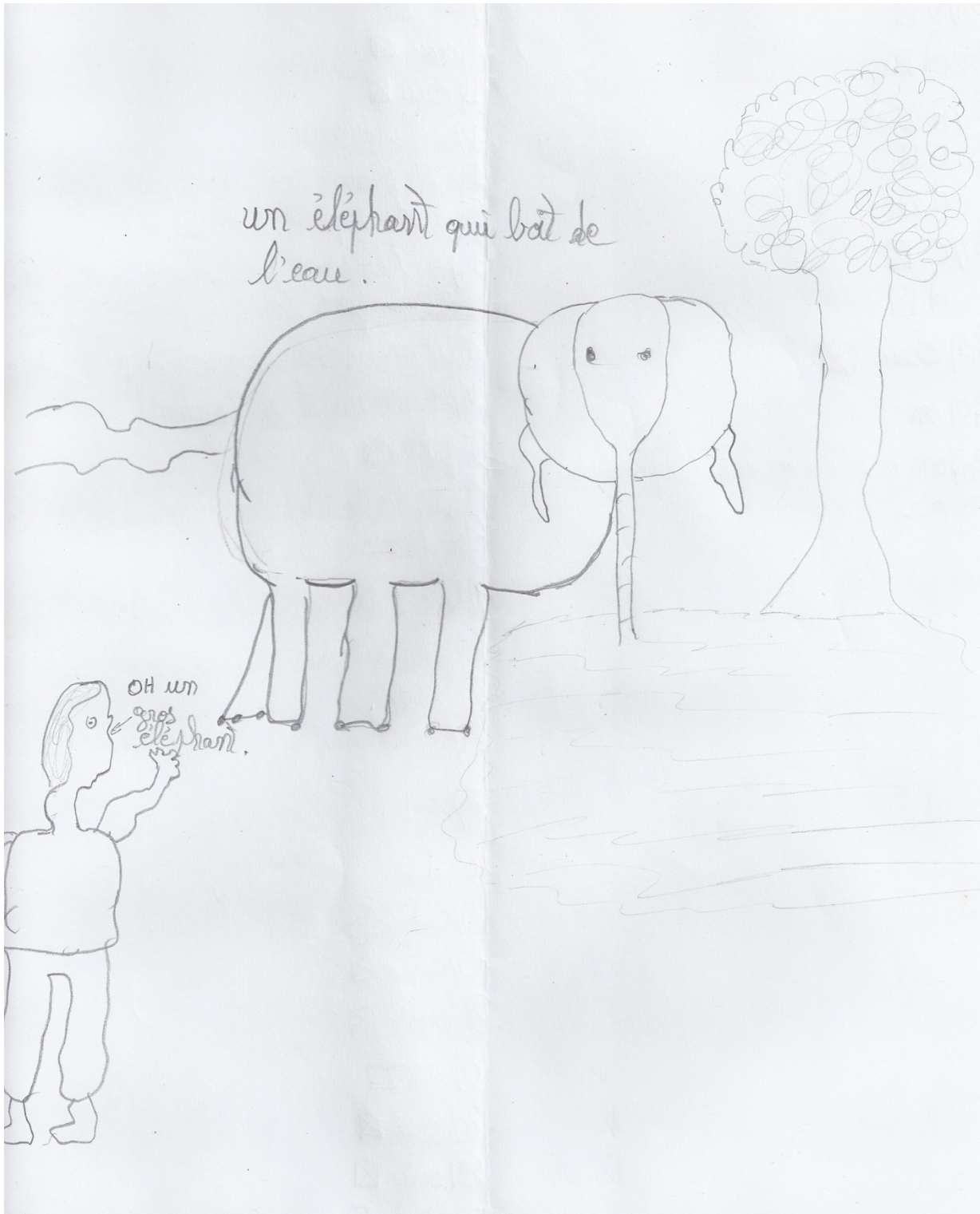


Figure 5: Posttest drawing by subject #3, an 11 year-old female in the observed elephants group. Above elephant: “An elephant drinking the water.” Child says: “Oh, a large elephant.”



