

Children's Environmental and Moral Conceptions of Protecting an Endangered Animal

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**Abstract**

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Emerging research suggests that children extend moral regard to the natural world (e.g., forests and waterways). When they do, their moral reasoning is predominately focused on human concerns, wherein the natural world has value insofar as it has value to humans. Biocentrism is the moral view that the natural world has value independent of its value to humans. Previous research has found only about 4% of children employed biocentric reasoning and that there was little evidence that it appeared in children younger than 10-12 years old. The research thus far has largely focused on scenarios where humans cause harm to non-sentient natural entities and ecosystems. The current study is the first to focus on children's moral reasoning in the context of humans harming an animal species. Fifty-two children equally divided across two age groups (7- and 10-years-old, gender balanced) were interviewed regarding their understanding of, and beliefs/values about protecting an endangered animal (the gray wolf); their moral obligatory judgments towards humans harming the animal; and their conceptions of animal rights. Results showed that children as young as seven-years-old extended moral obligations to not harming the wolf. Children as young as seven-years-old endorsed biocentric reasoning, particularly in the form of intrinsic value concerns. Furthermore, there was a developmental shift in biocentric reasoning. Ten-year-olds were more likely to express justice-

oriented biocentric reasoning (and did so to a greater degree) than the seven-year-old participants. Still, a substantial number of seven-year-olds endorsed biocentric justice-oriented reasoning. Implications for understanding the construction of moral concerns for the environment are discussed, and applications of these findings and future directions for research are offered.

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## Dedication

To my mother Maureen --

who taught me a deep sense of compassion and patience, who reminded me to look at the moon,  
and who loves me always and unconditionally.

And to my younger cousins --

Katie, who taught me how to give and then give some more,

Annie, an inspiration for this work and the greatest youngest wolf activist, brazen and unafraid,

Erich, who taught me that wisdom is little without heart,

Jeremy, who reminded me to *Be* the wave,

and youngest

Will, who has shown me that where there is a will, there is a way.

*Of all the wild creatures of North America, none are more despicable than wolves. There is no depth of meanness, treachery or cruelty to which they do not cheerfully descend.*

- William Hornaday, President, New York Zoological Society, 1904

*We reached the old wolf in time to watch a fierce green fire dying in her eyes. I realized then, and have known ever since, that there was something new to me in those eyes—something known only to her and to the mountain. I was young then, and full of trigger-itch; I thought that because fewer wolves meant more deer, that no wolves would mean hunters' paradise. But after seeing the green fire die, I sensed that neither the wolf nor the mountain agreed with such a view.*

- Aldo Leopold, A Sand County Almanac, 1949

*[The gray wolf has the right to not be killed] because if, if, mmm, if we have the right, not to be killed, unless we put ourselves, we go against that, or, unless people go against that right, and if they do go against that right, then that's kind of you know, they've made a bad decision, because everyone has their right to live, including animals. WHY? Because if you don't have one thing, then you don't have another thing, if you didn't have um, if you didn't have the plankton then you wouldn't have whales, if you didn't have whales, then you wouldn't have other things, like, enouuu-, I don't really know what feeds off whales, but, um, you know if you didn't have that one thing, then you wouldn't have other things because they're also their food source, so say something feed off those wolves, and they, then they would also become endangered, being extinct, so they have their right to live, so everything else has their right.*

- Female, age 10, 2013

## **Introduction**

Emerging research suggests that children extend moral regard to the natural world (Kahn, 1999; Melson, 2001; Myers, 2007; Nevers, Gebhard, & Billmann-Mahecha, 1997). When they do, their moral reasoning is predominately focused on human concerns, wherein the natural world has value insofar as it has value to humans (i.e., anthropocentrism) (Kahn, 1999).

Biocentrism is the moral view that the natural world has inherent value, that is, it is good in itself, independent of its value to humans and not only as a means to some end (Attfield, 2003; Kahn, 1999; Taylor, 1986). In this view, the person extends moral regard from human beings to the wider natural world and the moral duties they feel toward other humans to other species and natural entities. This view presents a non-contingent basis for promoting preservation of biodiversity, animal rights, and environmental protection. From this perspective one could, for example, judge that it is wrong to cut down rainforests because it could cause the extinction of many animal species. Psychologists (Clayton & Myers, 2009, for a review), educators (Gough, Scott, & Stables, 2000), environmental ethicists (Rolston, 1989; Singer, 1990), environmental politicians (Grendstad & Wollebaek, 1998), sustainable developers (Imran, Alam, & Beaumont, 2012), environmental management (Farber et al., 2006), and governing bodies (Holdgate, Kassas, & White, 1982) have argued that biocentrism is a perspective that supports conservation initiatives and a sustainable future.

Developmental psychologists have sought to understand the emergence and development of biocentrism in childhood. They have explored children's values towards the natural world, their moral understanding of human actions that affect natural entities and phenomena (e.g., birds, water, plants, air), their potentially contradictory environmental judgments, their moral

obligations towards the natural world, and their conceptions of harmony with the natural world (see Kahn, 1999, for a review).

Do young children morally reason in biocentric ways? Thus far, the answer to this question has not been so clear. Across a decade of research Kahn and colleagues have highlighted the rarity of biocentrism in disparate cultures, including inner city Black youth in Houston, children living in a remote village in the Amazon rainforest, and children in Lisbon, Portugal (see Kahn, 1999 for a review). When biocentrism has emerged in children's reasoning regarding humans harming the natural world it appeared, though in limited forms, in the context of concerns for wild animals (Kahn, 1997; Kahn & Lourenco, 2002; Kahn, Saunders, Severson, Myers, & Gill, 2008). Based on the findings that few children endorsed biocentric reasoning, Kahn proposed that children may develop biocentric capabilities by adolescence, yet only employ these concepts in limited contexts. That is, young children may have the capability to employ biocentrism, but they rarely do.

Most broadly, the current study aimed to investigate the emergence and development of children's biocentric reasoning. The current study is the first to focus on children's moral reasoning in the context of humans harming a wild animal species. The harm is presented within the context of the ultimate harm to an animal species – the threat of extinction. The current study aimed to address three developmental questions: 1) Do children as young as seven-years-old endorse a stringent form of moral obligatory criteria when reasoning about humans causing harm to an endangered animal?; 2) Do children as young as seven-years-old use biocentric moral reasoning for judgments regarding humans harming the endangered animal?; and 3) Does a developmental shift in the quality of biocentric reasoning occur between 7- and 10-years-old?

## **Animals in Childhood**

No research on the extension of moral obligations to the natural world has focused the investigation on animals alone. To the extent that other researchers have explored environmental and moral conceptions of the natural world, the investigations have focused on a) wider ecosystems, in which animals are not explicitly highlighted (Howe, Kahn, & Friedman, 1996; Kahn & Friedman, 1995, Kahn & Lourenço, 2002), b) wider ecosystems, in which animals are directly addressed, but are presented as groups of ambiguous animals (e.g., “marine animals,” “wild animals,” or “pets”) (Kahn, 1997; Severson & Kahn, 2010), or c) a specific species of animal, though moral obligatory criteria was not assessed (Kahn, et al., 2008). The current study brought children’s concerns for animals to the center of the investigation on children’s moral obligations and moral reasoning regarding the natural world.

Animals are arguably the most significant feature in children’s experience of the natural world (c.f., Melson, 2001, 2013; Myers, 2007). Kahn and Friedman (1995) interviewed inner-city youth and found that 84% believed that animals are an important part of their lives. Kahn and Lourenço (2002) found that 96% of children interviewed said that pets were important. They also found that 96% of children said wild animals were important.

Children’s interest in animals emerges early in development. One study showed infants were differentially attentive to and more positively engaged with living animals as compared to animal toys (Kidd & Kidd, 1987). DeLoache and LoBue (2009) found that infants exhibited preferential looking for natural stimuli over artifacts. Preschool children dream of animals, such as frogs, birds, cows, and sheep (Resnick, Stickgold, Rittenhouse, & Hobson, 1994). Twenty percent of young children’s invisible imaginary companions are animals (Taylor & Carlson,

1997). When told stories with human characters and then identical stories with animal characters, 75% of third-graders, preferred the animal stories (Boyd & Mandler, 1955). Animal representations are abundant in children toys, television, and books (Melson, 2001). For example, five of the top ten all-time best-selling children's books are about animal characters. Shapiro and Copeland (2005) suggest that animals are conveyed in modern children literature as individuals with agency, autonomy, and character, with typical capabilities and limitations that support the conception of the animal as a relatable social other.

Children conceive of animals as social others (Melson, 2001; Melson, Peet, & Sparks, 1991). Building on Myers' (2007) observational research on young children's interactions with animals, Myers and Saunders (2002) suggest that children perceive animals as experiencing subjects with whom they can form relationships. Animals are thought to be socially compelling, highly responsive, and capable of mutual adjustments and communication without words. Myers (2007) writes:

...animals appear to be optimally discrepant social others by the time of early childhood, offering just the right amount of similarity to and difference from the human pattern and other animal patterns to engage the child. Crucially, animals are social others...because they display the hallmarks of being truly subjective others (p. 10).

Myers presents four characteristics of animals that lend to children's understanding of the animal as a subjective social other. These include: agency (animals are agents of their actions), affectivity (animals appear to like/dislike interactions), coherence (animals act in accordance to human behaviors), and continuity (repeated interactions emerge in patterned responses). These four invariants lead to the child's experience of a social relatedness with the animal. Myers suggests that children also experience an intersubjective relatedness (certain nonverbal cues from the animal, and verbal/nonverbal cues from the human can motivate shared attention, affect, and intentions), as well as linguistic relatedness (young children will speak with animals without

adjusting their speech from how they speak with people, allowing a deepening sense of wonder and concern for the animals) (see also Myers & Saunders, 2002). Animals are living beings that appear autonomous, intentional, self-directed, and coherent in terms of an enduring self that persists despite variations in behavior or appearance (Melson, 2013; Myers, 2007; Myers & Saunders, 2002; see also Melson, Kahn, Beck, Friedman, Roberts, Garrett, & Gill, 2009; Melson Kahn, Beck, & Friedman, 2009).

Myers' (2007) observational research on preschooler's interactions with animals suggests that moral sensitivity regarding harm to animals emerges early. Myers suggests that his young participants were "nascently moral" (p. 152). Children experienced moral emotional responses and empathic distresses when learning about or witnessing harm to animals. Instances of harm to animals were quickly and spontaneously reported to parents. He argued that the nascent moral feelings are most clear in the case of pets, where a child is placed in a parental position in relation to the animal allowing for independence, interdependence, equality, and orientations toward justice. He writes: "The child may be more powerful than the animal, and it is dependent on her or him. In this circumstance, the child's own emerging experiences of justice and care moralities may readily generalize to the child's sense of moral obligation toward the pet" (p. 157). Caring for the pet requires the child to recognize the animal's needs and act towards fulfilling those needs, and in some cases, having to adjust one's own needs in compromise to the needs of the animal other.

Understanding the needs and subjective experiences of animals can provide a basis of moral regard for animals (Berenguer, 2010; Katcher, 2002; Myers, 2007). Nevers, Gebhard, and Billmann-Mahecha (1997) argued that children and adolescents would subordinate their own interests to the interests of other animals, especially if certain animals commonly held as pets

(e.g., dog, rabbit) were involved. They write: “The animal’s interest apparently appear to be so overwhelming that, at least verbally, children will often defend them more readily than their own” (p. 179). Children aged 6-11 years defended the animals’ interests based on a concern for the animal’s capacity to feel suffering. It is important to note that the findings from this study were not systematically analyzed and conclusions were drawn illustratively from the interviews conducted. An empirical study involving college students found that participants drew on the needs and experiences of a vulture in their concerns for the rights and intrinsic value of the animal, as well as, concerns for protecting the animal’s welfare (Berenguer, 2010). Kahn (1997, see also 1999) reported anecdotal evidence on the four ways children (as young as 7-years-old) established moral reasoning for the environment through considerations of one’s own needs and experiences in relation to the animal’s needs and experiences: 1) established a direct relation between humans and the natural world (“because I think fish and animals have a right to live just like we do, and it’s not fair to have killed them this way” Kahn, 1997, p. 1093), 2) a compensatory relation (“just because of their appearance and they can’t talk, they’re animals, and I don’t think that’s right, they could be people if they could talk, a form of people, well, not human beings but something like it, just a degree of level and that’s it, that’s the only difference”), 3) a conditional relation (“it’s not all right because they’re dead, living things just like we are, you wouldn’t want anybody to kill you like that”), and 4) hypothetical perspective-taking relation (“you put yourself in the animal’s position and you wouldn’t like that, so if you just kind of trade places and think about it, and everyone would think it wasn’t right”). More research is needed to understand the extent to which animals garner children’s moral regard and whether animal needs and subjective experiences are brought to bear in children’s moral obligatory concerns.

The animal presents a compelling recipient of harm in the investigation of children's moral obligations and moral reasoning extended to the natural world. Animals are important to children. Observational research suggests that animals are conceived of as social others that are worthy of moral regard. From a young age children experience animals as subjective beings that can experience harm and that have needs in the pursuit of wellbeing. Children can understand the experience of the animal in relation to their own experiences and needs. The current study will investigate children's environmental and moral conceptions of an endangered animal. The animal will be the recipient of harm and the harm will be in the context of the ultimate harm to an animal species – the threat of extinction.

### **A Canonical Endangered Animal – The Washington State Gray Wolf**

A single endangered animal species was chosen as the stimuli of investigation for the current study. This allowed for greater depth in exploring environmental understanding and moral reasoning than would be possible when asking a small set of questions across a range of species. Many animals were considered, including land (e.g., lions and tigers) and sea mammals (e.g., whales and dolphins), macro- (e.g., elephants and bears) and microfauna (e.g., frogs and triggerfish). Key considerations for the animal choice were developed and included: endangered local species, familiar and charismatic species, species that have cultural significance, and species that are at the center of conservation discourse. Fitting all of these criteria, the Washington State's gray wolf was selected.

The gray wolf presents a canonical example of a local, familiar, charismatic endangered species. The gray wolf is a well-known endangered animal. Perhaps written about more than any other wildlife species and one of the most researched animals (Mech & Boitani, 2010), these top-tier predators of their ecosystems are the sole ancestor of the domesticated dog (Pollinger,

Lohmueller, Han, Parker, Quignon, Degenhardt, Boyko, et al., 2010). Once one of the world's most widely distributed mammals (Feldhamer, Thompson, & Chapman 2003), the species is now regionally extinct in much of Western Europe, Mexico, and the United States (Mech & Boitani, 2010). Hunting and trapping (tied to conflicts with people over livestock loss) have reduced the species range to roughly one third of its original size. Habitat loss due to human encroachment and people's actions in response to their fear of the species are also seen as great threats to the survival of the gray wolves.

The conservation of the gray wolf is a significant topic in U.S. conservation and environmental policy. Kellert (1996) writes:

The wolf once inspired nearly pathological hatred – indeed, its elimination was considered the destruction of evil presence at variance with civilized society. Today the wolf has become for many a symbol of wildness and an icon in an emerging ethic of wildlife conservation. These conflicting attitudes assure that the wolf will remain a powerful litmus test of shifting American attitudes toward nature and living diversity (p.110).

Currently at the center of the debate is the endangered status listing of the gray wolf and the implications the listing has for the protections of the wolf. In 1974 the gray wolf was listed on the Endangered Species Act. The population rebounded to over 6000 across three Great Lakes states and seven western states in just three decades. The reintroduction of the gray wolves in the Rocky Mountain West is seen as a great success story and a testament to the ability to protect and recover nearly extinct wild species in their natural habitats (see Rosenthal, 2010; Fish & Wildlife, 2014). The gray wolf protections were removed in several states (including Idaho, Montana, Michigan, Wyoming) and management of wolf populations was turned over to the states. In June of 2013 the U. S. Fish and Wildlife submitted a proposal to lift the federal protections for the gray wolf and to remove the animal from the Endangered Species list of the

Endangered Species Act. A 90-day public commentary period was granted in response to the proposal. Public hearings have occurred around the country and the public commentary period has been extended three times, with the latest extension ending on December 17, 2013. Over the course of the public commentary periods, the Fish and Wildlife Service received over 30,000 public comments. Then, in early 2014 an independent scientific peer review report from UC-Santa Barbara was submitted to Fish and Wildlife. The report brought into question the science behind the Service's proposal to delist the wolf. It was suggested that the claims around wolf taxonomy and range used to motivate the proposal to delist are not empirically substantiated. In response to this controversial report, the Fish and Wildlife reopened the public comment period for an additional 45-days beginning Feb. 10, 2014. The public comment periods are now closed and the proposal rebuttals are in review.

Currently, the gray wolf is listed, in addition to the Federal designation, as an endangered species in Washington State. The gray wolf is an endangered species throughout Washington under state law and is endangered under federal law in the western two-thirds of the state. There are about 50 wolves living in Washington State. There is on-going debate on wolf-livestock conflicts questioning how best to protect the wolves and mitigate wolf-related livestock losses. On April 26, 2013 the Washington Department of Fish and Wildlife (WDFW) enacted a rule to permit people to kill a wolf that is attacking their domesticated animals (e.g., pets and livestock). On May 21, 2013 Governor Jay Inslee signed legislation that provides state wildlife managers increased resources to prevent wolf-livestock conflict and expand criteria for compensation to livestock owners for wolf-related losses. The bill included an increase of \$10 for the fee for personalized license plates, with an estimated \$1.5 million raised in the next two years that will be allocated directly to the WDFW's efforts to monitor wolf recovery and prevent wolf-livestock

damages. The Washington State Fish and Wildlife 2013 wolf survey that was released in early 2014 reports the formation of four new wolf packs and, simultaneously, a reduction in wolf conflicts with humans and livestock.

### **Moral Obligations to the Natural World**

Decades of structural-developmental research on people's moral obligatory judgments regarding harm to other people finds that these judgments are characterized by *criterion judgments* of: *prescriptivity* (considered as right or wrong), *generalizability* (they apply to all people in similar situations), and *rule-contingency* (not contingent on conventions, laws or rules); judgments that are justified by concerns for justice, rights, fairness, and welfare. The general pattern of findings suggest that across diverse cultures and for children as young as three, moral transgressions are universal and unalterable prescriptions that are judged to be wrong regardless of rules and authority, whereas social-conventions are relative and alterable and are judged to be wrong when they violate a rule or cultural expectation (e.g., Davidson, Turiel, & Black, 1983; Helwig, 1995, 1998; Helwig, Arnold, Tan, & Boyd, 2007; Helwig, Zelazo, & Wilson, 2001; Horn, 2003; Kahn, 1992; Killen, 1990; Turiel, 1983; Turiel & Davidson, 1986; Turiel, Killen, & Helwig, 1987; Nucci, 1981, 2001; Posada & Wainryb, 2008; Wainryb, 1995). Structural-developmental research has been applied to understand the human moral relationship to the natural world.

Research shows that children as young as six in varied regions of the world hold moral obligations for not causing harm to the natural world (see Kahn, 1999, for a review). Children extend moral obligatory concerns to the natural world, particularly in terms of humans not polluting rivers (Howe, Kahn, & Friedman, 1996; Kahn & Friedman, 1995; Kahn & Lourenço, 2002), not polluting coasts and the marine animals that live there (Kahn, 1997) and in terms of

not using pesticides in their local orchards (Severson & Kahn, 2010). For example, across several studies participants said it was not alright to pollute their local waterway, even if polluting is a common social practice in their community, and it is still not alright to pollute a waterway if it is an act committed by a person in a culture far away, commitments that were supported by moral justifications, most predominantly in terms of human welfare concerns (Howe, Kahn, & Friedman, 1996; Kahn, 1997; Kahn & Friedman, 1995; Kahn & Lourenço, 2002). While these studies show that children can judge actions that are harmful to the natural world as a violation of a moral obligation, only a few specific types of harmful acts have been investigated. Only one study (Kahn, 1997) has investigated children's judgment of moral obligations to not harming animals, particularly in terms of not causing harm to a general group of unspecified marine wildlife. To date, no study has investigated children's moral obligations to protecting an endangered animal.

The current study extended the research on children's moral obligations to the natural world to a new and pertinent environmental domain – endangered animals. Ethical concerns for the intrinsic value of life are expressed in children's and adolescents' views on why preventing extinction is important (Grace & Sharp, 2000; Grace & Ratcliff, 2002; Greaves, 1993). In another study, most 7-year-old (78%) and 10-year-old (95%) children endorsed that it mattered to them if an endangered fish species was harmed in an oil spill (Kahn, 1997). Given that animals are a central feature in the child's relationship with the natural world (see Clayton & Myers, 2009, for a review), that animals are perceived as social others (Melson, 2001; Myers, 2007; Shepard, 1996) and, even by the young child, as experiencing subjects worthy of moral regard (Melson, 2001; Melson, Peet, & Sparks, 1991; Myers, 2007), and that emerging evidence suggests that the wild status (Kahn et al., 2008) and endangered status of an animal (Grace &

Sharp, 2000; Grace & Ratcliff, 2002; Greaves, 1993; Kahn, 1997) are salient features in children's environmental moral concerns, it was expected that children would extend moral obligatory concerns to not harming an endangered animal. It was hypothesized that children as young as seven-years-old would endorse a stringent form of moral obligation to not kill the gray wolf, even if a law allowed killing, even if the killing was committed by people from a distant culture, and that these judgments would be justified by moral concerns.