Figure 6: A posttest from subject #32: a 10-year-old boy from Boromo in the Observed elephants group

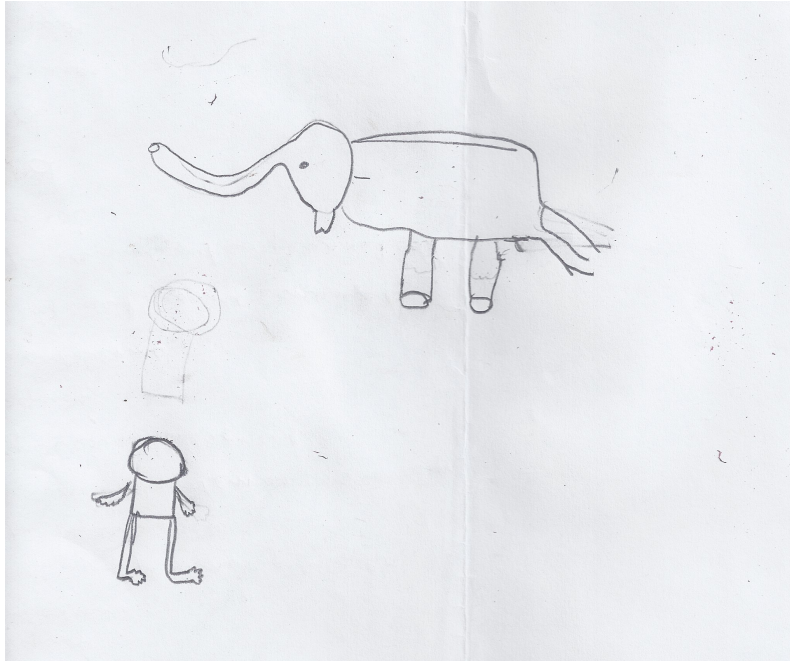


Figure 7: Pretest from subject #82: a 10-year-old girl from Ourobonon in the observed elephants group

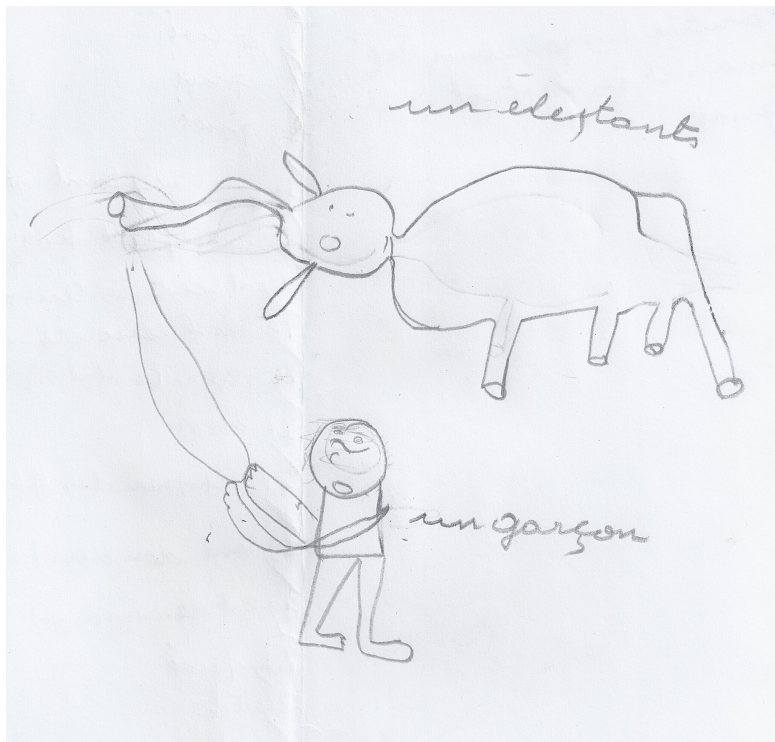


Figure 8: Posttest from subject #82 a 10-year-old girl from Ourobonon in the observed elephants group