### **Prevalence of Children's Biocentric Reasoning**

Research on children's environmental moral reasoning has shown that two overarching forms of reasoning (i.e., anthropocentric and biocentric) have been identified, yet only one (i.e., anthropocentric) is consistently seen in the data (Kahn, 1997, 1999; Kahn & Lourenço, 2002; Kahn, et al., 2008; Nevers, Gebhard, & Billmann-Mahecha, 1997; Severson & Kahn, 2010). Anthropocentric reasoning refers to an appeal that the natural world has moral standing due to the import the natural world has in human lives. For example, one child gave the following justification for why it is wrong to pollute the local waterway: "[It's not alright] because some people that don't have homes, they go and drink out of the rivers and stuff and they could die because they get all of that dirt and stuff inside of their bodies (Kahn, 1999, p. 100)." Biocentric reasoning refers to an appeal that the natural world has moral standing independent of its value to humans. For example, one child reasoned it is wrong to pollute the water because: "Fishes, they want to live freely, just like we live freely... They have to live in freedom, because they don't like living in an environment where there is so much pollution that they die every day (Kahn, 1999, p. 101)." Across the cultures and ages investigated, anthropocentrism is the prominent form of reasoning. However, the findings on the prevalence of biocentric reasoning are a puzzling story. Kahn, Severson, and Ruckert (2009) highlight that across studies only about 4%

of children employed biocentric reasoning and that there was little evidence that it appeared in children younger than 10-12 years old. Recent research shows that 90% of children (2nd and 5th graders) interviewed employed biocentric reasoning in scenarios where aliens, not humans, cause harm to the natural world, particularly an orchard ecosystem and the animals that live there (Severson & Kahn, 2010). With the alien scenarios, the researchers sought to remove human concerns from the context so that the children would not need to engage the challenging cognitive task of considering human concerns in context with nature concerns. Importantly, these findings show that children as young as seven-years-old can engage in biocentric moral reasoning, particularly when human concerns are removed from the scenario. Yet such conditions rarely have ecological validity (irrespective of the existence of aliens) in so far as environmental concerns in the real world rarely exist independent from human concerns.

It remains unclear if young children will employ biocentric moral reasoning in scenarios where humans cause harm to the natural world. Thus far researchers have focused on scenarios where humans caused harm to waterways (Howe, Kahn, & Friedman, 1996; Kahn & Friedman, 1995; Kahn & Lourenço, 2002) and ecosystems (Howe, Kahn, & Friedman, 1996; Kahn, 1999; Kahn & Lourenço, 2002; Severson & Kahn, 2010). Ecosystems are abstract, complicated ecological constructs. They involve various recipients of harm, including animals, plants, and non-sentient natural entities or phenomena (e.g., mountains, soil, food webs, decomposition, weather patterns, or trophic cascades). Severson and Kahn (2010) found that biocentric moral reasoning was employed significantly more often when the recipients of harm were specific natural entities compared to scenarios where the recipients of harm were ambiguous. Furthermore, the land or water ecosystem used in previous research may pull for anthropocentric concerns. Water (Howe, Kahn, & Friedman, 1995; Kahn, 1999; Kahn & Lourenço, 2002) is a

primary life source. Orchards (Severson & Kahn, 2010) are created to provide humans with food.

Across the studies investigating scenarios where humans harm the natural world we see very little biocentrism emerge (Howe, Kahn, & Friedman, 1996; Kahn, 1997, 1999; Kahn & Friedman, 1995; Kahn & Lourenço, 2002; Kahn et. al., 2008; Severson & Kahn, 2010), yet close analysis of individual interview items suggest that within the methodologies employed, particular questions tend to pull for much higher rates, namely questions that focus on the wild (Kahn & Lourenço, 2002; Kahn, et al., 2008), or endangered status of animals (Kahn, 1997). Biocentric reasoning, particularly in terms of the intrinsic value of the natural world (e.g., concerns for inherent welfare of natural entities), emerged in children's reasoning regarding the importance of wild animals (73%) (Kahn and Lourenço, 2002), concerns for bats' rights to not be killed (64%), to be wild (83%), and to live free (78%) (Kahn et al., 2008) and their reasoning regarding moral obligations to not harm marine life (26%) (Kahn, 1997). Kahn (1997) found that 13% of children (between the ages of 8 and 14) employed biocentric reasoning when justifying why it would matter to them if endangered animals were harmed in an oil spill caused by humans. Aside from the bat study (Kahn et. al., 2008) which did not investigate moral obligation but did focus on the welfare and rights of an animal, the remaining environmental moral reasoning studies involved investigations regarding moral conceptions of (including moral obligations to) animals in the context of larger ecosystems (e.g., waterways, orchards). Severson and Kahn (2010) had observed the highest levels of biocentrism (95%) in their study of aliens harming orchards and the creatures that live there, with many of the children (69%) employing biocentric reasoning specifically for the wild animals in the orchard. Thus, the current study extended the body of research on the emergence and prevalence of biocentric reasoning by constructing an

interview that focused on scenarios where humans cause harm to a wild endangered animal. It was hypothesized that children as young as seven-years-old would employ biocentric reasoning for scenarios where humans harm an endangered wild animal.

### **Emergence of Justice-Oriented Biocentrism**

The general pattern of findings on moral development suggest that concerns for the welfare of other people emerge in early childhood, while moral reasoning regarding justice emerges later in childhood (Kahn, 1992; Smetana, 1981; Turiel, 1983; see also Smetana, 2006, for a review). Children as young as three years old conceive of the welfare of others, first in terms of physical harm, followed by concerns of psychological harm (Helwig, Zelazo, & Wilson, 2001; Zelazo, Helwig, & Lau, 1996). From ages three to six children have an egocentric perspective of fairness, where they will judge it wrong for others to have all the goods (e.g., toys), but do not judge it obligatory to share their own goods with others (Damon, 1977; Smetana, 1981). By age eight, justice orientations shift to conceptions of direct reciprocity and by around 10-years-old children begin to orient towards equity concerns (Damon, 1977). Around the age of 12-years-old children's notions of justice involve the coordination of equity and equality and in adolescence they begin to orient towards universal conceptions of fairness (Damon, 1977; Nucci, 2001, 2002). Very little is known about the development of justice concerns in children's moral reasoning about the natural world.

In children's and adolescents' environmental moral reasoning two primary justification categories of biocentric moral reasoning emerge: intrinsic value concerns and justice-oriented concerns (Howe, Kahn, & Friedman, 1996; Kahn, 1997, 1999; Kahn & Friedman, 1995; Kahn & Lourenço, 2002; Kahn et al., 2008; Severson & Kahn, 2010). Intrinsic value concerns refer to an appeal that the natural world has value not solely derived from human interests, including value

for the welfare of biological life (e.g., “because it’s a living thing”), natural processes (e.g., “they all die then the life cycle won’t be working that much”), and teleology of the natural world (e.g., “they’re meant to grow”). Justice concerns refer to an appeal that the natural world has rights (e.g., “animals have a right to their life”), deserves respect or fair treatment (e.g., “it’s not fair to have killed them this way”), or merits freedom (e.g., “they should be out in the wild and actually have a lot of freedom”).

The alien study mentioned above identified a developmental shift in justice-oriented biocentric concerns (Severson & Kahn, 2010). The researchers found that 5th graders (mean age 10.6 years) were significantly more likely than 2th graders (mean age 7.9 years) to employ justice-oriented moral reasoning when justifying their concerns for aliens not causing harm to the natural world. The authors do not offer an interpretation of the development shift. The authors do present a glimpse of its rich quality in the description of the justice justification coding category and, in particular, the example justifications that several participants provided:

Justice: An appeal that nature deserves respect or fair treatment (e.g., “they were here first, they deserve to be treated the way [they] were treated before the aliens came”), has rights (e.g., “the animal they have derechos [rights].....they have to live”), and/or merits freedom (e.g., “the animals are meant to live and be free and run around”). (Severson & Kahn, 2010, p. 252).

These young migrant farmworker’s children brought to bear rich accounts of justice in their biocentric reasoning. They identified specific rights, including the right to live (“they have derechos [*rights*].....*they have to live*”), and teleological accounts of freedom (“the animals are *meant to live and be free* and run around”). Notice that at least two of the examples are about animals. In fact, very little justice was endorsed when orchards (0%) or forests (3%) were the recipients of harm, whereas it was the pets (37%) and wild animals (36%) that garnered justice-

oriented biocentrism. It may be that the animals in the scenario, not the aliens, allowed for children to express their justice concerns for the natural world.

It remains unclear if a developmental shift in justice-oriented biocentric reasoning will occur when children reason about humans causing harm to the natural world. Furthermore, we know very little about the quality of the justice-oriented biocentrism that does occur in the young child's moral reasoning. The current study sought to extend this finding by identifying a developmental shift in justice-oriented biocentric reasoning in scenarios where humans harm an endangered wild animal. It was hypothesized that there would be a shift in justice-oriented biocentrism, wherein 10-year-old children would be more likely than 7-year-old children to employ justice-oriented reasoning.

## **Methods**

### **Participants**

The participants were 52 school-aged children, including 26 7-year-olds ( $M$  age = 7.2 years,  $SD$  = .24; 13 females and 13 males) and 26 10-year-olds ( $M$  age = 10.5 years,  $SD$  = .26; 13 females and 13 males). Participants were recruited through the Child Subject Pool administered by the Communications Department Subject Pool at the University of Washington, and received \$10 for their participation. One seven-year-old female was replaced due to noncompliance during the interview. Five sibling pairs were recruited through the Child Subject Pool and were included in the sample.

Forty-nine parents (82% mothers, 18% fathers) returned the parent questionnaire, though parents often left responses to questions blank. Most parents (74%) reported the ethnicity of the child was Caucasian, 4% reported Asian, 2% reported Hispanic, and 12% were reported as more than one ethnicity. Most (56%) children had a reported parental income level of over \$100,000,

32% had a parental income of between \$50,000 and \$100,000, and 4% had a parental income of \$20,000-\$50,000. Forty-two percent of the children were reported to have at least one parent who had a graduate degree as the highest degree achieved; 46% had an undergraduate degree, 4% had a junior college degree, and 2% had a high school degree. Most parents (83%) reported that their child lived in a two parent/guardian household. Most parents (92%) reported that the child had siblings ( $N=49$ ,  $X = 2.55$ ,  $SD = 1.10$ ,  $range = 0-6$ ). See Table 1 for a summary of participant demographic information.

**Table 1. Summary of Participant Demographic Information**

<i>Participant Ethnicity</i>	<i>7-year-olds</i>	<i>10-year-olds</i>
Caucasian	37%	37%
Asian	2%	2%
Hispanic	--	2%
More than one ethnicity	8%	4%
<i>Hispanic/Caucasian</i>	4%	4%
<i>Pacific Islands/Caucasian</i>	2%	--
<i>Unspecified</i>	2%	--
<i>Parental Income Level<sup>a</sup></i>		
< \$20,000	--	--
\$20-50,000	4%	--
\$50-100,000	15%	17%
> \$100,000	25%	31%
No response	2%	--
<i>Parental Education Level</i>		
Some/no high school	--	--
High School Degree (Diploma, GED)	--	2%

Some College	4%	2%
Junior College Degree (Associate's)	2%	2%
Undergraduate Degree (Bachelor's)	17%	19%
Some Graduate School	0	2%
Graduate Degree (Master's, Doctorate)	23%	19%

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<sup>a</sup> Median income in 2010 for King County, WA was \$65,383 (Office of Financial Management, 2013).

## **Procedure**

Each participant was individually interviewed by the lead researcher (Ruckert) during a 1-hour session in an interview room in a University of Washington laboratory. The female lead researcher administered the procedure for all participants. The researcher obtained assent from the child participants and consent from the parent of the child participants in a main room of the research facility. Following the informed consent procedures the parents were asked to remain in the main room of the research facility and to complete a questionnaire (described below). The child was then escorted to an interview room located at the end of the main room of the research facility.

Each participant was interviewed individually by the researcher. The procedure comprised a semi-structured interview lasting approximately 35 minutes. The interviews were audio recorded and later transcribed for analysis. The interview protocol is described below. Following the interview the children were escorted back to the main room of the research facility. Parents and children were debriefed about the full nature of the research study and were given a chance to ask questions. The children then received their compensation.

## **Measures**

**Parent questionnaire.** The questionnaire included 21 questions regarding demographic information and the parent's report of the child's experience with nature and knowledge about endangered species. Demographic information included the child's date of birth, gender, race/ethnicity, grade in school, as well as the family income and the highest level of education held by a household member. In terms of the child's experience with nature, the questions focused on the number of household pets, the amount of time spent outdoors, the age of early childhood nature experiences, and the frequency of specific nature activities. Questions about the child's knowledge of endangered animals included targeted questions about the child's interest in learning about and helping animals in general, and endangered animals specifically. See Appendix A for the complete questionnaire.

**Interview.** The interview developed for this study focused on the Washington State gray wolf and consisted of three sections: 1) initial environmental profile, 2) moral obligatory reasoning, and 3) animal rights. Several methodological checks were employed in order to rule out reasons why a participant may have failed to endorse moral reasoning. The three methodological checks were presented near the end of the interview protocol and are described below. Each section of the interview is described below, complete with the full set of questions (see Appendix B for the interview protocol).

***Section 1 – Initial environmental profile.*** The first section aimed to build the initial profile of children's understanding, beliefs, and values regarding protecting the endangered animal. The questions were developed from interview methodology on environmental profiles of children's conception of varied environmental issues (Kahn, 1997, 1999; Kahn & Lourenço, 2002; Kahn et al., 2008; Severson & Kahn, 2010). Participants were asked about their understanding of endangered animals (e.g., Do you know what an endangered animal is?; What

are some animals that are endangered?; Tell me what you know about the gray wolf.) and animal extinction (e.g., Do you know what animal extinction is?; What are some animals that have gone extinct?). Following these questions each participant was then provided with the same basic definition of the two concepts (i.e., An endangered animal is when there are very few of one type of animal left in the world, so few that the animal is in danger of going extinct. An animal is extinct when there are no more animals of that type of animal left in the world. Once an animal is extinct in the world it will never come back. It is gone forever. ). In addition, value-oriented questions (e.g., Does it matter to you if an animal becomes endangered?; Does it matter to you if an animal becomes extinct?) and questions about children's understanding of the causes (e.g., Do you know what causes animals to become endangered?; What are some (other) human activities that can lead to an animal becoming endangered?) and solution-oriented questions (e.g., Let's say that you had the power to protect the endangered gray wolves from going extinct. How would you protect the gray wolves?) were also asked.

***Section 2 – Moral obligatory criterion questions.*** The second section assessed children's moral obligatory judgments regarding humans harming the endangered gray wolf. The section began with a brief account of the endangered status of the Washington gray wolf (i.e., The gray wolf was once found to live all over the world. In many places in the world the gray wolf can no longer be found in the forests and mountains where it once lived. Here in Washington State the gray wolf is now an endangered animal. There are only about 50 wolves living wild in our state. I'm going to ask you some questions about the endangered gray wolf.). The assessment of moral obligation drew upon domain theory research on moral obligatory judgments that are prescriptive, not contingent on rules or authority, are generalizable across relevant contexts, and are based on justifications of welfare, fairness, and rights (Helwig, 1995,

1998; Killen, 1990; Turiel, 1983; Turiel & Davidson, 1986; Smetana, 1981). Correspondingly, one question focused on whether killing the gray wolves is viewed prescriptively (i.e., Is it alright or not alright for people here in Washington State to kill the gray wolves?). A second question focused on the rule contingency of the judgment (i.e., Let's say that there was a law here in Washington State that allows people to kill the gray wolf. With this law in place, would it then be alright or not alright for people here in Washington State to kill the gray wolves?). The third question focused on whether the judgment regarding killing the gray wolf generalizes across contexts where a society legitimated the practice (i.e., Let's say that far away in the country of Greenland people kill gray wolves. Would it then be it alright or not alright for people in Greenland to kill the gray wolves?). For each of the three questions, participants were asked to provide justifications for their responses (i.e., Why or why not?).

***Section 3 – Animal rights questions.*** The third section explored participants understanding of animal rights. The questions were developed from Kahn and colleagues' (2008) interview questions addressing children's conceptions of bat rights. Participants were asked about their general understanding of animal rights (e.g., What does it mean for an animal to have a right?, Do you think animals have rights or do not have rights?, (if states animals have rights) Which ones?; Do you think that gray wolves have rights or do not have rights?). Additional rights-based questions focused on specific rights, including the right to live (i.e., Do you think that gray wolves have the right to not be killed?) and the right to freedom (e.g., Do gray wolves have the right to be wild?; Should the gray wolf be allowed to be wild and live free?). For each of these questions, participants were asked to provide justifications for their responses (i.e., Why or why not?).

***Methodological checks.*** Three methodological checks were employed to further explore the occurrence of environmental and moral reasoning: 1) check of knowledge regarding understanding endangered and extinct animals, 2) check of knowledge of controversy regarding the proposal to delist the gray wolf and remove its endangered status, and 3) check of beliefs regarding fear of the gray wolf and belief of the gray wolf as a dangerous animal.

The two conception questions regarding children's knowledge of endangered animals (i.e., Do you know what an endangered animal is?) and animal extinction (i.e., Do you know what animal extinction is?) were returned to near the end of the interview to verify that children understood what it meant for an animal to be endangered or extinct and maintained that understanding through to the end of the experiment. Furthermore, the probe "Can an animal that has gone extinct ever come back?" was given to children who expressed knowledge of extinct animals to assess the extent to which they understand the finality of extinction. This probe was provided at both presentations of the extinction question.

On June 13, 2013, about a month prior to the start of data collection for the current study, the U.S. Fish and Wildlife agency submitted a formal proposal to remove the gray wolf from the endangered species list. A few days later the New York Times published a story, "Federal Protection of Gray Wolves May Be Lifted, Agency Says", reporting the controversy around the U.S. Fish and Wildlife's proposal. Thus the children's knowledge around the potential delisting was assessed. Near the end of the interview children were asked if they had heard that the gray wolf may no longer be called an endangered animal.

Finally, the endorsement of fears and beliefs about the gray wolf as a dangerous animal was assessed. Near the end of the interview the children were asked two questions: 1) Are you afraid of the gray wolf? and 2) Is the gray wolf a dangerous animal?. The wolf depicted as a

villainous character, symbolic of evil, is a theme found frequently in western literature (Lopez, 1978). The Big Bad Wolf, a menacing predatory antagonist, appears in several children's stories, including Little Red Riding Hood, Three Little Pigs, and Peter and the Wolf. More benevolent representations have emerged in the last half of the twentieth century as a result of the wolf's reintroduction to proportions of the United States, where the wolf has served as a poster animal for the conservation movement (Askins, 2002).

### **Coding and Reliability**

A coding manual was constructed from a random selection of half of the interview data (26 participants with 13 from each age group). A coding manual is the description of the systematic approach to interpreting and characterizing (i.e., coding) the qualitative data. The construction of the coding manual followed well-established methods in social-cognitive literature (Damon, 1977; Kahn, 1999; Kohlberg, 1984; Turiel, 1983), and largely replicated the previous coding manuals developed on children's environmental moral concerns (see Kahn, 1999, for a review). Particularly, the coding scheme for the justification response coding nearly replicated that of Kahn and Lourenço (2002) which is presented in full as an appendix in Kahn (1999). Three types of responses were coded: content (e.g., animals become endangered due to: natural forces, disease, habitat destruction, pollution, and/or the human use of animal parts for food or goods and materials), evaluation responses (e.g., yes/no, alright/not alright) and justifications for content and evaluation responses. See Table 2 for abbreviated descriptions of the justification categories. See Appendix C for the complete coding manual.

**Table 2. Justification Categories**

<b>Category</b>	<b>Definitions and Examples from Data</b>
<i>Unelaborated Harm to Nature</i>	
	A concern for the harm caused to nature. No reference is made to whether that concern derives from an anthropocentric or biocentric orientation (“[It matters to me if an animal becomes extinct] because it... (pause) can die.”).
<i>Anthropocentric</i>	
<i>Punishment Avoidance</i>	An appeal to punishment or its avoidance.
<i>Personal</i>	An appeal to the personal predilections, interests, and projects of self and others (“[It matters to me if an animal becomes endangered] because, um, I care about animals.”)
<i>Relational</i>	An appeal to a relationship between humans and nature, but wherein the relationship fundamentally serves human needs (“animals are like my friends.”).
<i>Welfare</i>	An appeal to the welfare of human beings (“[It matters if an animal is endangered] because, animals can be important, um, like, in the human, um, like, the human cycle. So, like what we eat and stuff.”).
<i>Justice</i>	An appeal that humans have rights, deserve respect, fair treatment, ownership of property, and/or merit freedom.
<i>Aesthetic</i>	An appeal to the preservation of the environment for the viewing or more broadly, sensorial pleasure of humans (“Just because they are beautiful.”).
<i>Biocentric</i>	
<i>Intrinsic Value of Nature</i>	An appeal that nature has value, and the validity of that value is not derived solely from human interests (“[It’s not alright to kill the gray wolf because] they are living things too like us ... they can think too and they know when they are being hurt.”).

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<i>Harmony</i>	An appeal to a biocentric conception of harmony between humans and nature.
<i>Justice</i>	An appeal that nature has rights, deserves respect or fair treatment, or merits freedom (“[It’s not alright to kill the gray wolf] because, they’re well, I just feel like it’s kinda unfair to them that they keep on dying when people kill them and just endangered them and they become extinct, it’s just not fair.”)