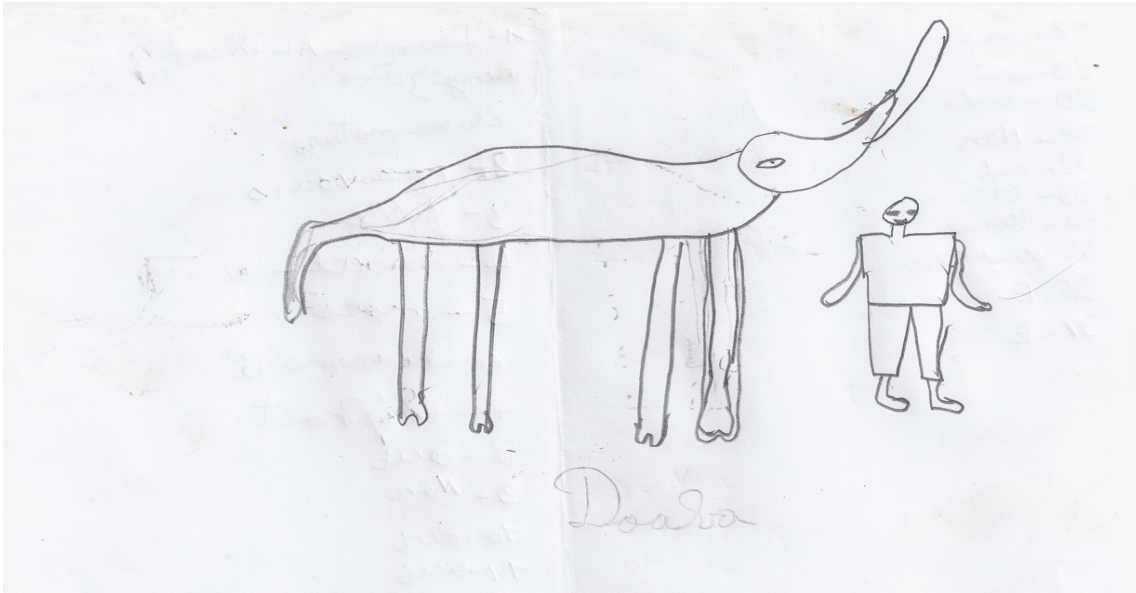


Figure 9: Pretest drawing by subject #37, a 10 year-old female in the no elephants observed group.

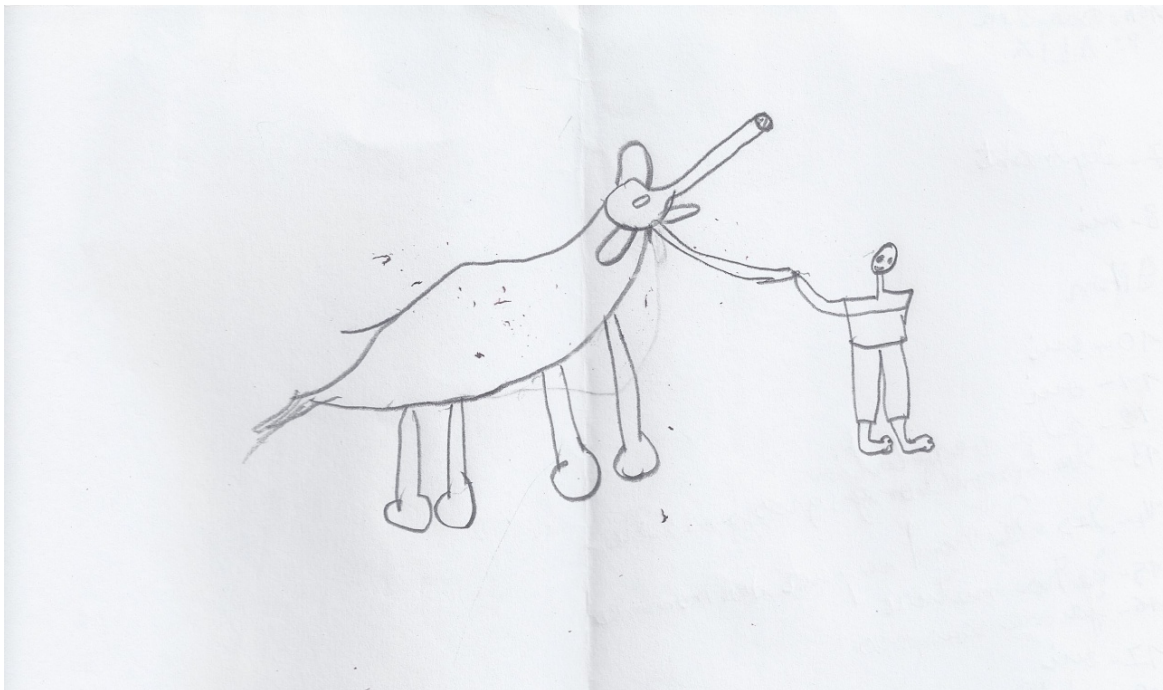


Figure 10: Posttest drawing by subject #37, a 10 year-old female in the NOE group.



Figure 11: Posttest drawing by subject #69, an 11 year-old female from Koho in the in-class education group, “*Elle conduit l’elephant.*” [She is working/driving the elephant]



Figure 12: Posttest drawing by subject #55, a 15 year-old female from Koho in the observed elephants group, “*Elle regarde l’elephant.*” [She is looking at the elephant]

Open-Ended Questions.

When asked to describe an elephant on the posttest, participants in the observed elephant group and the in-class education group were more likely to use words with positive or negative valence, rather than neutral descriptors.

The Role of Elephants.

In the observed elephants group, a 12 year-old male from Boromo reported on the pretest that, “the role of elephants is that people kill them.” Following his participation in the program, he reported that the role of elephants is “to live.” The number of participants describing the role of elephants as crucial to the ecosystem because they plant trees through the seeds that they excrete, creating forests, went from zero on the pretest to eleven on the posttest. All eleven participants were from the observed elephant group. One 10 year-old female from the village of Koho in the observed elephant group said on the pretest that the role of elephants was “to destroy trees,” and following the intervention she described their role as “to destroy and to plant,” showing a more integrated perspective. A belief of one 13 year-old male in the observed elephants group from the village of Ourobonon was that the role of elephants is “to live with the white people who help the elephants.” In the posttest he reported that the role of the elephants was to guard the forest. Again in the observed elephant group, one 10 year-old female from the village of Ourobonon reported on the pretest that “the elephants are there to help us [humans],” and on

the posttest stated that the role of the elephants is “to have fun with each other.”

In the NOE group, one 10 year-old male from Boromo first believed that elephants encourage the lions to devour the other animals. Notably, after the nature class where he was not able to see elephants, he reported that the role of elephants is to encourage the lions not to eat the other animals.

Human-Elephant Conflict.

In the in-class education group, after reading the story about the elephants, the message that elephants have been killed by people seemed to be better understood than in other groups. The majority of these participants in the posttest reported that the biggest danger to elephants was that people might shoot them, either for ivory or meat, or conflict over land.

One 14-year-old female from the village of Ourobonon in the in-class education group said on the pretest that the biggest conflict between humans and elephants is that elephants cause problems. After reading the booklet she stated that the biggest problem between humans and elephants is that people kill elephants. One 13-year-old female from the village of Ourobonon in the observed elephants group reported that the biggest problem between people and elephants was that she was afraid of elephants on the pretest. After the intervention, she reported that the biggest conflict is that people like to kill elephants. An 11-year-old female also from Ourobonon in the observed elephants group showed a change in her understanding of the reciprocal nature of the human-elephant conflict. She originally stated that the biggest problem between people and elephants is that if

an elephant is around it will kill her. After the intervention, she reported both sides of the problem; that people kill elephants and reciprocally elephants harm people.

In the posttest, the observed elephant group was the only group where the belief that there are *no* problems existing between humans and elephants was *not* reported. All other groups showed an increase in the response “no conflict,” from the pre to the posttest. Table 8 presents frequencies of both the no conflict response and the reciprocal or two-way response by group. In a post hoc analysis, significant between group differences were found, $\chi^2(3) = 15, p < 0.05$, see Table 9.

Table 8

Frequency of no conflict and reciprocal conflict responses to the question, “What is the biggest conflict between elephants and humans,” by group.

Group	No Human- Elephant Conflict Pretest	No Human- Elephant Conflict Posttest	Reciprocal /two-way conflict Pretest	Reciprocal /two-way conflict Posttest
Observed Elephants	0	0	1	4
No Observed Elephants	0	6	0	0
In- Classroom	0	2	0	0
Control	1	4	0	0

Table 9

Chi-square results for responses to human-elephant conflict question

	Value	df	Sig (2-sided)
Pearson Chi-Square	15.000	3	.002

Chapter 5

Discussion

Overview

It was hypothesized that (1) changes in attitudes, knowledge, feelings, and beliefs about elephants as measured on the modified Children's Environmental Attitude and Knowledge Scale (CHEAKS; Leeming, O'Dwyer & Bracken, 1995) would be greater in all three intervention groups than in the control group, and further, that changes on the CHEAKS in the observed elephants group would be greater than in the in-class education group and the NOE group; (2) changes in mentalization as measured by responses to culturally appropriate narratives on the modified Mentalizing Stories for Adolescents (MSA; Vrouva & Fonagy, 2009) would be greater in all three intervention groups than in the control group, and further, that changes on the CHEAKS in the observed elephants group would be greater than in the in-class education group and the NOE group; (3) changes in empathy as measured by the modified Basic Empathy Scale (BES; Jolliffe & Farrington, 2006) would be greater in all three intervention groups than in the control group, and further, that changes on the CHEAKS in the observed elephants group would be greater than in the in-class education group and the NOE group. The results supported hypothesis one but not hypotheses two and three. Conclusions drawn from these central findings, as well as conclusions drawn from other aspects of the data will be discussed in the following chapter. Study limitations and

recommendations for future research will also be addressed in this section.