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Note: Some categories are included as they are theoretically possible, yet were not endorsed in the interviews and thus do not have examples following the definition.

The lead researcher (Ruckert) coded the entire set of interviews. A research assistant trained in the use of the coding manual independently recoded 16 randomly selected interviews (about 30% of the data; all chosen from the set of data that was not used in coding manual development), balanced across age and gender. Inter-coder reliability was assessed using Cohen’s kappa (Cohen, 1960), a measure of inter-rater agreement. For evaluation responses  $\kappa = .96, p < .001$ ; for content responses,  $\kappa = .87, p < .001$ ; and for justifications reported at the level shown in in Table 3 and in the text,  $\kappa = .64, p < .001$ . Two commonly referenced benchmarks for interpreting the values of Cohen’s kappa are Fleiss, Levin, and Paik (2003), who rate any value of kappa over 0.75 as “excellent” agreement, between 0.40 and 0.75 as “intermediate to good”, and below 0.40 as “poor,” and Landis and Koch (1977), who rate a kappa of 0.81 to 1.00 as “almost perfect” and between 0.61 and 0.80 as “substantial” agreement. Previous research on children’s environmental moral reasoning have reported kappa for evaluations ranging between  $\kappa = .86$  and  $\kappa = .92$  (see Kahn, 1999 for a review), kappa for content questions ranging between  $\kappa = .81$  and  $\kappa = .86$  (Kahn et al., 2008; Severson & Kahn, 2010); and the kappa for justifications reported between  $\kappa = .63$  and  $\kappa = .78$  (see Kahn, 1999; Severson & Kahn, 2010).

## Results

### Overview of Analyses

Nonparametric tests were used to test statistical significance of categorical data (c.f., Helwig, 1995; Kahn & Lourenço, 2002; Liu & Agresti, 2005). T-tests were used to analyze categorical data (converted to score data) when appropriate. Effectively no gender differences were found – of the hundreds of tests for gender differences conducted on the evaluation, content, and justification responses, only a few tests were statistically significant (no more than would be expected by chance). Thus, results for males and females were collapsed for analysis. Developmental differences are reported where found. All tests for statistical significance, both nonparametric and parametric, were initially conducted with the entire data set. The data was then re-analyzed excluding the five participants who had had siblings participate in the study. All tests had remained significant. Findings for these test are presented following the findings on the full data set.

### Environmental Understanding

**Understanding of endangered animals.** Many children understood the basic features of what it means for an animal to be endangered. Of the 52 children, 62% stated that endangered animals are those with very few individuals left in its species and that an extinct species is one that there are no more animals left. Of the 52 children, 81% stated that endangered animals are those with very few individuals left in the species, or stated that an endangered species is one that is about to be “extinct” (that is, using the word extinct but not further elaborating on the response to the first question regarding endangered species) and then stated that an extinct animal is one that there are no more animals left in that species (that is, correctly providing the definition of an extinct animal for the following question regarding animal extinction). Nearly

all of the children (96%) offered some correct information about endangered animals, including information about the ongoing loss of individuals, anthropogenic and natural causes, effects to biodiversity loss, and conservation issues. Only one participant stated that they did not know what endangered species were and no participants offered incorrect or uncodable responses. Most of the children (83%) knew of type(s) of endangered animal(s) ( $X = 1.87$ ,  $SD = 1.66$ , *range*: 0-8). There were no gender or age differences in children's understanding of endangered animals.

**Understanding of extinct animals.** The large majority of children (92%) understood that an animal is extinct when there are no individuals of that species remaining in the world. Furthermore, 86% of the children stated that animal extinction occurs when all individuals no longer remain on the earth and offered some additional information regarding the causes, effects, or conservation issues regarding animal extinction. Only two participants stated that they did not know and two participants offered incorrect information (e.g., “using their amazing powers”). While many children (44%) stated that an animal that has gone extinct can never occur on earth again, the same number of children (44%) stated that an animal can be brought back from extinction through scientific technology and advances (of these, 38% were 7-years-old and 62% were 10-years-old, which did not present a statistically significant age difference,  $p = .10$ ). Most of the children (87%) knew of type(s) of extinct animal(s) ( $X = 1.27$ ,  $SD = .89$ , *range* = 0-4).<sup>1</sup> There were no gender or age differences in children's understanding of extinct animals.

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<sup>1</sup> These is not one definitive source for determining current status of endangered animals and there exists much controversy over status and listings across states and countries. For example, Federal (Endangered Species Act) and state (Fish and Wildlife) agencies disagree and US status can conflict with international assessments (e.g., IUCN's “Red List” which is employed by the UN). Therefore, children were not coded for “correctness” of identified animal. While children did report controversially listed animals (e.g., koala), none reported clearly incorrect responses (e.g., the Golden Retriever is endangered).

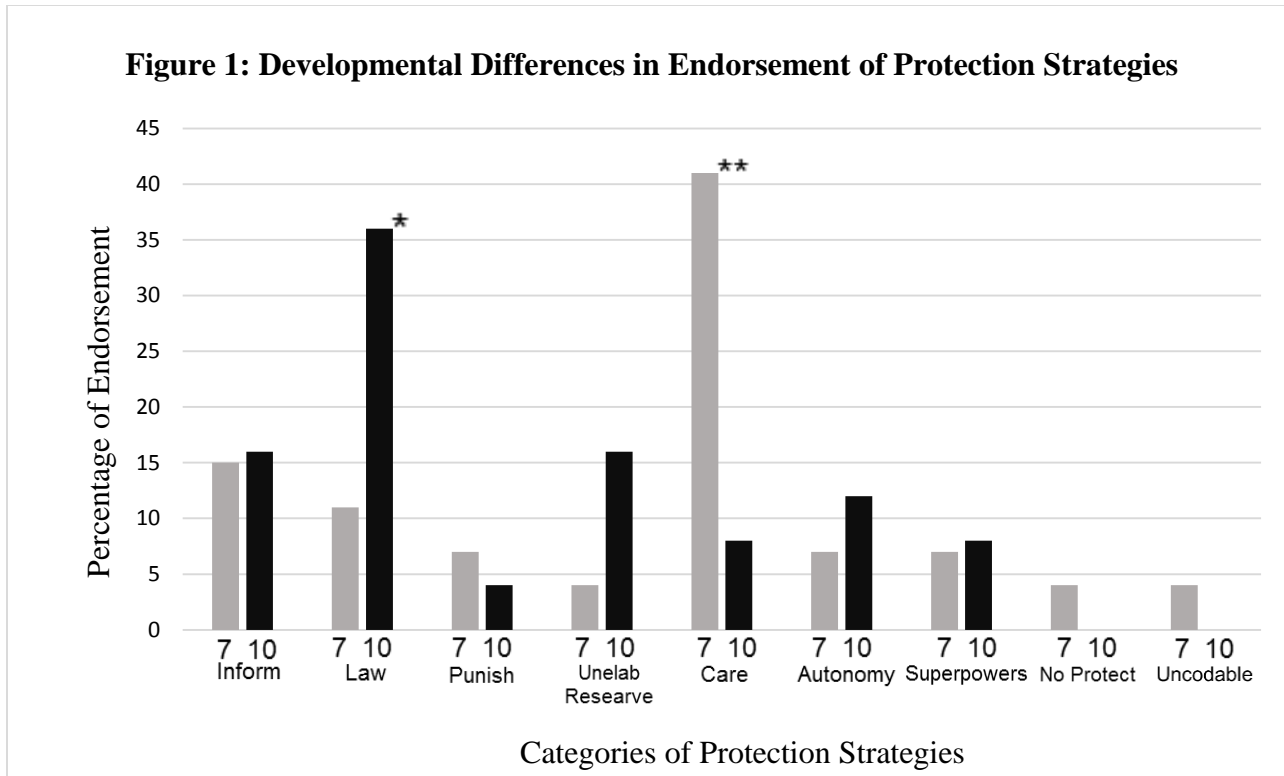
**Understanding the causes of animal extinction.** When asked about their understanding of the causes of animal extinction, participants most frequently mentioned humans killing animals (80%), including hunting or killing for sport. Then in decreasing order, participants mentioned natural causes (33%) and the anthropocentric causes of using them as resources (22%), habitat destruction, in general (6%), or specifically, human development (6%), pollution (6%), climate change (4%), and trapping/holding captive (2%). There was only one uncodable evaluation, no incorrect information provided, and two participants stated “I don’t know.” There were no age or gender differences found in children’s understanding of the causes of animal extinction.

When asked a second time, but with the focus placed on human causes of animal extinction, 37% stated killing, 25% stated pollution, 13% stated human development, 6% habitat destruction, 4% trapping/holding captive, and 2% using the animals as resources. There was only one uncodable and 12% stated “I don’t know” (e.g., not offering any additional information beyond what was offered in the response to the previous question).

**Knowledge about wolves.** Nearly half (56%) of the children failed to offer any information about the gray wolf. When information was offered, in decreasing order, most knew about wolf behavior (30%), including eating, communication, running, pack hierarchy, reproduction, aggressive behaviors, and lifespan, some spoke of conservation issues (26%), and several likened the wolf to the domestic dog (6%). Two participants offered uncodable responses. There were no age or gender differences in the presentation of knowledge about wolves.

**Conceptions of wolf conservation strategies.** Children were asked what they would do if they had the power to protect the gray wolves. Most children (96%) stated that they would protect the gray wolf. The most common responses were to create a reserve that involved human caretaking (25%) and to create a law (23%), followed by inform the public (15%), an unelaborated account of creating a reserve (10%) or an elaborated account of creating a reserve that was characterized by granting the wolves autonomy and sovereignty, and finally, punishing those who harm the wolf (6%). Four children stated they would use superpowers (e.g., creating a force field or a super punch) and one child stated that they would not protect the gray wolf.

Developmental differences were found in the two common responses of creating a law and creating a reserve that involved human caretaking. Ten-year-old children stated significantly more often than the seven-year-old children that they would create a law,  $\chi^2(1, N = 52) = 3.90, p = .05$  (Figure 1), while seven-year-olds endorsed creating a reserve that involved human caretaking significantly more often than ten-year-olds,  $\chi^2(1, N = 52) = 8.30, p = .004$  (see Figure 1).



Note: “Inform” = inform the public; “Law” = create a law; “Punish” = punishing those who harm the wolf; “Unelab Reserve” = creation of a reserve; “Care” = creation of a reserve that involves human caretaking of the wolf; “Autonomy” = creation of a reserve that involves granting the wolf sovereignty and autonomy over the land; “Superpowers” = superpowers that would protect the wolf, such as having the ability to create a force field around the wolves; “No Protect” = not protecting the wolf; and “uncodable” = response that did not fit within the coding categories.

### Environmental Moral Judgments and Reasoning

Most children endorsed pro-environmental judgments across the ten questions that involved justifications. That is, children stated that it mattered if an animal became endangered (96%), or extinct (98%), it was not alright to kill the gray wolf (90%), even if a law allowed it (94%), or even if it was a cultural practice (83%), they stated that the gray wolf should be allowed to be free (90%), that animals have rights (94%), that gray wolves have rights (94%), and that gray wolves have the rights to not be killed (86%) and to be wild (87%). Table 3

presents the breakdown of justification categories used by the children who stated pro-environmental judgments. For example, those who said that it mattered if an animal became endangered (96%), their judgments were supported with justifications of unelaborated harm (6%), anthropocentric justifications (e.g., 34%, welfare for humans, 26% personal predilection, and 2% aesthetic) and biocentric justifications (e.g., 32% intrinsic value and 14% justice) moral justifications. For those who said that it mattered if an animal became extinct (98%), they supported their judgment with justifications of unelaborated harm (10%), anthropocentric (43% welfare for humans, 16% personal predilection, and 4% aesthetic) and biocentric (26% intrinsic value and 8% justice) moral justifications. The following subsections present results for the evaluation or content judgments and the supporting justifications. Developmental findings are presented following the presentation of overall findings.

**TABLE 3: Percentages of Pro-Environmental Justification by Categories**

Justification Categories	Value of Nature		Moral Obligatory Criteria			Gray wolf should be wild and live free	Conception of Animal Rights			
	Matters If Animals Become Endangered	Matters If Animals Become Extinct	Not ok to kill	Not ok to kill with law	Not ok to kill in a faraway country		Animals have rights	Gray Wolves have rights	Wolves have the right to not be killed	Wolves have the right to be wild
	(N=50)	(N=51)	(N=47)	(N=49)	(N=43)	(N=47)	(N=49)	(N=49)	(N=46)	(N=45)
<b>Unelab. Harm</b>	6%	10%	2%	10%	14%	--	2%	10%	13%	--
<b>Anthropocentric</b>										
<i>Punish. Avoid.</i>	--	--	--	--	--	--	--	--	--	--
<i>Personal</i>	26%	16%	11%	8%	5%	6%	--	--	2%	--
<i>Relational</i>	--	2%	2%	--	5%	--	--	--	--	--
<i>Welfare</i>	34%	43%	28%	31%	14%	11%	10%	12%	20%	11%
<i>Justice</i>	--	--	--	2%	--	--	--	--	--	--
<i>Aesthetic</i>	2%	4%	2%	--	--	--	--	--	--	--
<b>Biocentric</b>										
<i>Intrinsic</i>	32%	26%	47%	37%	51%	81%	55%	51%	48%	62%
<i>Harmony</i>	--	--	2%	--	--	--	4%	2%	2%	4%
<i>Justice</i>	14%	8%	26%	18%	23%	19%	31%	27%	33%	27%

*Note:* Unelab. Harm = Harm to Nature; Nat. Process. = Natural Processes; Punish. Avoid. = Punishment Avoidance; Percentages do not always equal 100% as multiple justifications were possible.

**Conceptions of moral obligations.** Most children (90%) judged it was not alright to kill the gray wolves. Several (6%) stated that it was conditionally alright. Only 4% stated that it is

alright to kill the gray wolf. Most children (94%) judged it was not alright to kill the gray wolves even if a law permitted the killing. Only 4% stated that it was conditionally alright. Only one believed that it was alright to kill the gray wolf if a law was in place. Most children (83%) generalized their judgment to another culture and judged it was not alright to kill the gray wolves in Greenland. A minority (11%) stated that it was conditionally alright to kill the wolf in a faraway country. Only 6% stated that it was alright to kill a wolf in a faraway country.

An initial assessment of moral obligation can be made with an assessment of a conjunction of all three moral obligatory criteria (prescriptivity, rule contingency, and generalizability (c.f., Howe, Kahn, & Friedman, 1996; Kahn, 1997; Kahn & Friedman, 1995; Kahn & Lourenço, 2002). A large majority of children (83%) stated that it was not alright to kill the gray wolf, even if the law allowed it, and even in a faraway country. There were no gender or age differences found.

A more stringent assessment of moral obligation couples these criterion judgments with moral justifications (Kahn & Lourenço, 2002). These justifications include: unelaborated harm to nature, anthropocentric welfare, anthropocentric justice, and biocentric reasoning. Across the three scenarios a majority (60%) of participants reasoned that it was not alright across the three questions and based all three of their judgments on moral justifications. A chi-squared test revealed that 10-year-olds were significantly more likely than 7-year-olds to conceive of not killing the gray wolf as a moral obligation in this form,  $\chi^2(1, N = 52) = 6.47, p < .01$ .

Across the three scenarios a majority (65%) of participants reasoned that it was not alright and based at least one of their judgments on biocentric moral justifications. Furthermore, some children (29%) reasoned that it was not alright and based all three of their judgments on

biocentric moral justifications. A chi-squared test revealed that 10-year-olds were significantly more likely than 7-year-olds to conceive of not killing the gray wolf as a moral obligation that was prescriptive, generalizable, and not contingent on rules, and all of these evaluations were grounded in biocentric concerns,  $\chi^2(1, N = 52) = 4.59, p < .03$ .

**General conception of animal rights.** When asked to describe animal rights most children (65%) described specific types of rights, including general welfare (31%), the right to eating/hunting (15%), autonomy (6%), and mating (4%), playing (4%), and a right to habitat (4%). Four children (8%) offered uncodable responses and three (6%) stated that they did not know.

When asked if animals have rights most children (94%) said that animals do have rights. Of these children, 10% stated that animal rights were limited based on the animals' behavior or type of animal, and 8% stated that animals should have rights, but are generally not granted them. Of the children who stated that animals have rights, 86% stated specific types of rights, including the right to eat or hunt (20%), the right to welfare (20%), the right to autonomy (19%) the right to habitat (10%). Three children offered uncodable evaluations, two stated that they did not know, and zero children said "no." Most children who endorsed animal rights justified their response with biocentric moral reasoning (55% intrinsic, 31% justice, 4% harmony), and some endorsed anthropocentric concerns (10% endorsed welfare anthropocentrism). There was a total of nine uncodable justifications.

When asked if gray wolves have rights most children (94%) stated that they do. Of these children, 4% stated that animal rights were limited based on the animals' behavior or type of animal, and 9% stated that animals should have rights, but are generally not granted them. Of the children who stated that gray wolves have rights, 87% endorsed specific types of rights,

including the right to eat or hunt (28%), the right to welfare (26%), the right to habitat (15%), and the right to autonomy (13%). Two children offered uncodable evaluations, two stated that they did not know, and one stated “no.” Most of the children who endorsed rights for the gray wolf justified their response with biocentric moral reasoning (51% intrinsic, 27% justice, 2% harmony) and some endorsed anthropocentric concerns (12% endorsed welfare anthropocentrism). There was a total of 6 uncodable justifications

**Conception of Specific Rights.** Most children (88%) stated that gray wolves have the right to not be killed, while only a few (8%) stated that the gray wolves have the right to not be killed based on certain conditions (e.g., depending on the wolves’ behavior), and one stated that the gray wolves do not have that right to not be killed. Most of the children who endorsed the right of the gray wolf to not be killed also justified their response with biocentric moral reasoning (48% intrinsic, 33% justice, 2% harmony) and some endorsed anthropocentric concerns (20% welfare and 2% endorsed personal).

Most children (87%) stated that gray wolves have the right to be wild, while several (12%) stated that the gray wolves have the right, based on certain conditions, and one stated that the gray wolves do not have that right. Most of the children who endorsed the right of the gray wolf to be wild also justified their response with biocentric moral reasoning (62% intrinsic, 27% justice, 4% harmony) and some endorsed anthropocentric reasoning, particularly in the form of welfare concerns (11%).

**Allowances for the gray wolf.** The large majority of children (90%) believe that wolves should be allowed to be wild and live free. Of these children, the large majority based their judgment on biocentric moral reasoning (81% intrinsic, 19% justice). Anthropocentric moral

reasoning was also used to support the belief that wolves should be allowed to be wild and live free (11% human welfare concerns, and 6% personal predilection concerns).

**Developmental differences in biocentric moral reasoning.** To assess developmental differences in the use of biocentric reasoning, each child's justifications were collapsed to the highest categorical level of intrinsic value or justice reasoning. First a score was created for the use of intrinsic value reasoning. For each of the ten questions that attained justifications, the justifications were collapsed to the highest categorical level of intrinsic value, wherein the use of intrinsic value reasoning by a child for a given question was coded as 1. The use of multiple sub-category justifications within intrinsic value were then only counted once after collapsing. Not endorsing intrinsic value reasoning for a given question was scored as 0. Then the responses across the 10 questions were collapsed wherein the use of intrinsic value endorsed at least one time in the interview was coded as 1. If the child had not endorsed intrinsic value reasoning during the interview they received a code of 0. Then a second score was created for the use of justice-oriented reasoning. For each of the ten justification questions, the justifications were collapsed to the highest categorical level of justice, wherein the use of justice by a child for a given question was coded as 1. The use of multiple sub-category justifications were only counted once after collapsing. Not endorsing justice reasoning for a given question was scored as 0. Then the responses across the 10 questions were collapse wherein the use of justice reasoning endorsed at least one time in the interview was coded as 1. If the child had not endorsed justice reasoning during the interview they received a code of 0. Table 4 shows a breakdown of biocentric reasoning categories by age across the ten questions.