Attitudes, Knowledge, Feelings, and Beliefs about Elephants

It was hypothesized that direct exposure to elephants would lead to the greatest increase in environmental attitudes and knowledge specifically related to conservation of elephants, more so than any other type of intervention. A significant difference was found between the group of participants who observed elephants themselves and those who learned through a teacher, a book, or had no education at all. The first group showed more positive change than the other groups. These results supported this hypothesis. The findings suggest that it is one's personal experience that leads to an internal shift and ultimately the development of a conservation ethic, more so than being taught about elephants from a third party.

This finding supports the literature on the importance of personal experiences in shifting attitudes. Researchers have found that direct experiences with animals have the most impact when it comes to caring attitudes and behaviors (Serpell, 1999; Meyers, 1998; Kidd & Kidd, 1989; Kellert, 1997; Finger, 1994). Here again, with this Burkinabé sample, the children who were able to see and know the elephant were most likely to change their attitudes towards caring and sympathy for and conservation of the elephants.

Seeing this internal shift in a Burkinabé sample is particularly salient given the historical context of colonialism in West Africa and the need for elephant conservation to be relevant to those most affected by it for this cause to be sustainable. The local interest in elephants as neighbors that was observed in this

study is critical to sustainable conservation. Past research has found that moralistic attitudes towards animals are not limited by culture (Kahn, 1999). The results from the present study support this claim. In the qualitative findings, the 13 year-old male in the observed elephants group whose understanding of the role of elephants shifted from, “to live with the white people who help the elephants,” to “guard the forest,” was a particularly salient example of this shift. Here, after observing elephants in their natural environment, this participant went from understanding Westerners as those interested in protecting and taking care of elephants, to taking ownership of thinking about the elephant and its role as guardian of the forest. Ultimately the decision for species protection comes down to the community. The local interest in and internal desire to protect their local elephant populations will be crucial to sustainable protection of elephants.

Significant differences were found between participants from rural villages as compared to those from the town of Boromo on attitudes towards elephants. This difference, in which participants in villages had more negative attitudes and beliefs about elephants overall than those from the town, was not correlated with whether or not a participant had seen an elephant before. Therefore, it is likely that those participants who live in rural villages have been educated about the dangers of elephants as they pose a greater threat to this group. Village populations in this region are mostly agricultural and as elephants destroy crops, they are more likely to be negatively impacted by them. Elephants are also more likely to enter a village and potentially cause damage than to go near the town. Therefore elephants pose a

greater threat to the participants and their families in the rural villages. It is very poignant then that the participants from the rural village were just as likely to change their attitudes as those from the town, showing a sustained effect of the direct observation of elephants across both town and village participants. This finding supports the claim that the impact of personal experiences with elephants and the opportunity to safely observe them is enough to create a shift in attitudes. But that leaves open the question of why this happens.

What is occurring during that observation, and on what level does that internal shift take place? Examining themes found in the drawings of a person and an elephant suggests several possibilities. Participants who observed elephants were engaging with the elephant on a personal level, as seen by the greater number of drawings showing interaction between the person and the elephant such as touching, communicating, and waving, between the elephant and the person in posttest drawings from the observed elephants group than in the other groups. Also in the observed elephants group, on the posttest, several drawings showed a person and an elephant with similar features, and similar body position or movement, which may be another sign of the identification occurring from the participant to the elephant. The participants appear to be humanizing the elephants. While this is a first step in understanding what happens for the child when they meet the elephant, these questions will be explored further in the following section on mentalization.

Finally, while not a significant difference, the booklet had more of an impact

in the villages than in the town. This may have been due to the lack of resources such as books or television that could have exposed children to elephants in the villages. The novelty of the elephant book may have made it more impactful in the rural village than in the town. The control group however showed some increases on the CHEAKS in the town while remaining stable in the village. Access to resources may have caused the book to have less impact in the town. A small increase in scores on the modified CHEAKS was found in the control group in the town but not in the rural villages. This may have been because participants in the control group may have had access to resources such as books, media, and community members that could teach them about elephants and create some small amount of change in the town control group.

Mentalization

It was hypothesized that mentalizing capacity would increase over the course of the interventions. Specifically, it was expected that this shift would first happen through the elephant by way of the direct message of the program, and then generalize to people. While there was no significant difference found between groups on the modified Mentalizing Stories Test, qualitative differences were found in the open-ended questions.

A clear developmental shift was seen at an earlier and more basic stage of mentalization, understanding the subjectivity of the other, and in this case, the elephant. Before one can accurately attribute thoughts and feelings to an other, one must know that the other has its own mind and feeling states (Fonagy et al., 2002;

Sharp, 2006). Understanding that the other *has* a mind, thoughts, feelings of it's own is therefore a fundamental step in developing the capacity to mentalize. Changes at this earlier stage of mentalizing were observed, wherein the participants of this program began to think about and hold in mind the subjectivity of the elephant. The modified mentalizing stories test was designed to measure accurate attribution of thoughts feelings and mental states, and was not able to measure changes in inter-subjectivity. Therefore the measure used to assess mentalization through stories and attributing thoughts and feelings accurately may be a later stage of development that is not yet developed through this program, and a different measure may be more useful in capturing this developmental achievement.