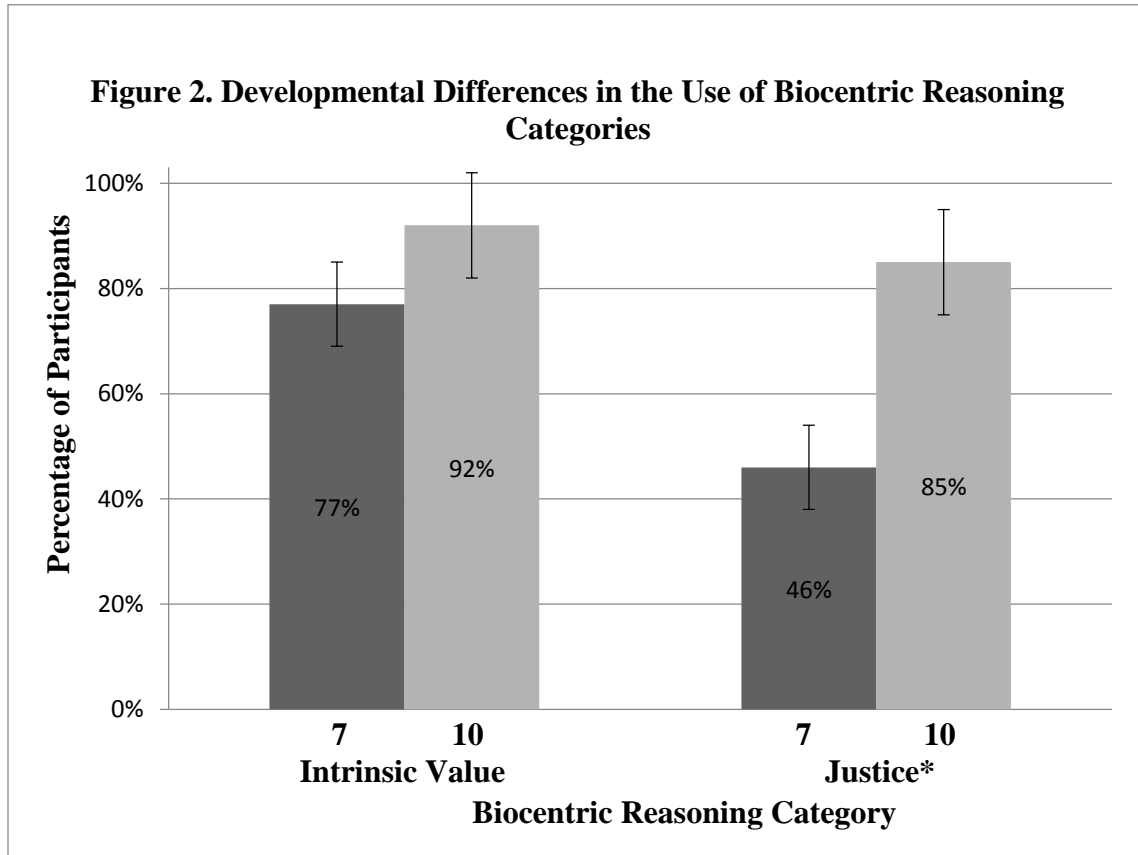
**TABLE 4: Percentages of Biocentric Reasoning Category Usage by 7- and 10- year-olds**

		Value of Nature		Moral Obligatory Criteria			Gray wolves should be wild and live free	Conception of Animal Rights			
Justification Categories	Age	Matters If Animals Become Endangered	Matters If Animals Become Extinct	Prescriptivity	Rule-Contingency	Generalizability		Animals have rights	Wolves have rights	Wolves have the right to not be killed	Wolves have the right to be wild
<i>Intrinsic Value</i>	7	19%	8%	19%	23%	35%	58%	35%	39%	31%	50%
	10	37%	37%	52%	41%	41%	70%	56%	44%	44%	67%
<i>Justice</i>	7	--	--	12%	8%	8%	27%	23%	27%	19%	15%
	10	19%	22%	26%	22%	22%	44%	30%	52%	33%	37%

A Chi-squared test was run to determine if the 10-year-old children were more likely to use intrinsic value biocentric reasoning than the 7-year-old children. No sex differences were found. Both 7-year-old (77%) and 10-year-old (92%) children endorsed intrinsic value biocentric moral reasoning. The 7-year-olds were just as likely as the 10-year-olds to use intrinsic value biocentric reasoning ( $p = .12$ ).

A Chi-squared test was run to determine if the 10-year-old children were more likely to use justice-oriented biocentric reasoning than the 7-year-old children. No sex differences were found. As hypothesized, 10-year-olds (85%) were significantly more likely to endorse justice-oriented biocentric reasoning than 7-year-old children (46%),  $\chi^2 (1, N = 52) = 8.50, p < .001$

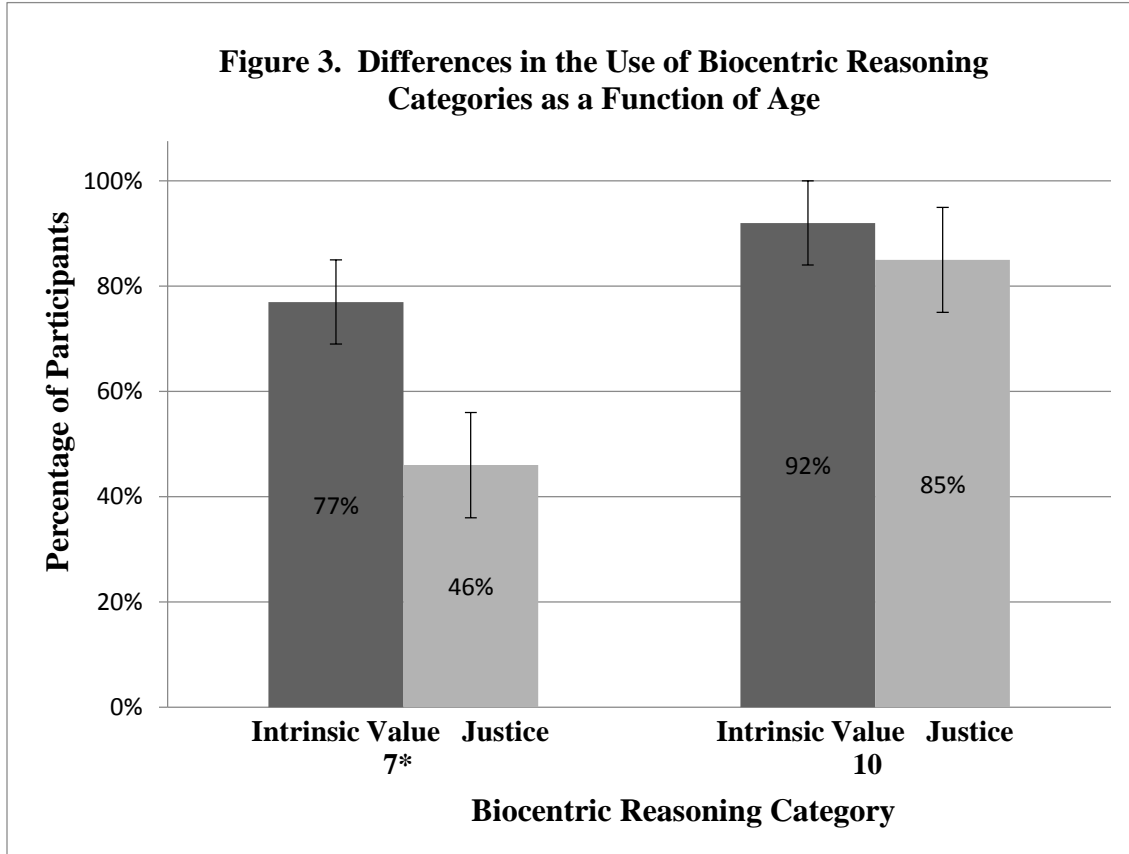
(Figure 2). Furthermore, these findings remain significant when the five sibling participants are removed from the analysis,  $\chi^2(1, N = 47) = 11.56, p < .001$ .



A Chi-squared test was run to determine if the 7-year-old children were more likely to use intrinsic value biocentric reasoning than justice-oriented biocentric reasoning. Seven-year-olds were significantly more likely to endorse intrinsic value biocentric reasoning (77%) than justice-oriented biocentric reasoning (46%),  $\chi^2(1, N = 26) = 5.20, p = .02$  (Figure 3).

A Chi-squared test was run to determine if the 10-year-old children were more likely to use intrinsic value biocentric reasoning than justice-oriented biocentric reasoning. The 10-year-olds were just as likely to use intrinsic value biocentric reasoning as justice-oriented biocentric

reasoning ( $p = .39$ ).



Additional chi-squared tests were run to determine if the children were more likely to use justice-oriented biocentric reasoning when responding to questions regarding animal rights, as compared to their justification responses in earlier questions. Justifications were collapsed to the highest categorical level of justice, wherein the use of justice by a child for a given question was coded as 1. The use of multiple sub-category justifications were only counted once after collapsing. Not endorsing justice reasoning was scored as 0. Then two scores were created for each child: 1) Pre-Rights Score (i.e., responses to the two “does it matter” questions and the three moral obligation questions), and 2) Rights Score (i.e., responses to the four rights questions: do

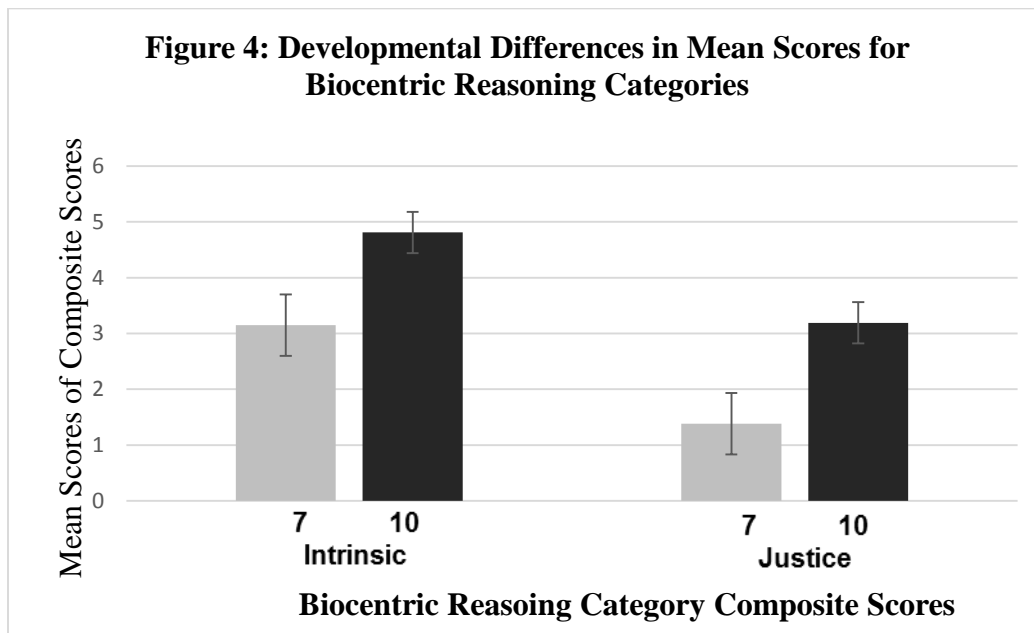
animals have rights, do gray wolves have rights, do the gray wolves have the right to not be killed, do the gray wolves have the right to live wild and free). The two scores were created by collapsing across each question set, wherein the child received a 1 if they endorsed justice reasoning at any point within the 5 pre-rights questions (i.e., forming their Pre-Rights Score as either 1 or 0) and 1 if justice was endorsed at any point within the 4 rights questions (i.e., forming their Rights Score as either 1 or 0).

A McNemar statistic for repeated measures was used to then test whether children were more likely to use justice-oriented reasoning during the rights questions than during the earlier non-rights questions. At the group level, children were more likely to use justice reasoning in the rights questions than during the non-rights questions ( $p = .04$ ). There was a development trend, though not significant, where seven-year-olds were more likely to use justice reasoning for the questions that ask directly about animal rights than the pre-rights questions ( $p = .07$ ).

To further explore this developmental trend, the additional question “should the gray wolf be allowed to be wild and free,” a general question about animal allowances, was then included in the Rights Score. While the question does not include specific mention of a “right” it does utilize language of “should” and “allowed.” The words are likely to be more common in the child’s vernacular than the specific word “rights”. This language may prime the conceptions of justice and rights concerns. The development trend was then significant when this question was included in the Rights Score. That is, seven-year-olds were more likely to use justice-oriented reasoning in the rights questions than the pre-rights questions ( $p = .04$ ).

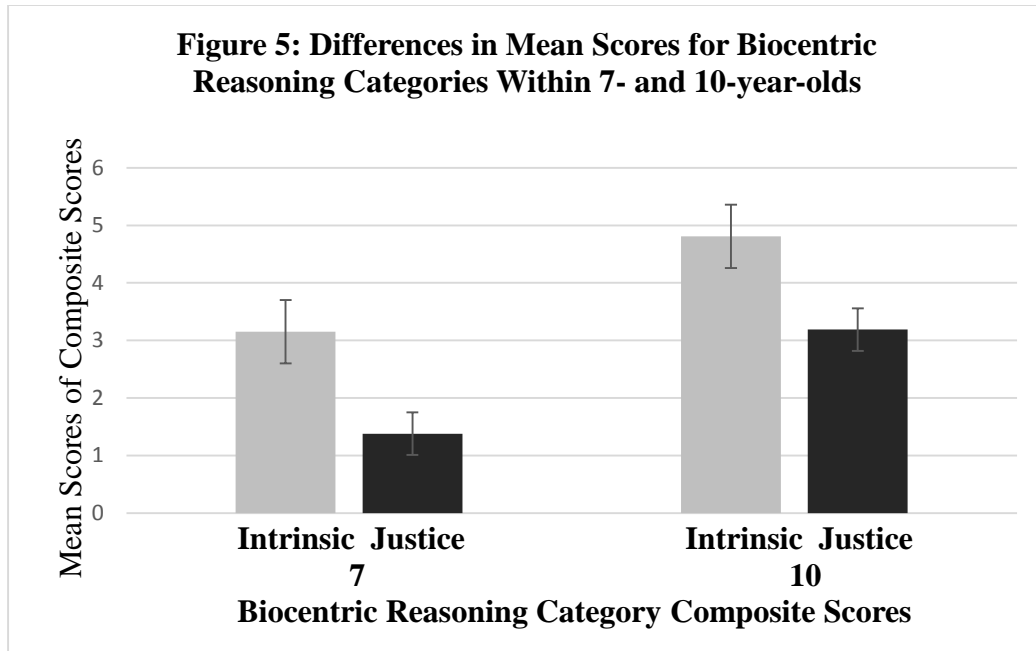
***Degree of biocentrism.*** To provide an overall assessment of the degree to which these children use intrinsic value biocentrism and justice-oriented biocentrism, and to test for

developmental differences, the ten justification questions were summed as two single scores, reflecting the degree of each child's 1) intrinsic value orientation, and 2) justice orientation. For each question, an affirmative response received a score of 1, a negative response received a score of 0, and then the composite scores were found across the 10 questions. For the Intrinsic Value Composite Score, 7-year-olds had a mean of 3.15 ( $N = 26$ ,  $SD = 2.84$ ,  $SE = .55$ ) and the 10-year-olds had a mean of 4.81 ( $N = 26$ ,  $SD = 2.6$ ,  $SE = .52$ ). For the Justice Composite Score, 7-year-olds had a mean of 1.38 ( $N = 26$ ,  $SD = 1.90$ ,  $SE = .37$ ) and the 10-year-olds had a mean of 3.19 ( $N = 26$ ,  $SD = 2.37$ ,  $SE = .46$ ). An independent samples t-test was then used to test the difference between the 7- and 10-year-olds for their Composite Scores. There was a significant difference for the Intrinsic Value Composite Scores for 7- and 10-year-olds,  $t(50) = -2.18$ ,  $p = .03$ . There was a significant difference for the Justice Composite Scores for 7- and 10-year-olds,  $t(50) = -3.04$ ,  $p = .004$ . Ten-year-olds endorsed both intrinsic value reasoning and justice-oriented reasoning to a greater degree than seven-year-olds (See Figure 4).



The analyses were then rerun after removing the five sibling participants. These tests revealed that there remained a significant difference for the intrinsic value composite scores for 7-year-olds ( $M = 3.09$ ,  $SD = 2.94$ ,  $SE = .63$ ) and 10-year-olds ( $M = 4.76$ ,  $SD = 2.68$ ,  $SE = .54$ ),  $t(45) = -2.04$ ,  $p = .05$ . Furthermore, there was a significant difference for the justice composite scores for 7-year-olds ( $M = 1.36$ ,  $SD = 2.01$ ,  $SE = .43$ ) and 10-year-olds ( $M = 3.32$ ,  $SD = 2.32$ ,  $SE = .46$ ),  $t(45) = -3.07$ ,  $p = .004$ .

Additional t-tests were run to assess the differences in children's degree of biocentric reasoning types within each of the age groups. A paired samples t-test was used to test if seven-year-old children used more intrinsic value reasoning than justice-oriented reasoning. There was a significant difference for the seven-year-olds wherein intrinsic value reasoning was endorsed more than justice-oriented reasoning,  $t(25) = 2.31$ ,  $p = .03$ . A paired samples t-test was used to test if 10-year-old children used more intrinsic value reasoning than justice-oriented reasoning. There was a marginally significant difference for the 10-year-olds wherein intrinsic value reasoning was endorsed more than justice-oriented reasoning,  $t(25) = 2.04$ ,  $p = .05$  (Figure 5).



As an additional step, a 2 (Age) X 2 (Biocentric reasoning) repeated measures ANOVA was then conducted to see if there were any main effects or an interaction effect. There was a main effect for Age. Ten-year-olds endorsed biocentric reasoning more than seven-year-olds,  $F(1, 50) = 18.70, p < .001$ . There was a main effect for Biocentric reasoning type. Children endorsed intrinsic value reasoning more than justice-oriented reasoning,  $F(1, 50) = 9.42, p = .003$ . There was no Age X Biocentric reasoning interaction. The degree to which 7-year-olds use intrinsic reasoning more than justice reasoning is not significantly different from the degree to which 10-year-olds use intrinsic reasoning more than justice reasoning ( $p = .89$ ).

The analyses were then rerun after removing the five sibling participants. The main effect for Age remained significant. Ten-year-olds endorsed biocentric reasoning more than seven-year-olds,  $F(1, 50) = 17.87, p < .001$ . The main effect for Biocentric reasoning type remained significant. Children endorsed intrinsic value reasoning more than justice-oriented reasoning,  $F(1, 50) = 7.04, p = .01$ . Again, there was no Age X Biocentric reasoning interaction.

The degree to which 7-year-olds use intrinsic reasoning more than justice reasoning is not significantly different from the degree to which 10-year-olds use intrinsic reasoning more than justice reasoning ( $p = .81$ ).

### **Knowledge and Biocentrism**

A composite Extinction Knowledge score was created for each child based on the content responses provided for the four questions: 1) Do you know what an endangered animal is?, 2) Do you know what an extinct animal is?, 3) Do you know what causes animals to become endangered?, 4) What are some (other) human activities that can lead to an animal becoming endangered? For each question, an affirmative response received a score of 1, a negative response received a score of 0, and this was determined for each of the possible content codes, and then the composite scores were found across the four questions. There was a possible total of 36 content codes across the four questions. There was no significant difference in the degree of informational content provided in content responses between the 7-year-olds ( $X = 4.96$ ,  $SD = 1.51$ ,  $SE = .03$ ) and 10-year-olds ( $X = 5.8$ ,  $SD = 1.77$ ,  $SE = .34$ ),  $t(50) = -1.86$ ,  $p = .07$ ).

The relation between biocentric reasoning and composite Extinction Knowledge score was then assessed using the Pearson product-moment correlation coefficient statistic. This test was run to assess if there was a positive relationship between knowledge and reasoning. That is, did the children who scored high on Extinction Knowledge tend to also score high on biocentric reasoning? After controlling for age, the degree to which children endorsed knowledge content regarding extinction did not correlate with the degree to which they endorsed intrinsic value biocentrism ( $r = .07$ ,  $p = .64$ ) or justice-oriented reasoning ( $r = .23$ ,  $p = .11$ ).

## **Methodological Checks**

**Understanding of endangered and extinct animals.** This first methodological check addressed the concerns that children as young as seven-years-old a) would not know the basic definitions of endangered/extinct at the start of the interview, and after being told the definitions and then going through a 30 minute interview b) would not be able to remember this definition through to the end of the interview. This did not appear to be the case. Of the 52 children, 62% state at the start of the interview that endangered animals are those with very few left in its species and that an extinct species is one that there are no more animals left. Of the 52 children, 81% state that endangered animals are those with very few individuals left in the species, or state that an endangered species is one that is about to be “extinct” (that is, using the word extinct) and then states that an extinct animal is one that there are no more animals left in that species. At the end of the interview 71% state that endangered animals are those with very few left in its species and that an extinct species is one that there are no more animals left. At the end of the interview 90% of children state that endangered animals are those with very few individuals left in the species, or state that an endangered species is one that is about to be “extinct” (that is, using the word extinct) and then states that an extinct animal is one that there are no more animals left in that species. McNemar statistic for repeated measures was used to test children’s understanding of these concepts at the start of the interview and at the end of the interview. No statistically significant shifts in understanding were found.

**Knowledge of wolf delisting proposal.** When asked if they had ever heard that the gray wolf may no longer be called an endangered species, nearly all of them responded (96%) that they had not heard that.

**A case for the “Big Bad Wolf?”** Half (50%) of the children stated that they were afraid of the gray wolf, most commonly due to the fear of attack (30%). For those who stated they were not afraid of the gray wolf (50%), they mostly stated that they were not afraid because they would not encounter gray wolves (15%), that gray wolves would not attack them (14%) and that if they gray wolf would attack them, it would only be in self-defense (16%). When asked if the gray wolf was a dangerous animal all but one child stated yes and 50% of those stated a conditional yes, if the gray wolf was provoked, it would attack in self-defense.

There were no significant age or gender differences in the expression of fear. An equal proportion of 7- and 10-year-olds reported fear across both ages,  $\chi^2 (1, N = 52) = 0.00, p = 1.0$ . 58% of the females stated they were afraid of the gray wolf while 42% of the males stated they were afraid of the gray wolf,  $\chi^2 (1, N = 52) = 1.23, p = .27$ .

### **Qualitative Presentation of Biocentric Justification Data**

Most children (85%) engaged in biocentric reasoning, most commonly in the form of biocentric intrinsic value reasoning (77% of 7-year-olds and 92% of 10-year-olds) and less frequently in terms of justice-oriented biocentrism (46% of 7-year-olds and 85% of 10-year-olds). The raw justification data present the rich and complex quality of this research and of the children’s biocentric moral reasoning. The following qualitative presentation of justification data will highlight types of issues and concerns that children had brought to bear in their environmental moral reasoning.

**Intrinsic value of biological life.** To ground the appeal that the natural world has value that is not derived solely from human interests, children would draw on the living status and biological needs of biological life (see also Kahn, 1999). For example, one 10-year-old female

stated that wolves should be allowed to be wild and free “because, it’s like...um, because it’s a living thing. And sort of needs to be wild and free to live.” A seven-year-old male stated the wolves should be allowed to be free “because it doesn’t want to be locked up and caged. WHY DOESN’T IT? Cause it doesn’t have time to roam around. That’s what it likes.” These two children are drawing on the needs and wants (tied to biological needs) of the wolf to ground their judgments. Similarly, a 10-year-old male stated that wolves are “living things and all living things should have rights. WHY? Because they should be able to eat when they want, hunt when they want, and stuff like that.” In this example the child draws on the biological desires to eat and hunt to ground their prescriptive judgment that wolves should have rights. The claim is not coded as a justice-oriented form of biocentrism as the statement of rights is a restatement of their evaluation judgment. The justification for the evaluation that the wolves should have rights is grounded in the biological needs and wants of the animal. Along similar lines, a seven-year-old male stated that the gray wolves have the right to not be killed: “Because they don’t want to be killed...they don’t want to die.” In the following two examples, the children ground their evaluation of the animals’ rights on the value of biological life. A 10-year-old female stated “[Animals] should have rights. OK, WHY? Um...because, they’re living things.” Similarly, a 10-year-old male stated “I think they do have rights. WHY? Um, because they are living things, and all living things should have rights.”

**Intrinsic value of teleology.** A justification based on teleological concerns is one where the individual makes an appeal to the natural entities’ design or purpose (Kahn, 1999). For example, a 10-year-old female stated that gray wolves should be wild and free “because, that’s where they’re supposed to be wild things, I guess, and I think they should be able to live there.” For this young girl, the wild status of the animal grounds a teleological argument that the animal

is meant to be in the wild and that is where “they should be.” A 10-year-old boy stated that gray wolves have the right to be wild: “because they were wild to begin with.” This boy makes an appeal to the original state of the animal to justify its continuation. This is a form of “is” to “ought” reasoning wherein the way that something has been necessitates how it should be. Another 10-year-old boy stated: “because they’re wild animals and that’s like in their blood.” The child employs an English colloquialism that implies a teleology based on biology or inheritance. One 10-year-old boy stated: “because they are wild animals and not like domesticated.” The boy labels the wolf as wild, and not domesticated, and places the wild animal, not the domesticated animal, in the wild environment. Finally, consider this 10-year-old female’s teleological account of wildness:

I don’t think it should be kept in a backyard, but ah, um, and it shouldn’t be fenced off, because this is nature, and this is what nature does, I mean, I don’t think that the wolf—cause if they are put in fenced off areas then they can’t they they have if they have really big territories then they may like, in the zoo, like animals pace, and that usually means cause that they’re bored and they don’t know what to do. And that would be a bit like an animal in captivity, then it’s not itself, it’s just something that it’s made to be...

This child also suggests that wild animals are meant to be in the wild. Wild animals that are in captivity are not fulfilling the teleological purpose of the wild design, it’s “not itself, it’s just something that it’s made to be.” When a wild animal is not in the wild, perhaps fenced off, they do not have access to the large territories that wild lands provide. The wild animal that does not get the room to move, such as the animal in the zoo, does not fulfill its biological needs, it might “pace” or become “bored.” Wildness is tied to a biological account of flourishing for the wild animal. A teleological account recognizes that fulfilling one’s design or purpose engages the individual’s potential to flourish.

**Justice-oriented biocentric reasoning.** Justice-oriented reasoning involved appeals that nature had rights, deserved respect or fair treatment, or merits freedom (Kahn, 1999). For example, a seven-year-old boy stated that gray wolves have the right to not be killed “Cus every animal deserves to be on the world HOW COME? Because they’re cool, they, they have a life...” This child believes that a living being deserves its chance at life. One seven-year-old remarks that the wolves’ preferences to be free warrants its right to freedom, she states: “Because... they’re living. And they don’t want to be locked up. WHAT DO THE GRAY WOLVES WANT? Not to be locked up, and to be free.”

Justice-oriented biocentric concerns were at time directly and explicitly contextualized by welfare (Kahn, 1999). One child reasoned that extending justice to the animal was about caring for the animal and that caring was expressed in granting it its freedom: “it’s just kinda cruel to keep animals like locked up in zoos and cages and stuff, and it’s kind of like the saying, if you love something you gotta set it free.” Another equated fairness to life: “I just feel like it’s kinda unfair to them that they keep on dying when people kill them and just endangered them and they become extinct, it’s just not fair.” Finally, one child stated that wolves have rights (in general) “Because they um, if they are not free, then they’ll like learn other habits and then they won’t, then if they’re set free then they’ll just die, cause they are not resourceful in any way probably.” The child states that the wolf has rights and in justifying this, identifies a right to freedom that is key to survival for the animal.

Justice conceptions regarding the right to unjustified harm were present, though emerged less often than other forms of justice reasoning. Consider one 10-year-old male states:

Well maybe they do stuff that’s wrong, like attack farmers chickens, but if they aren’t the kind of gray wolf that attacks farmers chickens and eating them, like they live in the

forest, then I don't think it would be good to do it. AND WHY NOT? Cause they are living a peaceful live. In the forest and they get shot for some reason.

The child believes that the harm to the wolf is disproportional to the act of the wolf. The wolves "weren't doing anything." The wolves were "living a peaceful life" and not causing any harm that warrant retribution. Consider one 10-year-olds judgments regarding the conditions of the gray wolves rights to not being killed and to being wild:

...if they're not doing anything like bad, like hunting livestock. Cause also people pay money for that and they pay money for their animals and it's kind of like stealing. SO YES IF THEY'RE NOT DOING ANYTHING BAD, WHY? Well if they are not doing anything bad then they are not doing bad, they're just along, and they shouldn't be hunted, that's be bad to hunt them. HOW COME? If they weren't doing anything. Well, cause, they never did anything to you, you know. MMM HMM [YES]. BUT IF THEY'RE EATING, YOU SAID, IF THEY'RE EATING LIVESTOCK WHICH THE FARMERS SPENT MONEY ON, THEN IT'S KIND OF LIKE THE WOLVES ARE STEALING FROM THE FARMERS? Yeah. DO YOU THINK GRAY WOLVES HAVE THE RIGHT TO BE WILD. Yes, if they are not doing anything bad, so it's the same answer as the one before. AND WHY? Because, it's their, if they're doing stuff bad then they're gonna be hunting the livestock, the farmers, and stealing, and if they're not doing anything, then, like, like they didn't do anything, the farmers, I mean the wolfs, didn't do anything to the farmers, so the farmers have no right to hunt the wolves.

This child is also concerned with unjustified harm to the gray wolf. The child reasons that there are some harm to the gray wolf that are permissible in the context of retribution for harm done by the gray wolf, such as the gray wolf "stealing" a farmer's livestock. In contrast, when the wolves are not causing harm, including "anything to you" or "anything to the farmer", then the harm done to the wolf, such as killing them, or limiting their access to wild lands, are unwarranted and disproportional.

Another form of justice-oriented reasoning that emerged contextualized a teleological account, wherein the appeal establishes fundamental linkages between justice and telos such that the entity has the right to fulfilling a purpose or design. Consider another 10-year-old female's judgment regarding the rights of gray wolves:

... they can't vote, but they can have their natural rights. AND WHY DO THEY HAVE THEIR NATURAL RIGHTS? Cause that's just how the world works and that's just how they're gonna not become extinct. TELL ME MORE ABOUT WHAT YOU MEAN ABOUT "HOW THE WORLD WORKS." Well, that's cause, if you're um, it's how, humans, how their way is is ta come up with things and do the things that we do, but that they're still um, like the way the world is to do that, but the way of the world for wolves is also to do what they do, so that's kind of what I mean by the way of the world. WHICH RIGHTS DO A GRAY WOLF HAVE? Their territories, and their mating, and um, and um, maybe what they eat, because when they, something that they would eat, would be, the elk and the stuff, and their elk and sometimes berries and stuff, like that, but um, also if that's like the um, if that's the way, how, it it, goes, then it's the way of the food chain, and their few rights come together because, that's how it goes, and so they have their right to mate, because that's their way of reproducing, and how they would keep their population numbers the same as they always been, and maybe they only have a few pups, but then the population number should change, unless people are killing them and then that's the need when they need longer life spans to reproduce.

The child suggests that the wolves have 'natural rights' that are based on the design or purpose of the wolf. For example, the wolves would have the right to mate as that is their way of reproducing. The wolves have the right to eat as that is the way of the natural process of the food chain, where the wolves eat elk and elk eat berries. To fulfill the design of their link in the food chain, they have the right to eat. The rights granted to the wolf are granted based on the 'way of the world' and the 'world of the wolves' insofar as these worlds define a teleological account of biological design.

**Isomorphic and transmorphic biocentric reasoning.** Isomorphic reasoning is an appeal that is based on recognizing a correspondence between humans and the natural world, wherein humans and the natural world are viewed as essentially similar and thereby the natural world deserves the same value considerations as humans (Kahn, 1999). The isomorphism can occur in the context of intrinsic value reasoning and justice-oriented reasoning. Consider this 10-year-old male's justification for why it is wrong to kill the gray wolf: "they are living things too like us, ... they can think too and they know when they are being hurt." This child ground the concern for the intrinsic value of the life of the wolf on the capacity to experience pain, an

experience shared by humans. Similarly, a 10-year-old female stated that it would matter if an animal became extinct: “because those animals, they have feelings and they are like us, and they have feelings...” Along the same lines, this 10-year-old female stated: “Because well it’s basically like killing anything else or anyone else and that’s not allowed...because they’re living things...because they’re just like you and you wouldn’t want people coming around and killing you.” Another stated: “It’s their habitat and that’s where they live and they should be able to live there. WHY? Because, if they couldn’t it would be like telling someone they can’t live in their house anymore...it would just be very, not very nice.” These children were taking the perspective of the animal’s experience as a subjective being with the capacity to feel pleasure and pain in ways similar to their own experiences, such as also having the capacity to “think” and “know when they are being hurt”. The children likened the animal’s experiences to human experiences of feeling pain, physical (“you wouldn’t want people coming around and killing you”), as well as even psychological (“telling someone they can’t live in their house anymore...not very nice.”).

Isomorphic justice reasoning occurred wherein the conception of human rights were employed to ground the conception of animal rights. For example one 10-year-old male stated that wolves have the right to be free “because they don’t like to be pinned up or killed. They like to be free like us.” Just as humans prefer certain freedoms, wolves too prefer certain freedoms. A 10-year-old female stated: “I think animals have rights because it’s important for animals to be free, like we’re a free country and animals should be free too. HOW COME? Cause then that’s kinda fair, like we’re free, we still have laws, but we’re free.” For this young girl granting humans’ freedom warrants granting freedom to other animals, within the jurisdiction of a “free country.” One seven-year-old male engaged in a justice-oriented isomorphism stating: “[Animals

have rights] because humans are animals, they should be treated equal, like humans, we are animals too, we should, all animals should be treated equal...” Here the child draws on the concept of equality, extends equality to all animals, and bases the extension of equality concerns on what is granted to humans.

Transmorphic concerns are concerns where a biocentric isomorphism is established, and then extended, including reasoning wherein an inequivalent correspondence between the natural world and humans does not void the mapping of similar value considerations to the natural world (Kahn, 1999). Humans and the natural world are viewed as both similar and different, yet the qualities that establish similarity are overriding in establishing a biocentric justice orientation. For example, consider this 10-year-old female’s justification for why it is wrong to kill the gray wolf:

they do have a heart and they do have, I mean they do have things to do in their life and although they may not make checklists of what they have to do in that day, they also know well, we need to go, cause that’s their instinct, they have to go and find food and in the springtime find a mate and everything...

The young girl recognizes that the animal has needs to fulfill (“they do have things to do in their life”) which may be different from human needs (“they may not make checklists”) but are legitimate and deserving regard. A 10-year-old male’s transmorphic justification parallels the young female’s concerns for the animal’s experiences that are at once similar and different to humans. This child finds meaning and power in the coupling of similarities and differences:

I think that animals are smart in a sort of way, like in a different kind of way, than we are. Like we are smart in communication, they are smart in communication, they like use howls and (\_\_\_), but we like use words. And we have a more complicated language. And sometimes we think that we are smarter than animals, but they might have a type of smartness that we do not have, and stuff like that. And they- like a lot of animals are really good at smelling. We’re not that good at smelling. But like, if I wake up and I start going down the stairs and I start smelling, I can smell, like if I’m going down the stairs and like the

kitchen is like three rooms away, I can smell the smell of pancakes or stuff like that. But I bet wolves and dogs definitely smell better.

The young boy recognizes that there are differences between humans and wolves, in some cases wolves have an advantage over humans (“animals are really good at smelling. We’re not that good at smelling”) and in some cases the human capacity exceeds the nonhuman capacity (“we have a more complicated language”). The differences are based on similarities, where both animals communicate, have “smartness”, or can smell.

Transmorphic justifications also emerge in justice-oriented biocentrism. One 10-year-old male stated: “Cause animals are creatures just like we are and they have the same rights as we do. HOW COME? Well, not necessarily the same rights, um, to vote, but they have the same rights to live on planet earth.” Here the concern for equity of rights emerges. They may not be the same rights in all cases, but for both humans and animals, they possess the right to live.

A 10-year-old girl captures this idea when she grants that a wolf has the right to be wild:

Yes. Well it depends what wild means, if wild means, you know, crazy, well then they don’t really have that right. But you know if it’s to be wild and what they normally do, then I think they do, cause what I normally do is maybe sit down in the summer read a book outside and I have my right to be to draw or my mom has her right to go and if she wants to go and start up her own business, she has her right to do that, and that would mean that the wolves would have their right to go and do the things that they do.

Where humans have rights to do certain things (e.g., draw or own a business), wolves too have rights to do the things that wolves do, such as “to be wild.”

### **Parent’s Report of Child’s Environmental Knowledge and Experience**

**Knowledge of and interest in animals.** On a five-point scale (1 being no knowledge/interest and 5 being really knowledgeable/interested), parents reported their child’s interest in animals ( $N = 49$ ,  $X = 4.36$ ,  $SD = .68$ ,  $range = 3-5$ ), their child’s knowledge about

animals ( $N = 48$ ,  $X = 3.42$ ,  $SD = .61$ ,  $range = 2-5$ ), their child's interest in learning about endangered animals ( $N = 49$ ,  $X = 3.60$ ,  $SD = .76$ ,  $range = 2-5$ ), their child's interest in doing things to help endangered animals ( $N = 49$ ,  $X = 3.48$ ,  $SD = .89$ ,  $range = 2-5$ ), and their child's knowledge about endangered animals ( $N = 49$ ,  $X = 2.80$ ,  $SD = .68$ ,  $range = 1-4$ ). Many parents reported that they had spoken with their child about endangered animals (67%), and that their child had learned about endangered animals at a museum (75%), at school (85%), in books or magazines (77%), on television or in movies (71%), and on computers or the internet (40%).

**Experience of and interactions in nature.** Parents reported that most children (73%) had a pet in their household ( $N=48$ ,  $X = 2.56$ ,  $SD = 3.48$ ,  $range = 0-14$ ). Pets included fish, dogs, cats, hamster, gerbil, and "sometimes bugs." Parents reported that their children spent time outside on a school day ( $N=49$ ,  $X = 1.79$  hours,  $SD = .62$ ,  $range = 1-3$ ) and on weekends/holidays ( $N=49$ ,  $X = 3.71$  hours,  $SD = 2.0$ ,  $range = 1-10$ ). Table 5 presents parents' report of participants' experience of a list of activities in nature, including whether their child has engaged in the activity, the average age of the first time experiencing that activity, and the frequency that the child engages in that particular activity. Nonparametric tests were run to determine age and gender differences for whether the children engaged in certain activities. No age or gender differences were found on this measure. T-tests were used to determine if gender or age differences exist in amount of time spent outside on the weekend or on a school day. No gender or age differences were found.

The Pearson product-moment correlation coefficient statistic was used to determine whether a relationship exists between the degree of biocentric moral reasoning used and extent to which children interacted with the natural environment, as indicated by parent's extent of endorsement of the list of 21 nature activities. First, a composite score was created for the total

number of activities parent's reported their children having experienced. For each activity provided to the parent, an affirmative response received a score of 1, a negative response received a score of 0, and then the Composite Interaction Score was found across the 21 activities for each child. Across the 21 activities presented in Table 5, the mean Composite Interaction Score was 15.22 activities ( $N = 49$ ,  $SD = 3.75$ ,  $range = 4 - 19$ ). Then, the average frequency score across the 21 activities was found for each participant ( $N = 49$ ,  $X = 2.74$ ,  $SD = .51$ ,  $range = 1.50 - 3.81$ ).

Then, three composite scores were created to determine the degree of each child's 1) intrinsic value orientation, 2) justice orientation, and 3) overall biocentric reasoning. These were the same composite scores as described above in the subsection "Degree of biocentrism." Here, in accord with the analyses described below, the group means are presented across ages. Again, the intrinsic value orientation composite score reflected the degree to which children engaged in intrinsic value reasoning across the ten questions ( $N = 49$ ,  $X = 3.99$ ,  $SD = 2.82$ ,  $range = 0-10$ ). Again, the justice orientation composite score reflected the degree to which children engaged in justice reasoning across the ten questions ( $N = 49$ ,  $X = 2.29$ ,  $SD = 2.23$ ,  $range = 0-7$ ). The total biocentric reasoning composite score reflected the degree to which children engaged in intrinsic value and justice reasoning across the ten questions ( $N = 49$ ,  $X = 6.27$ ,  $SD = 3.44$ ,  $range = 0-12$ ).

The composite interaction and the average frequency scores were then compared to the three composite reasoning scores using the Pearson product-moment correlation coefficient statistic. No significant correlations were found between the composite interaction score and 1) the intrinsic value composite score,  $r = .22$ ,  $N = 49$ ,  $p = .12$ , 2) the justice orientation composite score,  $r = .08$ ,  $N = 49$ ,  $p = .58$ , or 3) the total biocentric composite score,  $r = .24$ ,  $N = 49$ ,  $p = .10$ . No significant correlations were found between the average frequency score and 1) the intrinsic

value composite score,  $r = -.13$ ,  $N = 46$ ,  $p = .40$ , 2) the justice orientation composite score,  $r = -.01$ ,  $N = 46$ ,  $p = .94$ , or 3) the total biocentric composite score,  $r = -.11$ ,  $N = 46$ ,  $p = .47$ . Finally, while not significant, an interesting weak positive correlation was observed between the composite interaction score and the reported income,  $r = .27$ ,  $p = .06$ .

**Table 5: Parent’s Report of Children’s Engagement in a List of Nature Activities**

	Child has engaged in activity:			Average age of first experience.	Parent’s report of the frequency at which the child engages in the particular activity.				
	Yes	No	Not known		1 = Never		5 = Frequently		
					1	2	3	4	5
Grow a plant. <i>N</i> =49	98%	2%	--	6.61	4%	35%	25%	20%	12%
Plant a tree. <i>N</i> =48	44%	52%	4%	4.55	39%	33%	8%	2%	--
Pick fruit. <i>N</i> =48	98%	2%	--	2.95	2%	21%	37%	17%	13%
Raise livestock. <i>N</i> =48	2%	98%	--	7	67%	--	--	--	2%
Climb a tree. <i>N</i> =48	92%	8%	--	4.45	6%	18%	27%	29%	10%
Hike in the forest or woods. <i>N</i> =49	98%	2%	--	2.69	2%	23%	33%	23%	14%
Walk in the park. <i>N</i> =49	100%	--	--	1.85	--	2%	23%	31%	39%
Fish. <i>N</i> =45	67%	33%	--	4.48	21%	39%	19%	4%	2%
Encounter a wild animal outdoors. <i>N</i> =43	86%	14%	--	2.83	8%	27%	35%	10%	6%
Visit the zoo.	98%	2%	--	1.93	2%	33%	33%	17%	6%

<i>N</i> =45									
Build a fire outdoors. <i>N</i> =43	<b>86%</b>	<b>12%</b>	<b>2%</b>	<b>4.52</b>	<b>10%</b>	<b>37%</b>	<b>29%</b>	<b>10%</b>	<b>4%</b>
Camp in the forest or woods. <i>N</i> =42	<b>81%</b>	<b>19%</b>	--	<b>3.46</b>	<b>14%</b>	<b>35%</b>	<b>21%</b>	<b>17%</b>	<b>2%</b>
Swim in a lake or river. <i>N</i> =44	<b>93%</b>	<b>7%</b>	--	<b>2.85</b>	<b>2%</b>	<b>25%</b>	<b>33%</b>	<b>21%</b>	<b>8%</b>
Swim in ocean. <i>N</i> =44	<b>80%</b>	<b>11%</b>	--	<b>3.73</b>	<b>8%</b>	<b>54%</b>	<b>17%</b>	<b>10%</b>	--
Explore rock /tidal pools at the beach. <i>N</i> =45	<b>100%</b>	--	--	<b>3.27</b>	<b>2%</b>	<b>33%</b>	<b>42%</b>	<b>10%</b>	<b>8%</b>
Feed wild animals. <i>N</i> =41	<b>37%</b>	<b>59%</b>	<b>4%</b>	<b>3.5</b>	<b>29%</b>	<b>21%</b>	<b>8%</b>	<b>6%</b>	--
Bird watch. <i>N</i> =44	<b>59%</b>	<b>39%</b>	<b>2%</b>	<b>3.53</b>	<b>19%</b>	<b>23%</b>	<b>14%</b>	<b>12%</b>	<b>6%</b>
Collect things in nature (e. g. , seashells, rocks) <i>N</i> =45	<b>100%</b>	--	--	<b>2.64</b>	<b>2%</b>	<b>10%</b>	<b>19%</b>	<b>31%</b>	<b>29%</b>
Look for insects. <i>N</i> =44	<b>84%</b>	<b>16%</b>		<b>2.37</b>	<b>6%</b>	<b>17%</b>	<b>27%</b>	<b>19%</b>	<b>14%</b>
Visit a farm. <i>N</i> =43	<b>95%</b>	<b>5%</b>	--	<b>3.33</b>	--	<b>60%</b>	<b>23%</b>	<b>8%</b>	--
Be alone in a nature. <i>N</i> =41	<b>41%</b>	<b>54%</b>	<b>5%</b>	<b>5.5</b>	<b>33%</b>	<b>17%</b>	<b>6%</b>	<b>8%</b>	<b>4%</b>

## Discussion

All three hypotheses were supported. As hypothesized, 7- and 10-years-old children extended moral obligations to not harming the endangered gray wolf. Many (83%) judged the act

of killing the gray wolf to be wrong, even if a law allowed it, and even in a faraway country where another culture killed the gray wolf. A majority (60%) of participants reasoned that it was not alright across the three questions and based all three of their judgments on moral justifications. Furthermore, many participants (67%) reasoned that it was not alright and based at least one of their moral obligatory judgments on biocentric moral justifications. As hypothesized, children as young as seven-years-old endorsed biocentric reasoning in the form of intrinsic value concerns for the natural world. Ten-year-old (92%) children were just as likely to endorse intrinsic value reasoning as the seven-year-olds (77%), yet they expressed intrinsic value reasoning to a greater degree than the younger participants. As hypothesized, there were developmental differences in justice-oriented biocentric moral reasoning between 7- and 10-year-old children. Ten-year-olds (85%) were more likely than seven-year-olds (46%) to endorse justice-oriented biocentric reasoning and they endorsed this justice reasoning to a greater degree than the seven-year-olds. Still, as just noted, a substantial number (46%) of 7-year-olds endorsed biocentric justice-oriented reasoning.