As discussed earlier, the term mentalization refers to “the capacity to envision mental states in the self or other, to use an understanding of mental states - intentions, feelings, thoughts, desires, and beliefs – to make sense of, and even more importantly, to anticipate, another's (or her own) actions” (Slade, 2009, p.8). As reflected in Slade's definition, this capacity involves several stages. Before one can accurately attribute thoughts and feelings to an other, one must know that the other has it's own mind and feeling states (Slade, 2009). Understanding that the other *has* a mind, thoughts, feelings of it's own is a fundamental step in developing the capacity to mentalize. Therefore, in the development of mentalization, the child must begin to hold the other in mind and imagine that they have thoughts, feelings, and needs of their own. Posttest responses showed that participants were keeping

the elephant in mind.

Changes at this earlier and critical stage of mentalizing were observed, wherein the participants of this program began to think about the subjectivity of the elephant. Changes in the qualitative responses to open ended questions showed that participants in the program began to think about the elephant as having its own needs, thoughts, and feelings. As participants began to describe the elephant's motivation: living in family groups to take care of their young and needing the forest for food and for space and water they showed a newly formed understanding up the elephant as a subjective other with it's own mind and it's own self and needs.

Again, the qualitative findings about the role of the elephants, several participants showed on the posttest that they were thinking about the role of the elephant from the elephant's perspective. For example, one student first believed that elephants encourage the lions to devour the other animals, and afterwards reported that the role of elephants is to encourage the lions not to eat the other animals, clearly showing that the elephant has a mind to think about encouraging a lion to behave in a certain way. Another participant first reported that "the elephants are there to help us [humans]," and post-intervention stated the role of the elephant is "to have fun with each other."

Notably, when asked about the human-elephant conflict, participants in the observed elephants group who were unable to think of ways that elephants and people might conflict on the pretest were able to think about the elephant's experience and how that interacts with humans on the posttest. The responses of an

11-year-old female from a rural village in the observed elephants group are an example of the types of changes towards mentalization that were observed in all three intervention groups. She showed a change in her understanding in thinking about the elephant's experience. She originally stated that the biggest problem between people and elephants is that if an elephant is around it will kill her. After the intervention, she reported both sides of the problem; that people kill elephants and reciprocally elephants harm people. The main distinguishing feature of the observed elephants group on this question and on mentalizing capacity was their understanding of the reciprocal nature of the human-elephant conflict. The fact that all participants who had direct exposure to elephants were able to show some understanding of the potential conflicts between humans and elephants as opposed to all of the other groups, shows that there was some trigger of or shift towards thinking about the elephant and the human experience of cohabitating in the world. In sum, participants did come to think about the elephants as separate and having their own subjective experience, a critical development that was not measured by the modified Mentalizing Stories Test.

Age implications for effective intervention.

A major finding in this study that points to the need for early intervention was the age difference found on the modified Mentalizing Stories Test for elephants. Children who were 9 and 10 years old were significantly more likely to identify with the elephant than those age 11 and older. This was measured by the participant's attribution of human characteristics to elephant behavior in a multiple-choice

scenario. While this is only a preliminary finding, it does support the claim that developmentally, children are more likely to identify with animals at an earlier age (Melson, 2001). It is likely that identification is most likely to happen at the time when children are naturally prone to identify with animals and animal attributes.

It was hypothesized that this shift in the capacity to mentalize occurs first through the animal and then generalizes to humans. For this to happen with animals, the child needs to be open to this identification as well as interested in the animal's thoughts, feelings, and behaviors. Because of the developmental shift that takes place after the age of ten away from the animal, and towards identification with humans, this type of animal-focused intervention might be most effective at around age 10 and younger. This finding suggests the need for early intervention when it comes to environmental education regarding elephants.

The Role of the Elephant as a Subject of Observation

Why was the elephant effective as a subject for study in this intervention? As stated above, this study examined the efficacy of an elephant-based intervention, in which one of the mechanisms at play was identification. It was believed that observing animals provides an experience of self in relation to an other, and in this study, the elephant was the subject of observation and, hopefully, identification. It was crucial that elephants exhibited or represented the behaviors that this intervention was hoping to foster in children. In the observed elephants group, this was the case.