This section will comprise a discussion of the interpretations, limitations, future directions, and the broader implications of this research.

### **Moral Obligations to an Endangered Animal**

In the current study the majority (83%) of children reasoned that it was not alright to kill the gray wolf, even if the law allows it, even in a faraway country and many (60%) based all of their judgments on moral justifications. This research extends our knowledge of children's moral obligations to the natural world to a new environmental domain: endangered species. More importantly, the study highlights children's ability to justify their evaluations with biocentric reasoning. Most of the participants (67%) justified least one of their moral evaluations with

justifications grounded in biocentric concerns. Previous research has found that children support their moral obligatory concerns with anthropocentric reasoning (see Clayton & Myers, 2009; Kahn, 1999; Kahn, Severson, & Ruckert, 2009 for reviews). That is, when children judged it wrong to harm the natural entity (e.g., a waterway), even when a law permits it, even in the face of cultural practices that legitimize it, they supported these judgments with reasoning regarding the welfare and rights of humans. The natural world has value insofar as it has value to humans. The current study shows that young children extended moral obligatory concerns to the endangered animal. When they did, many children would to some extent ground these concerns in a moral regard for the animal that was independent of the value it has for human welfare.

The differences in the contextual features of the scenarios of the previous research and the current study are important to consider when interpreting the difference in the findings on anthropocentric and biocentric reasoning brought to bear in moral obligatory judgments. Children brought to bear concerns for the welfare and rights of the endangered gray wolf in their moral obligatory judgments against humans killing the wolf. Past research found that human welfare concerns ground children's moral obligatory judgments against humans polluting waterways. The critical differences in these scenarios are the harmful act and the recipient of the harm. Water is an essential life force for human welfare. Asking about polluting water may prime the children to consider human needs. The ultimate threat to an endangered animal is the act of killing it. This further threatens the species that is already at risk. Most children in the current study understood that an animal that is endangered is one that has relatively few individuals of that species remaining in the world. During the interview, children were told that the gray wolves are endangered. While some children considered anthropocentric concerns (e.g., "I love animals") when justifying their judgment that killing the wolf is wrong, many offered

biocentric concerns in the context of killing the animal. The features of this concern will be discussed further in the subsequent subsection on the prevalence of biocentrism.

### **Prevalence of Children's Biocentric Reasoning**

The current study extends our knowledge for children's biocentric concerns for the natural world. The current study found that biocentric reasoning was the prevailing moral justification children (85%) used in their concerns for the endangered animal, most commonly in the form of biocentric intrinsic value reasoning (77% of 7-year-olds and 92% of 10-year-olds) and less frequently in terms of justice-oriented biocentrism (46% of 7-year-olds and 85% of 10-year-olds). Previous research on environmental moral reasoning found limited instances of biocentric reasoning (about 4% across ages) in scenarios where humans caused harm to the natural world (see Clayton & Myers, 2009; Kahn, 1999; Kahn, Severson, & Ruckert, 2009 for reviews). More recent research (Severson & Kahn, 2010) found biocentric reasoning in children as young as seven for scenarios where aliens, not humans, caused harm to the natural world. The current study extends this body of research to show that children as young as seven-years-old engaged in biocentric reasoning for scenarios where humans cause harm to the natural world.

The findings on the high prevalence of biocentrism, particularly in terms of intrinsic value reasoning, offer insight into the salient features of animals that garner moral regard. It appears that three key features are brought to bear in children's moral reasoning about animals: 1) the sentience of the animal, 2) the biological needs of the animal, and 3) the wild status of the animal.

**The saliency of sentience.** The sentience of the animal is a key feature that children identified when reasoning with biocentric moral regard for the endangered gray wolf. In his

*Introduction to the Principles of Morals and Legislation*, 18th century philosophy, Jeremy  
Betham (1923) compared the treatment of animals to the issue of slavery, he stated:

The French have already discovered that the blackness of the skin is no reason why a human being should be abandoned without redress to the caprice of a tormentor... What else is it that should trace the insuperable line? Is it the faculty of reason, or, perhaps, the faculty of discourse? But a full-grown horse or dog is beyond comparison a more rational, as well as a more conversable animal, than an infant of a day, or a week, or even a month, old. But suppose the case were otherwise, what would it avail? The question is not *Can they reason?* nor, *Can they talk?* but, *Can they suffer?*

According to Betham, the sentiency of the nonhuman animal, its ability to feel pain, to suffer, entitles the animal to moral regard. Similarly, Singer (1990) granted moral regard, not on capacities for intelligence, but to the capacity to feel pleasure or pain. Regan (1986) argued that our moral duty to animals is to not harm them. He wrote: “The fundamental wrong is the system that allows us to view animals as our resources...(p. 32)” and went on to say: “Inherent value, then, belongs equally to those who are the experiencing subjects of a life” (p. 38). Regan granted moral regard to entities that are “subject-of-a-life,” that is, animals that can experience levels of sentiency (e.g., sense perceptions, motives, desires).

The concern for physical welfare and the normative judgment of moral wrongs of physical harm is a primary developmental achievement in the construction of moral concepts (see Smetana, 2006 for a review). To investigate preschool children’s moral judgments of physical harm in the context of unusual or “noncanonical” moral events, Zelazo, Helwig, and Lau (1996) included a scenario where an animal felt good when it was hit and bad when it was pet. Children as young as three-years-old judged it wrong to inflict harm on animals, even in the unusual context where petting produced pain.

Animals are perceived as subjective beings who display the hallmarks of experiencing subjects (Melson, 2001; Myers, 2007; Myers & Saunders, 2002). The child softly pets their

puppy and the puppy nestles deeper in the child's arms, but when the child pulls the animal's tail, the animal runs away. The child runs towards the flock of pigeons and the birds take flight. The child probes the insect and it curls into a tightly wound ball. The child learns of the animal as a subjective experiencing other with needs and experiences not so similar, but perhaps also not so different, than their own.

Often children in the current study based their concerns for the animal's sentience on their understanding of the human capacity to feel pain. The children likened the animal's experiences to human experiences of feeling pain, physical ("you wouldn't want people coming around and killing you"), as well as even psychological ("telling someone they can't live in their house anymore...not very nice."). Recall the isomorphic reasoning regarding the 10-year-old male's justification for why it is wrong to kill the gray wolf: "they are living things too like us, ... they can think too and they know when they are being hurt" or the 10-year-old female who stated that it would matter if an animal became extinct: "because those animals, they have feelings and they are like us, and they have feelings..." The children were taking the perspective of the animal's experience as a subjective being with the capacity to feel pleasure and pain in ways similar to their own experiences.

**Nonhuman animal needs.** Children as young as three years of age understand that animals are living things (Huang & Lee, 1945) and will attribute biological characteristics, including breathing, growing, reproducing (Backscheider, Shatz, & Gelman, 1993; Greif, Nelson, Keil, & Gutierrez, 2006) and having emotions (Gelman & Spelke, 1981). As early as four years of age, children can distinguish living animals (which they know can eat, breathe, and have babies) from mechanical animals (which they know to not have these properties) (Carey, 1985). Five-year-olds know that living entities (e.g., squirrel, pine tree, tulip) need to intake

food and water to survive (Inagaki & Hatano, 1996). Along these lines, children in the current study expressed awareness of and concern for animals' biological needs.

The animals' living status, their biological needs, including perceived desires or wants, present salient features of the nonhuman animal that were brought to bear in children's biocentric moral reasoning. Children were taking the perspective of the animal, in terms of recognizing its needs ("it's a living thing. And sort of needs to be wild and free to live.") and desires ("it doesn't want to be locked up" and "they should be able to eat when they want, hunt when they want....."). Considering the perspective of another is a developmental achievement that is critical in moral development (Piaget, 1932; Kohlberg, 1969). Kohlberg (1969) argued that role-taking, or the consideration of the other as having subjective needs and experiences like the self, is key in the construction of moral consideration for the other. Kohlberg wrote:

...social cognition always involves role-taking, i.e., awareness that the other is in some way like the self, and that the other knows or is responsive to the self in a system of complementary expectations. Accordingly developmental changes in the social self reflect parallel changes in conceptions of the social world (p. 349).

Kohlberg suggested that role taking opportunities offer the awareness of other's perspectives. Through considering the other's perspective the child can understand the other as having interests similar, as well as perhaps different, than their own.

Children in the current study considered the animal's perspective as having similarities and differences to their own. As discussed in the Results section, transmorphisms are means of considering the perspective of an animal that is simultaneously similar, and dissimilar from oneself. Recall the 10-year-old female's justification for why it is wrong to kill the gray wolf. The young girl recognized that the wolves have needs to fulfill ("they do have things to do in their life") that may be different from human needs ("they may not make checklists") but are

legitimate and deserve consideration. This is akin to the 10-year-old male's transmorphic justification wherein the child considered the experience of the wolf, its capacities for communication and intelligence ("they are smart in communication, they like use howls..") and drew on his own capacities for communication and intelligence ("...but we like use words. And we have a more complicated language"). He found both similar and dissimilar features and then subsequently ground his moral regard for the nonhuman animal in the complementary nature of similarities and meaningful inequalities between humans and nonhuman animals. The current study highlights that nonhuman animal needs, both similar and dissimilar from human needs, present a salient feature that children consider when grounding their biocentric regard for the endangered wolf.

**Warranted by wildness.** Wildness is a salient feature brought to bear in children's biocentric reasoning. Past research provided initial evidence that wild animals garner high rates of biocentric moral reasoning (Kahn, 1997; Kahn & Lourenço, 2002; Kahn et al., 2008). Consistent with previous research, the interview items in the current study that asked directly about the animal's wild status garnered the highest rates of biocentric reasoning across the 10 justification questions.

Some children ground their conceptions of biocentrism in terms of a teleological account of flourishing, wherein a wild animal is meant to be wild. Teleology, or telos, is an Aristotelian proposition that entities, both living and nonliving, have endpoints, designs, or purposes. Moral reasoning that entails teleological reasoning is characterized by the appeal to the design or purpose in natural objects, processes, or occurrences, including (a) appeals based on a sense of metaphysics, balance, completeness, aesthetics, or religion, and (b) appeals to the original state of nature (an "is") to justify its continuation (an "ought") (Kahn, 1999).

The use of teleological reasoning regarding wildness presented a qualitative shift in the development of biocentric intrinsic value reasoning. Ten-year-old children in the current study endorsed a teleological account of wildness in order to ground their conceptions of the intrinsic value of the wild gray wolf. Recall the 10-year-old's teleological reasoning: "because, that's where they're supposed to be wild things, I guess, and I think they should be able to live there," "because they're wild animals and that's like in their blood," and "because they are wild animals and not like domesticated." The young child recognized that wild animals, by the very definition of the term wild, are creatures that have not been tamed by humans. Wild animals retain their instinctual ways and as such have specific capabilities and needs defined by wildness. Their autonomy centers in their capacity to live free lives. For a wild animal to be wild it must retain this autonomy. It must be free from the confined grip of captivity.

The concept of freeness can ground the concept of wildness (c.f., Rolston, 1989 for a discussion). When Thoreau wrote: "In wildness is the preservation of the world," he referred to a quality, an inherent state of being, that which is produced in nature, that which is untamed. Another prominent philosopher, Rolston (1986), defined wildness as deeply akin to the idea of freedom: "We love the natural mixture of consistency and freedom; there is something about the word wild that goes well with the word free, whether it is the determined freedom of the wild river or the more spontaneous freedom of the hawk in the sky" (p. 45). Similarly, a 10-year-old girl recognized the teleology of the wild wolves who "shouldn't be fenced off, because this is nature, and this is what nature does."

The seven-year-old participants may not be able to grasp the concept of teleology in the context of wildness, however, by seven years of age they have the capacity for teleological reasoning. Several studies on folkbiological reasoning (where people are asked to classify

biological and nonbiological natural entities) observed teleological reasoning in children younger than seven years of age (Inagaki & Hatano, 2002; Kelemen, 1999; Keil, 1994). The young child appears to have the capacity to utilize teleological reasoning when classifying a wild animal within the ontological category of “living thing” but it may be that this reasoning is not salient or is too challenging in the context of moral concepts or the concept of wildness. Perhaps the conception of freedom inherent in wildness challenged the seven-year-old capacities to engage teleological reasoning as a feature of moral regard. The young participants were able to endorse that wolves should be allowed to be wild and free and that they be granted the right to be wild and free and justify these concerns based on the intrinsic value of life, and not of the moral constructs of autonomy or freedom. A challenge for the 7-year-olds, and not some 10-year-olds, appears to lie in the ability to justify welfare or rights of the animal in the context of a teleological account of wildness.

### **Emergence of Justice-Oriented Biocentrism**

Ten-year-old children (85%) were more likely to engage in biocentric justice reasoning than seven-year-old children (46%) and to use this form of reason to a greater degree than those seven-year-old children who did use justice reasoning. The developmental shift replicated the pattern seen in Severson and Kahn (2010) and extends the finding to an account of reasoning for scenarios where humans, not aliens, cause harm to the natural world. Interestingly, a minority (20%) of the seven-year-olds in Severson & Kahn (2010) endorsed justice biocentrism, whereas nearly half (46%) of the seven-year-olds in the current study endorsed justice biocentrism. By pulling human considerations from the scenario, the alien questions may have constrained the children’s use of justice-oriented biocentrism. In the current study, having humans remain in

context allows for rich isomorphisms and transmorphisms with the human species that children engaged in to ground their moral regard for animals.

With an endangered wild animal as the recipient of harm in the context of investigation, the current study offers further insight into the development of justice-oriented biocentrism in two key ways: 1) a qualitative account of the development of rights concepts as conceptualized through welfare concerns, and 2) a qualitative account of the development of justice concepts in the context of teleological concerns.

**Children's conceptions of animal rights.** Justice is an overarching concept that takes into account rights concepts. Within the conception of justice there is a concern for basic fair equal treatment (Rawls, 2001), our basic moral feelings of right or wrong (Mills, 1971), the realm of equalities and the allowance of inequalities in people's choices, their decisions and actions (Dworkin, 1981), the distribution of goods (Nozick, 1973), the recognition of equal worth and difference in identity formation and expression (Taylor, 1994), and access to a dignified existence (Nussbaum, 2006), for example. These arguments for justice in varied ways employ the concept of rights, but are not defined in justice as rights. Rights conceptions are a part of justice conceptions. For example, inhibiting a right is an injustice. Justice as fairness addresses concerns for who is given what rights and how. Rawls (2001) wrote: "The concept of justice I take to be defined, then, by the role of its principles in assigning rights and duties and in defining the appropriate division of social advantages" (p. 51). Rights as entitlements ground the conception of rights within the definition of justice. Mills (1971) wrote: "Justice implies something which it is not only right to do, and wrong not to do, but which some individual person can claim from us as his moral right" (p.49). Nussbaum (2006) wrote: "The sphere of justice is the sphere of basic entitlement" (p. 302). Rights are ethical, social, or legal principles

of entitlements and freedoms. There are human rights, children's rights, indigenous rights, animal rights, natural rights, legal rights, civil rights, or political rights, to name a few. In research on environmental moral reasoning, justice concerns involved appeals that the natural world has rights, as well as appeals to unjustified harm, appeals that the natural world deserves respect or fair treatment, and merits freedom (see Kahn, 1999 for a review). Conceptions of rights are a piece of the justice story and can shed light on shifts in children's justice reasoning and the quality of their reasoning around justice issues regarding the natural world.

Findings of the current study indicate that children ground some animal rights issues in the concept of animal welfare. When the children described what it means for an animal to have rights, many (65%) of the children described specific types of rights that are tied to welfare concerns (e.g., general right to welfare, or specific rights to eating, hunting, mating, playing, habitat, and autonomy). When children endorsed that animals had rights, and they often did (94% said animals in general, and wolves in particular, had rights), they often (86%) stated specific types of rights tied to welfare (including a general right to welfare, or specific rights to eating, hunting, habitat, or autonomy).

Often children endorsed intrinsic value biocentric reasoning to support their judgment that animals in general (55%), and wolves in particular (51%), have rights in general, and that wolves have the right to not be killed (48%) and to be wild and free (62%). Their concerns were often tied to the intrinsic value of biological life (e.g., "because they are living things, and all living things should have rights"). At times children ground their justifications for endorsing animal rights on the value of life and specifically, what a life form needs or wants (e.g., "Because they're living things and all living things should have rights. WHY? Because they should be able to eat when they want, hunt when they want, and stuff like that."). The saliency

of the animal's needs, which support animal welfare, ground the biocentric reasoning regarding animal rights.

To some extent children endorsed justice-oriented biocentric reasoning to support their judgment that animals (31%), including wolves (27%), have rights in general, and that wolves have the right to not be killed (33%) and to be wild and free (27%). As evident in the Results section, the seven-year-old boy who stated that gray wolves have the right to not be killed “Cause every animal deserves to be on the world. HOW COME? Because they're cool, they, they have a life...” The child engages in a right to life claim. The child says the animal “deserves” its life. Children's justice reasoning at times followed the Respect for Life Principle (Warren, 1997) wherein living things are goal directed and can be harmed if their goals are thwarted (e.g., “Because... they're living. And they don't want to be locked up. WHAT DO THE GRAY WOLVES WANT? Not to be locked up, and to be free.”). As evident in the Results, the justice concerns that are directly and explicitly contextualized by welfare (e.g., “it's just kinda cruel to keep animals like locked up in zoos and cages and stuff, and it's kind of like the saying, if you love something you gotta set it free.”). There was also the less common justice concerns contextualized by unjustified harm. As evident in the Results, the children who argue against any harm to the wolf that is disproportional to the act of the wolf (the wolves “weren't doing anything.” they were “living a peaceful life” and not causing any harm that warrant retribution). The welfare of the animal is a salient feature in grounding the children's conception of rights, as well as, their broader conceptions of justice.

Studies have highlighted a general shift from a focus on welfare concerns in the young child and an emphasis of justice concerns that are conceptualized with welfare in older children (Kahn, 1992; Davidson, Turiel, & Black, 1983). In the current study, the rights questions appear

to tap into children's environmental moral reasoning to show a similar pattern. Another question from the current study, regarding the protection of the gray wolf, highlights this shift, wherein the 7-year-olds were more likely to endorse caretaking for the wolf and the 10-year-olds were more likely to endorse the creation of a law. Kahn (1992) suggested that conceptions of justice are hierarchically integrated or "incorporated" with concepts of welfare and that they "draw upon each other ontogenetically." In order to reach justice one needs to stand on the building blocks of welfare. It may be that when it comes to understanding concepts of justice extended to the nonhuman animal, children need to first conceptualize issues of welfare and then be able to extend their welfare concerns to contextualize their justice concerns for the animal.

Research on children's conceptions of children's rights indicated two overarching forms of rights: nurturance rights and self-determination rights (Ruck et al., 1998). Nurturance rights are a concern for welfare, including the right to welfare, care, and protection. Self-determination rights include rights to autonomy and control over one's own life. Children tend to focus on nurturance rights and then shift to considerations for self-determination rights in young adolescence. There are important variations within these concerns that highlight the contextual differences that probe for expression of rights concepts throughout development. For example, the concern for self-determination and autonomy can be expressed prior to adolescence when asked about issues of privacy and personal choice, such as keeping a diary. It appears both welfare concerns and personal concerns can structure early conceptions of rights.

Helwig (1995, 1998) found that by six years of age children are concerned with freedoms (e.g., freedom of speech and religion) but that these concerns are justified with appeals to personal choice and expression until around eight years of age when the concerns are justified with broader cultural, societal implications of rights such as fostering communication towards

correcting social injustices. Personal concerns provide the experiential basis from which to construct moral concepts of rights (Nucci, 2001). Nucci (2001) wrote: “The function of such personal concepts is to provide the basic information (i.e., the psychological necessity of the personal sphere) needed to extend the moral conceptions of justice and beneficence to include a moral conception of rights” (p. 73). Experiences in the personal domain inform children’s development of rights concepts in the moral domain.

Some children express their conception of human rights to ground and extend their conception of animal rights, a form of isomorphic justice reasoning (e.g., “They like to be free like us.” and “We’re a free country and animals should be free too.”) These children generalize their concerns for freedom to the proverbial *we* – freedoms are extended to all people (“free like us” or “we’re free”). The same freedoms extend to animals. These children have a developed concept of human rights of freedom and equality and include nonhuman animals in this discourse.

**Justice contextualized by telos.** Justice contextualized by telos is a type of justice biocentrism that involves appeals to establish fundamental linkages between justice and telos, including the right to a flourishing life and the right to fulfilling a design or purpose. The young participants of the current study endorsed justice-oriented reasoning that is in line with prominent moral philosopher Martha Nussbaum’s Capabilities Approach. Nussbaum (2007) wrote:

The general aim of the capabilities approach in charting political principles to shape the human-animal relationship would be, following the intuitive ideas of the theory, that no animal should be cut off from the chance at a flourishing life and that all animals should enjoy certain positive opportunities to flourish. (p. 307)

Nussbaum's Capabilities Approach is based on the Aristotelian idea of flourishing. This idea holds that a given life form possesses certain capabilities that it has a need to exercise and suggests that limiting the ability for a creature to exercise these capabilities is an injustice. For Nussbaum, dignity is based on natural powers, that is, the very functions of life and autonomy lies in the pursuit of flourishing. She wrote: "I believe that thinking of animals as active beings who have a good and who are entitled to pursue it naturally leads us to see important damages done to them as unjust" (p. 302). She argued that animals are subjects who have entitlements to flourishing.

The use of justice contextualized by telos reasoning presents a qualitative shift in the development of biocentric reasoning between 7- and 10-year-olds. Only one 7-year-old endorsed this form of reasoning, whereas 31% of the 10-year-olds endorse this reasoning at least once during the interview. For example, one 10-year-old female stated that it mattered to her if an animal became endangered "because they're just like us, and they have a purpose too....They have lives too and they deserve to live." Here the concern for the animal's purpose in life warrants why it ought to maintain its life. Along similar lines, the one seven-year-old who endorsed this form of reasoning stated that the gray wolves have the right to be wild: "Cause they're a type of animal who deserve to be wild. WHY DO THEY DESERVE TO BE WILD? Cause they've always been wild...wild their whole life..." This was at the very boundary of endorsing the complex form of justice contextualized by telos biocentrism. The young child, in limited words, captured the idea that wolves are inherently wild and thus should be granted the right to fulfill that. The 10-year-olds who endorsed justice-oriented telos reasoning that is contextualized by justice concerns achieved a far greater complexity and nuance than this 7-year-old girl. Recall the 10-year-old from the Results section who referred to the wolves' "natural

rights.” The young child reasoned that wolves have rights based on “how the world works”. The child reasoned the “the way of the world for wolves is also to do what they do.” The child reasoned that the wolves have “natural rights” such as the right to mate and to eat in order to maintain the rhythms of the species, its reproduction and viable populations, and for balance with greater systems, namely the food chain. The concern for specific needs and behaviors is contextualized by an account of fulfillment at a species level and in terms of the species in relation to the wider ecosystem. The wolves’ rights are not like the human right to vote, but specific to the wolf and its capacity to achieve its biological design and placement in the wider system. The wolves have a right to be a wolf. This form of reasoning is a central feature of Nussbaum’s Capabilities Approach.

Nussbaum ground the Capabilities Approach in differences in needs and abilities across species. Nussbaum wrote: “The basic moral intuition behind the approach concerns the dignity of a form of life that possesses both deep needs and abilities; its basic goal is to address the need for a rich plurality of life activities” (p. 305). The extent to which our duties for justice extend to the world’s biodiversity depends on the given animal’s capabilities. The more capabilities an animal has, the more complex it is viewed to be. More complex life has more capabilities to be inhibited and can therefore suffer more harm. Hence, our duty increases as their complexity increases. This account of morality extended to animals harkens back to Aristotle’s early conceptions of animal rights, wherein animals are accorded less rights than humans, yet are accorded more rights than plants, based on their differential capacities for sentiency and rationality (see Regan & Singer, 1989 for an interpretation of Aristotle’s original text). While Nussbaum did not tie degrees of sentiency to justice, as Aristotle did, she did take into account the complexity of the given species in determining the potential for injustices. For Nussbaum, an

animal's capabilities define what it means to flourish as that animal. Injustices incurred by humans are inherently different than injustices incurred by wolves. A human has the right to be a human and fulfill the capacities that make us human. A wolf has the right to be a wolf and fulfill the capacities that make a wolf a wolf. Recall the 10-year-old who stated that just as she has the right to draw, or her mom has the right to own a business, the wolf has a right to be a wolf and do what wolves normally do. This form of biocentric reasoning integrates conceptions of welfare, based on needs and propensities, with the concept of autonomy, into a nuanced and complex conception of justice extended to the nonhuman animal.

Studies have revealed a developmental shift from concerns for direct equality around 8 years of age towards equity concerns around 10 years of age (Damon, 1977; Nucci, 2001). In some cases the transmorphisms and isomorphisms in this study map onto such a developmental account of justice. Recall the seven-year-old who stated that "humans are animals...all animals should be treated equal..." This reasoning highlights a form of equity between human and animals wherein each party receives the same (equal) treatment. This is in contrast to the children who employ transmorphic reasoning to ground their justice-oriented concerns ("not necessarily the same rights, um, to vote, but they have the same rights to live on planet earth."). This reasoning is similar to the young 10-year-old girl quoted above regarding "the way of the world for wolves..." in that the children recognized the similarities and differences between humans and animals and grant animals rights based on the concurrence of similarities and differences wherein rights are accorded to the extent that those are the rights that are needed. Rather than a concern that animals and humans have the same entitlements, the older children argue for both humans and animals getting what they need, their own entitlements. It appears that with increasing age children can take concerns for animal welfare, in terms of what the

animals can do and what they need, and can extend welfare concerns as a basis for justice concerns. We may be seeing emerging evidence for environmental moral reasoning, which maps onto Kahn's (1992) findings on human-human morality, for a developmental account of justice biocentrism that is built on welfare. Here the early welfare concerns, including concerns for needs and capabilities of the other, are integrated into justice concerns through a teleological account akin to the Capabilities Approach. Isomorphism and transmorphisms act as the toolkit to building welfare and rebuilding it to incorporate justice in more advanced reasoning.

### **Limitations**

**Representativeness of the sample.** The small sample size and the homogeneity in the demographics of the sample for this study limits the representativeness of the sample and the confidence in generalizing the findings to the larger population. In general, larger sample sizes should lead to increased precision in making inferences about a population from a sample. The sample in the current study included only 13 females or males within a given age group. This limits the power to detect any gender differences that may exist or be revealed. The demographics of the sample limit the confidence of generalizing these results to the larger population. Participants in the current study are predominantly Caucasian, middle to upper-middle class (with over 50% with a parental income of \$100,000 or more), most of whom come from two parent households, and are from the Seattle, Washington area, a region with a distinctive ethos around the natural world. Furthermore, there were five pairs of siblings, which add to the homogeneity of the sample.

**Gender differences?** Findings on gender differences are a contentious topic. Psychology as a field is being critiqued regarding claims of gender differences (e.g., mathematical or spatial abilities, influences of hormones on emotions, moral reasoning) that are thought by some to be

built on biased and/or false assumptions and inaccurate research (Caplan & Caplan, 2009; Vidal, 2012). In moral psychology, the debate has been ongoing for decades. Do gender differences exist in moral reasoning? On gender differences in moral reasoning, Gilligan (1982) wrote:

...just as the conventions that shape women's moral judgments differ from those that apply to men, so also women's definition of the moral domain diverges from that derived from studies of men. Women's construction of the moral problem as a problem of care and responsibility in relationships rather than as one of rights and rules ties the development of their moral thinking to changes in their understanding of responsibility and relationships, just as the conceptions of morality as justice ties development to the logic of equality and reciprocity. Thus the logic underlying an ethic of care is a psychological logic of relationships, which contrasts with the formal logic of fairness that informs the justice approach" (p. 73).

Gilligan suggested that women are more concerned with issues of welfare while men are more concerned with issues of fairness. Gilligan suggested important insights for moral psychology, particularly in terms of highlighting the need for considering gender stereotypes and social influences as contextualizing features of moral reasoning, as well as the need to research underrepresented groups. Yet, Gilligan's (1982) findings on gender differences are largely unsupported by more recent research on moral development. The general pattern of findings on moral development indicates that boys and girls as young as three and across cultures are concerned with issues of welfare (see Smetana, 2006 for a review). Justice concerns build from welfare conceptions in both boys and girls (Kahn, 1992; Davidson, Turiel, & Black, 1983). Researchers find that women (and men) from traditional, hierarchically organized societies assert the legitimacy of individual rights (Turiel & Wainryb, 1998), girls (and boys) as young as six support civil liberties in the US (Helwig, 1995, 1998) and in mainland China (Helwig, Arnold, Tan, & Boyd, 2007), and that concepts of rights, personal autonomy, and justice concerns develop in early adolescence for both boys and girls (Helwig, 2006; Nucci, 2001; Ruck

Abramovitch & Keating, 1998). The general pattern of findings suggest that across gender there exists substantial similarities in children's developing moral cognition.

To date, the research on children's environmental moral reasoning has not found gender differences (Kahn, 1999; Kahn et al., 2008; Kahn & Lourenço, 2010; Severson & Kahn, 2010). The current study also found null results for gender differences in moral reasoning. In the current study we see both boys (89%) and girls (92%) concerned with animal rights, with most of the children endorsing that animals have rights. We see both boys (81%) and girls (89%) employ intrinsic value biocentrism to support their moral concerns and that both boys (62%) and girls (69%) employ justice-oriented moral reasoning. Yet the current study, as well as the previous research on children's environmental moral reasoning, all have very small samples of girls and boys and thus limited power to detect sex or gender differences.

Further research may reveal that the overarching patterns of similarities in moral reasoning encompasses nuanced differences in quality and expression within conceptual categories. Building on observational research of children aged 6-12 years, Myers and Saunders (2002) argued that both girls and boys express conceptions of care for animals. The difference lies in the quality of these care conceptions. Where boys expressed a care that involves being open to the animal's needs, girls expressed a care that involves putting the animal's needs above their own. Nevers and colleagues (1997) interviewed children, though never systematically analyzing the data, and anecdotally report that while both boys and girls endorsed the intrinsic value of animals, girls endorsed concerns for the welfare of life more than boys. In these anecdotal and observational findings we see an orientation of care emerging in both girls and boys but the quality of this care is expressed differently among boys and girls.

Gender differences has emerged in research on adult concern for the natural world. Across studies the general pattern suggested that women express higher levels of concern for the environment than men (Blocker & Eckberg, 1997; Gutteling & Wiegman, 1993; Jianguang, 1994). Compared to American men, American women expressed greater humanistic sentiments (i.e., strong affection and emotional attachment to animals) and moralistic sentiments (i.e., little support for practices that inflict harm on animals, such as hunting and trapping) (Kellert, 1996). Across these findings we can see potential gender stereotypes at play and as manifested in adults. Constrained by hegemonic masculinity, wherein systems of gender expectations constrain the range of acceptable emotions for men (Kimmel, Hearn, & Connell, 2005), men may be unable to verbalize or unwilling to recognize their sensitivities and emotional relationships to nonhuman animals. Future research might explore potential gender differences as they are articulated over maturation from childhood to adulthood, such as the expression of concern for the welfare of the wolves or expression of fear of the wolves.

Cultural differences in play with gender differences may take on nuance and complexity. Wainryb (1995) found that young girls growing up in traditionally hierarchically organized society expressed the same patterns of moral concerns as boys (e.g., moral obligations grounded in issues of welfare and justice), but verbalized justice concerns more often than the boys interviewed. Wainryb and Turiel (1994) suggested that women in subordinate positions within their culture may express greater concern with issues of fairness and justice regarding entitlements of those in dominant positions. Further research on gender difference in environmental moral reasoning may reveal overarching concerns for animal welfare and rights that change over development, but that take on nuanced differences in expression and form in the

context of different environmental issues, and in the intersectionality of gender identity and cultural and regional identity.

Caplan and Caplan (2009) presented two important assumptions to be aware of when investigating gender differences: 1) gender differences that are observed does mean that all males, or all females will exhibit the found difference, and 2) gender differences are not necessarily biological and social factors need to be considered. Drawing on these concerns, it will be important to consider how gender differences take on nuance in the intersection between cultural or regional differences. To understand the development of biocentric reasoning, we need to more fully understand all of the frameworks that might be working for or against a biocentric orientation. The intersection of gender with cultural or regional influences will shed light on this understanding. The agenda is not about seeking to uncover gender differences, but seeking to understand where gender differences might emerge within the context of why they might emerge. Gender differences in thinking about animals may reveal implications at a larger scale, such as how girls and boys are encouraged or discouraged to express caring or justice oriented concerns in general. By exploring gender and culture one might begin to find ways in which the expression of biocentric reasoning reflects larger cultural values or vices, e.g., issues of racism and classicism.

***Homogeneous sample.*** The current study had a homogeneous sample of mostly white middle-to upper middle class children. Being white and middle class is not the necessary criteria for biocentrism. In the current study there was no significant relationship between parental income and biocentric reasoning. Akin to the pattern found in the current study, a high prevalence of biocentric concern was observed in a sample of children of low income migrant farmworkers who were predominantly Hispanic American (Severson & Kahn, 2010). The young

children in inner-city Houston, who were predominately African American, reasoned morally about protecting waterways in very similar patterns to children in Lisbon, Portugal, and these patterns extended to the children growing up in a small village on the Amazon (Kahn, 1999). While these children drew largely on anthropocentrism, across these studies biocentrism was observed in the context of concern for wild animals. That is, the biocentric concerns can and do emerge in African American children, as well as children living on the Amazonian river and children living in the heart of the metropolitan Lisbon. The shifts in the prevalence of biocentrism appears to be a matter of changing the methodology (i.e., the context of the harm, or the recipient of the harm) rather than changing the culture.

It may be that the findings on biocentrism in regards to scenarios where humans cause harm to animals will largely extend to other groups, yet differences in the groups will lead to differences in the quality of biocentrism expressed. For example, indigenous children may endorse intrinsic value of ecosystems to a greater degree than the individual biological life concerns that was observed in the urban population sampled – a broader pattern of findings we see in folkbiological reasoning (Medin & Bang, 2014). It may be that concerns for endangered animals emerge in different ways across groups who have specific relationships with different endangered animals. For example, you may see that children of farmers in Eastern Washington will endorse biocentric concerns for endangered animals broadly speaking, but when asked about the gray wolf, a highly contentious endangered species in Eastern Washington, the children's moral concerns may look very different than the concerns expressed by children in Seattle. Future research should investigate varied groups of children, such as those with a varied race or class, access to experiences in the natural world and environmental education, cultural beliefs and values, connotations of the gray wolf in particular, or conservation more broadly. Again, the

intersection of culture and region may reveal nuanced differences in the expression of moral regard for endangered animals.

**Stimulus sampling.** Several concerns arise regarding threats to construct validity due to stimulus sampling issues. Two overarching stimuli concerns apply: 1) the particular endangered animal chosen as the representative endangered species and 2) the particular questions selected to represent a categorical assessment of environmental moral reasoning.

***The gray wolf.*** The unique characteristics of the gray wolf may pull for higher or lower rates of moral reasoning than that which may be endorsed for other endangered animals. For example, the wolf is a direct relative of the domestic dog and shares many of the features of the dog. The likeness to the domestic dog may have pulled for high moral regard for the gray wolf. It appears that the children were not making associations with the domestic dog that could bias their judgments of the wolf. The coding manual was equipped to account for any form of isomorphisms between dogs and wolves and very little were observed in the data. Furthermore, children were not spontaneously offering isomorphisms to verbally ground their judgments or their understanding.

It is also possible that the wolf constrained children's judgments of moral regard for an endangered animal. Melson (2013) suggested:

Wild animals with what might be termed "privileged status"--panda bears, dolphins, porpoises and whales--galvanize societal concern and protection in ways that equally endangered species, such as wolves and sharks, do not. Therefore, moral reasoning about wild animals appears to vary not only by the developmental level of the child, and the child's experiences with wild animals, but also by species and by cultural views of wild animals and their habitats.

Melson's argument, based largely on observational and hermeneutic data, suggested that wolves may not garner the high value that a dolphin, whale, or panda bear might garner. The panda bear was spontaneously mentioned as the favorite endangered animal by several seven-year-olds, though the question "what is your favorite animal" was never asked. Perhaps more charismatic animals, such as the panda, could garner higher moral regard than the gray wolf.

It is likely that microfauna, such as endangered insects or endangered reptiles, would not pull for as high rates of biocentrism as a charismatic macrofauna like the gray wolf. For example, adults, including marine biologists and the general public, view the Antarctic kill, an endangered animal that plays a pivotal role in the food chain, as background habitat for animals rather than an animal that garners interest or concern (Leane & Nicol, 2011). Interviews with children aged 6- and 10-years old revealed that moral concerns, including concerns for the intrinsic value, extended to vertebrate animals but not insects and spiders (Nevers, Gerbhard, & Billman-Mahecha, 1997).

The current study chose a single endangered species that is at the center of the conservation debate as an initial foray to assess environmental and moral conceptions of endangered species. Most of the children in the study know very little about the wolf, though having knowledge about the wolf did not relate to their biocentric reasoning. The children extend moral regard based on concerns for the sentiency, biological needs, and wildness of the wolf. To the extent that an endangered animal holds these qualities, we may see similar rates of biocentric reasoning endorsed for other creatures. Future studies could replicate the interview methodology of the current study with many other endangered species, yet with so many endangered animals becoming extinct each year, that would be an impractical number of replication studies. The comparisons across species may be more practical and interesting at

higher levels of animal kind, such as micro- or macrofauna, predators or prey. Larger categorical distinctions across animal kinds may reveal key salient features that garner biocentrism as well as the characteristics of a natural kind wherein biocentrism falls away.

***The interview methodology.*** For the most part, the interview questions were developed from the earlier interviews conducted on environmental moral reasoning (Kahn, 1999; Kahn, et al., 2008; Severson & Kahn, 2010). The structures of many of the questions follow the structure of earlier research questions, with the specific content of the current study incorporated. For example “does it matter to you if...” or “do you think the \_\_\_\_\_ has the right to not be killed?” were questions used in earlier studies, where the issues of endangered animals or the content of gray wolves were included in place of the previously researched content. The structure of the interview methodology follows so closely to that of previous research that the coding manual for the children’s justifications in the current study was largely identical to the coding manuals used in previous research. That said, the specific questions may constrain the construct validity of the current study. The following section will discuss several concerns with the specific questions used in the current study.

The representation of biocentric reasoning may be constrained by the language of several interview questions. The second-person personal pronoun in two of the questions may have pulled for higher rates of anthropocentrism in those questions. The two questions are “Does it matter to you if an animal becomes endangered?” and “Does it matter to you if an animal becomes extinct?” These two questions resulted in the highest rates of personal predilection anthropocentric responses across the ten justification responses (26% and 16%, respectively). When children were asked “does it matter *to you*...” they may be primed to respond within the context of personal reflection and personal concerns (e.g., it matters because “I care about

animals” or “I love animals”). Future research should ask these questions without the second-person personal pronoun.

The structure of the moral obligation questions followed 30 years of domain theory research on the moral domain as characterized by criterion judgments of prescriptivity, generalizability, and rule-contingency. Within this context, the harmful transgression is the act of killing. The focus on killing the animal is likely a salient feature that pulls for high rates of biocentrism. The current study first sought to uncover the capacity to engage in biocentric reasoning at an early age. To do so, the context of harm is simplified to a salient feature of killing, where intention and purpose is left unspecified and uncontextualized.

How would children respond if the animal was harmed in other contexts, such as where the animal is trapped? Or is hunted for food? For sport, or fun? Or for science? Will children endorse trapping wolves in order to gain scientific information, or endorse removing wolves from wild environments and relocating them so to reduce livestock predation? Will they endorse killing wolves that kill farmer’s livestock? A future interview may include a) different harm, such as trapping, or b) contextualized harm, for example an interview may include: “Is it alright or not alright for the farmers here in Washington State to kill the gray wolf when the gray wolves eat the farmer’s livestock? Why or why not?”