Children had the opportunity to observe elephants taking care of their young

in many ways. This included adults forming a circle around the babies to protect their young, adults bathing and washing their young, and even a matriarch turning to display her size when she felt that the young elephants might be in danger. The elephants were almost always in family groups and frequently played with or gently touched each other with their trunks. Another altruistic behavior that was exhibited in front of the children was the elephants lending a helping trunk when another was stuck in a muddy area or had difficulty getting out of the watering hole. Given these behaviors, it is possible that the elephant as a particularly social and empathetic species had an impact on shifting the children's attitudes towards them through observation and identification.

Empathy

While it was hypothesized that changes in empathy would be seen on the modified Basic Empathy Scale, there were no significant changes. The only trend that was noted was a slight positive shift in the observed elephants group, but as this is not a significant difference, no conclusions can be drawn about changes in empathic capacity that occurred over the course of the interventions. However, qualitative changes were seen in participants' likelihood to try to empathize with the elephants, gaining insight into their thoughts and feelings (Decety and Jackson, 2004). Participants reported that elephants live in family groups in order "to take care of each other," that elephants can be sad if a family member dies, and that other species, including humans, may be sad if there are no more elephants in the region. This kind of thinking about the feelings of others, both human and elephant,

involves empathy.

Although, attempts to measure changes in empathic capacity were unsuccessful, this finding makes sense in retrospect, as emotional or affective changes may not occur over the course of one week. The qualitative and directional changes noted in the findings may be signs of ways in which this intervention plants seeds of empathy in part of a longer growing process towards healthy emotional development.

A baseline gender difference was found in empathy. A significantly higher percentage of females than males reported feeling sad in response to another's sadness. This gender difference in childhood expression of empathy supports the literature that girls express empathy earlier than boys (Sagi & Hoffman, 1976; Martin & Clark, 1982).

Study Limitations and Future Research

This study had several limitations including the design of the measures, access to participants, length of study, and cultural factors that may have influenced the results. There are several reasons that no significant differences on the modified Mentalizing Stories Test and modified Basic Empathy Scale were detected. The length of the modified questionnaires was too short. The full-length questionnaires were almost four times as long as the modified measures used in this study. The measures had to be shortened due to factors on the ground including restricted time with participants and unfamiliarity with and discomfort on the part of the teachers with very long interviews. Given more time with participants, a

wider variety and more questions would have been used. The types of questions asked, including a Likert-type rating scale were not commonly used among this sample of children, and it is possible that not all of the children understood the questioning style, which may have impacted participants' ability to accurately respond.

The modified Mentalizing Stories Test, the assessment designed to measure accuracy of mentalizing was not able to measure changes in inter-subjectivity. Therefore the measure used to assess mentalization through stories and attributing thoughts and feelings accurately may in fact be assessing a later stage of development, and one that is not developed through this program. A different measure may be more useful in capturing the child's nascent understanding of the other's subjectivity.

The next major factor was the potential influence of a Caucasian American researcher. The rural West African participants were unaccustomed to being in the presence of a Westerner and it is likely that ideas about the researcher may have had some effect on participant behavior and responses. The influence of the researcher's presentation should be considered in understanding the findings, but the control group should have helped to mediate this effect as well as the fact that the same researcher and local colleague interviewed all 106 participants.

The short period of time between pre- and post- assessments was another limitation of the study. While the impact of the intervention was examined, long-term changes were not assessed. A longitudinal one-year follow-up with this same

cohort has been planned, but this is outside the scope of the current dissertation.

Another limitation of the study was a difference between the in-class education booklet and the nature class. The nature class intervention has been in existence in the region for five years while this was the first year that the booklet was being used in classrooms. The booklet may not have been as well implemented as the nature class as teachers were not able to supplement the book's instruction. The booklet may have been more effective than was found in this study if used in conjunction with teacher intervention or other in class lessons. Therefore, the impact of the in-class education program should be re-assessed after it has been revised and re-implemented. However, the impact of the direct elephant observation still stands as the comparison between the nature class with no observed elephants group and the nature class with elephants observed group allowed for an alternative assessment of the impact of direct exposure to elephants.

Given the findings from the present study, future research should be carried out to further explore the psychological impact of animal-based intervention programs. First, future research should look at the long-term effects of this program as the cohort has already been measured before and after the intervention. As these are initial findings further study should continue to explore the ways in which gender, age, and culture influence perceptions of elephants and the efficacy of both field-based and classroom-based environmental education programs. In the following year, it is hoped that the same participants will be evaluated and changes in both conservation attitudes and empathic capacity will be measured one year

post intervention. As differences between those from villages and the town's perception of the role that elephants play were significant, future research should also consider the context of the participants carefully and target areas most in need. It would also be interesting to study the impact of a similar intervention on children from a vastly different culture to more clearly understand the impact of cultural beliefs and attitudes on this elephant-based intervention.

Over the past ten years, Des Elephants et Des Hommes educational program has found that a majority of the local children living near elephant reserves where the NGO is active have never been exposed to elephants. This was again found in Burkina Faso in 2011. This means that almost all of the children who participated in this program were seeing elephants for the first time. The effect of novelty should be measured in future studies by comparing those participants who are seeing elephants for the first time to those who have previous exposure to elephants. The number of participants with previous experiences with elephants was too small to be measured in this sample.

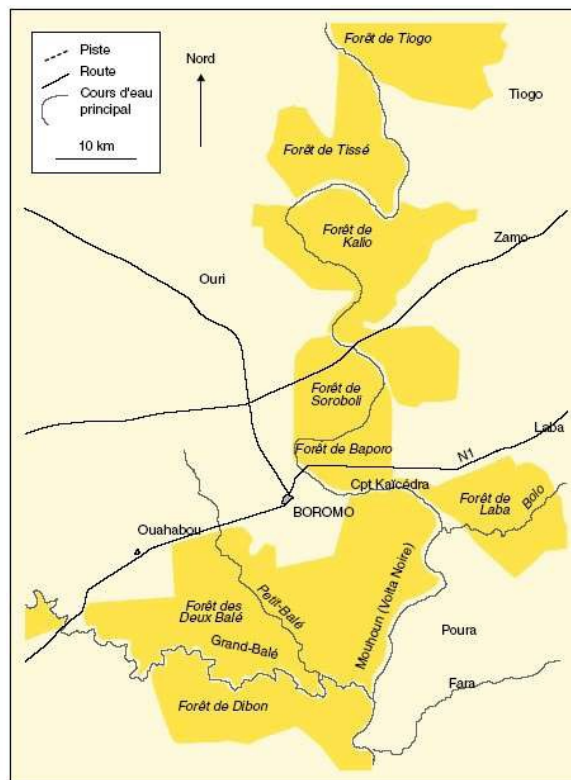
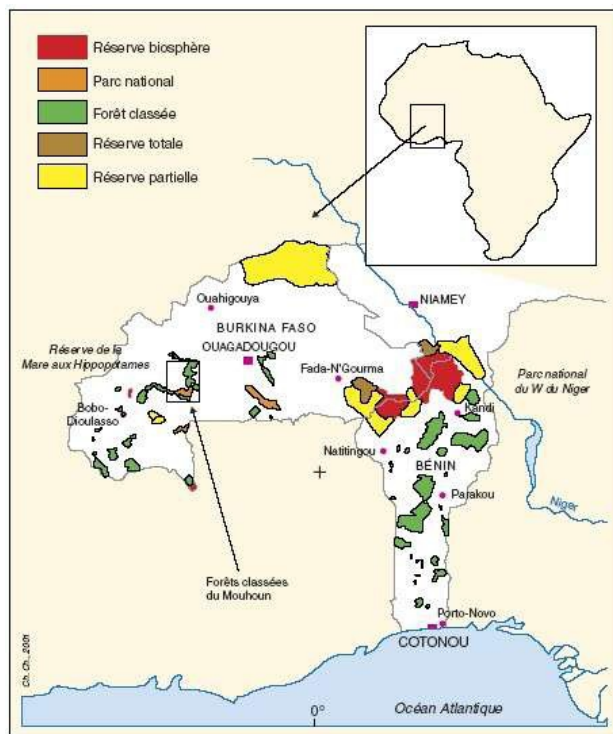
Conclusions

Preliminary conclusions can be drawn that environmental education programs in which children have direct experiences with elephants may be most effective in communicating conservation messages and in developing a sense of the elephant as a separate being with its own subjectivity. This may be due to the personal meaning created through experience, as opposed to an idea or lesson, and the identification that occurs with the exposure to an elephant. Other interventions

such as indirect exposure through games and classroom activities also lead to some improvement in conservation attitudes. It is also believed that the connection that children have with animals, as seen in the younger child's identification with the elephants, creates an ideal time to intervene, specifically with environmental education programs directed towards the protection and understanding of local elephant populations. These types of interventions may be useful not only in fostering a conservation ethic, but also in building the capacity to think about others and critical psychological capacities that have been implicated in resilience and healthy emotional development. The duration of these effects remains to be studied in this same sample.

Appendix

Location of Study



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