The type of harm and the context of the harm likely impact the strength of the child’s moral obligatory judgment. A few of the children interviewed in the current study spontaneously suggest that people in Greenland may kill the animal if they need the animal for food. Some children remark that it was alright to kill the gray wolf here in Washington if the wolf is attacking a family pet. Kahn and Lourenço (2002) found that middle and high school aged

children judged air pollution to be wrong but granted the permissibility of driving to work, even when they recognized driving causes pollution. Children as young as 7- and 10-years-old recognized that the use of pesticides are harmful to the environment, but justify the use of pesticides with the concerns for human (material) welfare (Severson & Kahn, 2010). Future research could explore children's moral obligations to not harming the endangered animal in various contextual transgressions that may alter the degree or strength of the moral obligation.

The animal rights questions offer only a small glimpse into children's conceptions of animal rights. The two specific rights questions (i.e., rights to not being killed and to be wild) largely followed the structure of the interview questions employed on children's conceptions of bats' rights (Kahn, et al., 2008). Findings of the current study thus replicate and extend the findings on bats rights to the endangered gray wolf. These specific rights garner biocentric reasoning for bats and wolves. These specific rights may garner higher rates of biocentrism than other specific rights. The right to not be killed may be particularly salient for the case of the endangered animal. There may be developmental difference in the type of rights that are warranted to the animal. For example, building on the work of Ruck and colleagues, it may be that young children endorse nurturance rights whereas older children endorse self-determination rights. An interesting parallel can be made with the children's concepts of protecting the gray wolf. At the end of the interview children are asked how they would protect the wolf if they had the power to do it. Many say they would make sure the wolf had a reserve, a safe place to live. There was a developmental difference wherein the younger children endorsed human caretaking as an essential feature of the reserve, whereas the older children endorsed autonomy in the reserve as important. The current study offers an initial foray into understanding children's

concepts of animal rights. Future research can explore more types of specific animal rights and the developmental differences in the conceptions of these varied rights.

New questions regarding general conceptions of rights are included in the study that have not been included in previous research: a) “What does it mean for an animal to have rights?” and b) “Do you think an animal has rights or does not have rights?” These questions provide new information on children’s conceptions of specific animal rights, as many of the children respond to the questions by stating specific rights as their response (e.g., a right to hunt). For the most part children endorse that animals have rights and offer specific forms of rights. On occasion, though not often, and when it occurred, usually it was a 10-year-old, a child would spontaneously talk about how animals should have rights but are not given the rights they deserve. That is, when a child is asked: “Do you think animals have rights or do not have rights?” some specify that animals “should have rights.” When this happened, their distinction is probed out to understand if they thought animals could have rights, if they should have rights, and why they thought animals were not granted the rights they, according to the child, should have. This appears to be a developmental achievement in the nuanced distinction that not all children spontaneously offered. Children at this age may make this distinction if directly probed. Future research can systematically investigate the distinction between having rights and having rights that are not granted to the animal.

### **Future Directions**

As mentioned above, there are many ways wherein future research can investigate how far the findings of the current study extends. In this section two overarching avenues of research directions are explored: 1) will biocentrism extend beyond the concern for animal life? and 2) will biocentrism generalize to varied cultures and groups?

*Beyond the animal: How far will biocentrism extend?* The current study finds that the endangered gray wolf will garner children's biocentric moral regard. Future research can investigate different endangered species, macro- and micro- fauna, charismatic animals, predators vs. prey, familiar and unfamiliar, culturally relevant, with more positive, or more negative, connotations than the gray wolf, for example. Based on children's emotional, cognitive, and social relationships with animals, it is likely that many animals, endangered or not, will garner biocentric regard. Future research can explore this. The curious conundrum lies in the question: how far, beyond the animal, will children's biocentric regarding for the natural world extend?

Animals are important to children (Howe, Kahn, & Friedman, 1996; Kahn & Lourenco, 2002; Kahn & Friedman, 1995; Myers & Saunders, 2002) but so are wetlands (Korfiatis, Horvardas, Tsaliki, & Palmer, 2009), seashores (Kahn, 1997), insects (Wilson, 1984), rocks, mountains, trees (Anderson, 1996), rivers, plants (Nevers, Gerbhard, & Billman-Mahecha, 1997) and most likely oceans, canyons, caves, geysers and more. Thus far research has shown that anthropocentrism is the predominant moral concern with regards to non-animal natural kinds (Kahn, 1999). Interestingly, Severson and Kahn (2010) find that 85% of participants employed biocentric reasoning in their concerns for aliens harming forests. It is unclear if plants and trees could garner high rates of biocentric concern when humans cause harm. Future research can explore this.

Biological needs are a feature shared by living things and may be a salient feature that grounds children's biocentrism for plant life. The biological needs are a salient feature that ground the biocentrism children endorsed for the gray wolf. Nevers, Gebhard, and Billmann-Mahecha (1997) suggest that biocentrism regarding nonanimal living kinds (e.g., plants and

trees) involves an abstraction that advances from viewing non-human objects as simply “self-like” to considering them as objects with “interests” and “needs” that can vary from their own. In a recent study on people’s moral perceptions of a robot Kahn and colleagues (see 2013 for transcript quotes) encounter isomorphic reasoning between robots and plants. For example, one participant states:

Um, I don’t know, I’m just very attached to happiness being in kind of like humans or animals. So he’s [the robot] more like a plant that way, I guess. Where they, uh, prefer certain states, you know like a sunny day or rain or something, but you wouldn’t really think of it as being a happy plant. You just think of it as being a healthy plant.

Here the adult participant suggests that like plants, robots may have certain states that are good for the entity. The participant encounters plants (and the robot) as experiencing subjects.

Fatouros and colleagues (2008) find that plants respond to tactile cues, communicate with other plants through chemical signals, and recognize different light wavelengths. These findings were utilized to ground the recent (2009) Swiss Government's Federal Ethics Committee on Non-Human Biotechnology. This code of ethics, extends “dignity” to plants wherein "living organisms should be considered morally for their own sake because they are alive." This code of ethics restricts certain harm done to plant life. Along similar lines, Ecuador’s Constitution (2008) regards the rights of the natural world in its Article 71: the natural world “has the right to integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes." The biological needs and processes that support those needs ground the extension of rights to natural entities, including plants, in Ecuador. Children may extend biocentric reasoning to plant kinds based on the biological needs and capabilities of the plant. Understanding the ways biocentrism extends and emerges in children’s moral conceptions of the natural world will require investigations into varied natural kinds.

*Cultural differences in biocentric reasoning?* The question stands – how universal are these moral judgments? Future research might investigate how far the findings on children’s biocentrism extends to different populations of children. Do they extend to other communities in Seattle? In Washington? In other states in the US? To urban and rural children? In other countries?

It is hard to imagine one would garner such high rates of biocentric reasoning regarding the gray wolf in a small town in Montana where “the word wolf is whispered” (NPR, 2014) due to ongoing human-wolf conflicts that sever the relationships between community members and the wider natural world. Here are two views from the most recent and final public hearing on the Fish and Wildlife’s proposal to de-list the gray wolf, held in Pinetop, AZ on December 13, 2013.

Wolves released in Gila County will be in Scottsdale in the real near future, munching down on pink Pomeranians, pampered polo horses, or kids chasing soccer balls.

- Terry Wheeler Mayor of Globe, Arizona

To me, the wolf reintroduction in our area is the same as having a convicted felon who's a murderer move to your neighborhood, and the government pays for their housing and food. It's the same thing.

- Leslie Johnson, owner of Flying H Ranch

These two individuals do not want wolves in their community, they do not believe in the "rights" of the wolf to roam free in the region. People living in proximity to wolf populations (e.g., Alaska, Minnesota, Michigan, Montana, and Wyoming) often hold deeply embedded skepticism and hostility toward wolves (Kellert, 1996). Would the children in these communities endorse the high rates of biocentrism endorsed by the current study’s group of Seattle children? In a nationwide survey, Americans divide almost evenly in their negative and positive views of wolves (Kellert, 1996). Those that hold positive sentiments for the wolves tend to be young adults, college-educated, city residents, and members of environmental organizations. Those

who hold negative sentiments tend to be livestock producers, elderly persons, rural residents, and the least educated. It may be that children in different communities hold the capacities for biocentrism but that the expression of biocentrism varies in contexts and conditions.

Morality based on concepts of welfare, justice, and rights (Dworkin, 1981; Gewirth, 1978; Kant, 1964; Rawls, 2001) accounts for a universal phenomena in moral reasoning (Shaw & Wainryb, 1999; Turiel, Killen, Helwig, 1987; Wainryb, 1995). Moral relativism is the view that moral principles are relative to a society and individuals and thus are not universal phenomena (Wolf, 1992). Shweder, Mahapatra, and Miller (1987) argue that moral and conventional understanding occurs through communication and socially transmitted information that lead to different conceptions of self, society, and the nature of reality, constructions that allow for different moralities that are equally reasonable and rational. These claims are based on findings from a study of American and Indian population's judgments about varied practices (e.g., matters of diet, clothing, and cultural/religious customs). The authors suggest that the Indians treated certain practices as moral, practices that Americans viewed as conventional (e.g., Indians felt it was morally wrong for a widow to eat fish and wear bright clothing where Americans judged these as conventions). Turiel, Killen, and Helwig (1987) reinterpret the stimulus events used by Shweder, Mahapatra, and Miller (1987) and suggest that the events fall into four main categories: 1. direct moral events, 2. unearthly-belief-mediated moral events, 3. multidimensional events, 4. social-conventional events. Turiel, Killen, and Helwig argue that there are similarities in moral injunctions regarding harm, as well as cultural differences in the assumptions about reality (e.g., Indians believe a women wearing bright clothes would cause distress to the spirit of her dead husband). Beliefs about reality are a key finding in cultural variations regarding moral judgments. Turiel, Killen, and Helwig (1987) write: "Assumptions

about reality or the natural order, and cultural definitions also may have a bearing on the subject's domain interpretation of events, given that the assimilation of events to domain judgment is not a static process and can be conceptually transformed" (p. 186). That is, differences in moral judgments may be due to differences in understanding of the nature of morality, and reality, rather than moral concepts (Shaw & Wainryb, 1999; Turiel, Killen, & Helwig, 1987; Wainryb, 1995).

It may be that some species, with particular cultural relevance, presents contexts that vary the expression and degree of biocentrism. Future research can investigate the culturally relevant beliefs that people have about endangered species (e.g., the owl in the Southwest, or the wolf in the Midwest – two highly contested creatures among multiple stakeholders' perspectives). Beliefs emerge in ways that appear to inform judgment regarding the environment. For example, some cultures believe that eating certain animals (e.g., whales or dogs) is a deep part of cultural history, tradition, and ceremony, and in some cases, an important part of their spiritual life. Some believe eating certain animals is an egregious breach of animal welfare and rights concerns, or detrimental to conservation efforts and preservation of the species. Consider the following passage from the 42nd Annual Meeting of the International Whaling Commission (IWC) (Appendix 1 – Resolution on Norwegian proposal for Special Permits) in which the IWC is granting Norway extended fishing rights for small whales: "Aware that there exists difference in views between member states on the regulatory competence of the IWC with regard to small cetaceans and noting that this resolution does not seek in any way to prejudice different member's positions...." The quote highlights the IWC's attempt to deal with the varied perspectives that exist regarding the consumption of the whales, perspectives that varied even within a group of pro-whalers. These beliefs have weight in public policy and decision making.

For example, federal decisions in the United States must take into account religious practices of Northwest tribes in mandating resolutions on the dispute over coal mining in Alaska. Beliefs emerge in ways that appear to inform directly the judgment of the environmental act. Future research can investigate the variations in moral regard in the context of varied beliefs and the intersectionality of gender, race, class, culture, region, or religion, for example.

### **Broader Implications**

Understanding children's biocentric moral regard for the endangered gray wolf should shape the conservation agenda by informing environmental education, environmental policy, and conservation initiatives. In a recent meeting with Megan Bang, a scientist and educator, at the University of Washington's College of Education, we discussed the ways in which the findings of the current study could be applied in science education. Bang is currently working on a project, "Remaking Relatives," that aims to develop curriculum that will support children's understanding of ecological relationships. One of the tasks is to train teachers how to use the language of plant capabilities, for example, how to teach children about the ways plants communicate in response to cues from natural stimuli in the environment. These scientists and educators are interested in understanding and supporting children's *relational construals* – the ways which children comprehend relationship dynamics between humans and the wider natural world. These lessons support a conception of an interconnected natural world wherein humans are part of larger ecosystem relations. Understanding the capabilities of one entity supports a more complicated understanding of wider ecological relations. For example, the wolves hunting behavior will affect the ungulates' (e.g., deer) feeding behavior which will impact the plant growth in a given area, and such processes have been shown to then further impact ecological topography, such as the movement of rivers (see Eisenburg, 2010). By synthesizing an account

of children's patterns of thought that support conservation concerns (e.g., children's tendency to draw on biological needs and capabilities of the wolf to ground their claims for protecting the species), Bang suggested that the current study could provide a toolkit for educators to use. The findings could support attuning teachers to recognize what is happening in children's ideas, what frameworks they are working with, so that the educators can recognize patterns of thought and build from these to support learning. In the instruction regarding relational construals with the natural world, educators are currently utilizing "brainstorming" activities to engage children's learning. Educators need to be able to recognize patterns in children's thinking and to employ salient features of the environmental context that can spark construction of knowledge. The findings could guide the discourse during these brainstorming sessions and structure the material that is presented and built upon by the educator.

Research on human-nature relationships is increasingly employed to inform public policy and environmental initiatives (Guerra, Graham, & Tolan, 2011; Tseng, 2012). For example, the American Public Health Association drew on research on the natural world, health, and wellness, to develop a policy statement that calls on public health, medical and other health professionals to raise awareness of the benefits of spending time in the natural world. The APHA "encourages land use decisions that prioritize access to natural areas and green spaces for residents of all ages, abilities and income levels." The research findings on the health benefits of access to natural spaces are employed to direct decisions that affect the community directly.

Research findings are utilized in various ways in order to inform policy decisions. For example, Carol Weiss (1977) offers a model for the role of research in policy decisions, referred to as *conceptual use*. In this framework, research is used by policymakers and practitioners as tools to rethink and reframe how they approach issues, problems, or potential solutions. Two

additional ways in which empirical evidence is used to support policy decisions have been identified: *instrumental use* (i.e., research directly influences a policy or practice decision) and *political use* (i.e., research used to justify a position that is already staked out) (Tseng, 2012). The current study could be employed in these ways in order to inform environmental policy decisions. Specifically, policymakers might rethink the ways in which they frame their decision making, drawing more deeply on human values, including children's values, of the natural world to inform policy decisions. The current study offers insight into the perspective of children who care about and value the gray wolf. The findings highlight that the issue of endangered species matters to them. By drawing on children's values in the development of environmental policy we engage them in the policy process. It is imperative that we empower children to recognize their potential to affect the world in meaningful ways. Consider the words of one student who was part of a group of students rallying for control to determine the use of a 2.3 acre plot of land in Keene, New Hampshire "...Your decision to involve us or not will determine our future commitment to this town and to public decision-making. It will effect whether we think we can really make a difference" (Thomashaw, 2002, p. 270). If we do not engage children in the matters of policy and conservation, they may not engage themselves.

## **Conclusion**

Conservation of the Earth's dwindling biodiversity is one of the most important environmental issues of our century (Ehrlich & Ehrlich, 1981; Ehrlich & Pringle, 2008; Ehrlich & Wilson, 1991; Wooldridge, 2008). It is estimated that 30,000 species go extinct each year and if humans continue to degrade the biosphere at current rates of destruction, one half of all species will be extinct within 100 years (Wilson, 2002, 2006). The International Union for Conservation

of Nature (IUCN) reported in 2012 that 25% of mammals, 41% of amphibian species, 33% of reef-building corals, and 13% of birds are under threat of extinction.

Children are our next generation of conservationists. To understand and support children's concerns for conservation we need to understand their moral relationship with the natural world (Shepard, 1996; Melson, 2001; Leopold 1970; Kahn & Kellert, 2002; Karpiak & Baril, 2008; Kellert, 2002; Melson, 2001; Myers, 2007; Wilson, 1984). Understanding their developing moral conceptions of endangered species must shape the conservation agenda. To do this we need to know more about the developing environmental mind and values of the child, especially regarding endangered species.

The findings of the current study extend our understanding of children's environmental moral reasoning and the emergence and development of biocentrism. In scenarios involving harm to endangered species, biocentrism is the predominant form of moral reasoning. Biocentrism supports moral obligatory concerns as well as concerns for animal rights. The findings show for the first time high rates of biocentrism in young children, including seven-year-olds (the youngest observed in the literature), for scenarios where humans cause harm to the natural world. There is a developmental shift in biocentric reasoning, wherein 10-year-olds are more likely to endorse justice-oriented biocentric reasoning than 7-year-olds.

The endangered animal presents a provocative recipient of harm. When reasoning about an endangered animal, children draw on features of the gray wolf including its sentience, biological needs and perceived desires, and the wild status of the animal. Children draw on their understanding of human welfare and justice concerns to extend these concerns to the gray wolf. The current study offers insight into the perspective of children who care about and value the

gray wolf. The findings highlight that the endangered species matters to them and that they think about welfare and rights of the animal in deep and beautiful ways.

Important questions remain unanswered. Will the findings on biocentrism generalize to children in other cultures or other regions in the world? Will children extend biocentric moral regard to other endangered animals, to endangered plants, or threatened ecosystems? Do biocentric concerns for the endangered animal emerge in children younger than seven? Will adolescents endorse biocentric reasoning regarding endangered animals? Do certain experiences, understandings, or beliefs support the development of biocentric concerns for endangered animals? Future research can address these questions. The current study provides a comparative baseline for our understanding of biocentrism in children's moral reasoning regarding humans harming the natural world.

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**Appendix A: Participant Demographic and Background Questionnaire**

**Young Participant's Information**

Participant #: \_\_\_\_\_  
Date: \_\_\_\_\_  
**To be filled out by Researcher**

1. Date of Birth: \_\_\_\_\_Month \_\_\_\_\_Day \_\_\_\_\_Year

2. Gender:  Boy  Girl

3. Race/Ethnicity: \_\_\_\_\_

4. Grade in school (e. g. , 1<sup>st</sup> grade, 2<sup>nd</sup> grade, etc. ): \_\_\_\_\_

5. My relationship to participant:  Mother  Father  Guardian  Other, please specify: \_\_\_\_\_

**Young Participant's Family Information**

6. Participant's immediate family:

A. Number of Parents/Guardians living in household: \_\_\_\_\_

B. Number of children in immediate family (including participant): \_\_\_\_\_

For each child, please provide the following information:

Age Gender Age Gender

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. What is the highest level of education held by a member in your household? (check one)

- some/no high school
- high school degree (Diploma or GED)
- some college
- community or junior college degree (e. g. , Associates degree)
- undergraduate college/university degree (e. g. , Bachelors degree)
- some graduate school
- graduate school degree (e. g. , Masters or Doctorate degree)

8. What is your estimated gross yearly family income? (check one)

- less than \$20,000
- \$20,000 to \$50,000
- \$50,001 to \$100,000
- over \$100,000
- Refuse

**Young Participant's Experience with Nature**

9. Does your household have a family pet? (circle one)                      Yes                      No

If yes, which kind and how many (of each kind):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

10. On average, how much time does your child spend outdoors

on a school day? \_\_\_\_\_

If yes, list the three most common outdoor activities:

\_\_\_\_\_

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11. On average, how much time does your child spend outdoors

on a non-school day? \_\_\_\_\_

If yes, list the three most common outdoor activities:

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12. Please fill the following information to the best of your knowledge:

	Which of the following has your child experienced?			Age of first experience.	How often does the child above engage in this activity? (circle one)				
	Yes	No	Not known		1 = Never		5 = Frequently		
Grow a plant.					1	2	3	4	5
Plant a tree.					1	2	3	4	5
Pick fruit.					1	2	3	4	5
Raise livestock.					1	2	3	4	5
Climb a tree.					1	2	3	4	5
Hike in the forest or woods.					1	2	3	4	5
Walk in the park.					1	2	3	4	5
Fish.					1	2	3	4	5
Encounter a wild animal outdoors.					1	2	3	4	5
Visit the zoo.					1	2	3	4	5
Build a fire outdoors.					1	2	3	4	5

Camp in the forest or woods.					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Swim in a lake or river.					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Swim in ocean.					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Explore rock /tidal pools at the beach.					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Feed wild animals.					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Bird watch.					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Collect things in nature (e. g. , seashells, rocks)					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Look for insects.					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Visit a farm.					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Be alone in a nature.					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

13. List any additional activities in nature that your child has experienced:

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14. For the following 6 places, rank order from 1 through 6 (1 being the most, 6 being the least), in regards to where your child has received information about animals:

- Museums/Science Centers \_\_\_\_\_
- School \_\_\_\_\_
- Books/Magazine \_\_\_\_\_
- Television/Movies \_\_\_\_\_
- Computer/Internet \_\_\_\_\_

Home \_\_\_\_\_

15. Rate the participating child's *interest* in animals: (circle one)

1	2	3	4	5
1=No				5=Really
Interest				Interested

16. Rate the participating child's *knowledge* about animals: (circle one)

1	2	3	4	5
1=No				5=Really
Knowledge				Knowledgeable

17. Has the participating child learned about endangered animals in any of the following ways?

Museums/Science Centers	Yes	No
School	Yes	No
Books/Magazine	Yes	No
Television/Movies	Yes	No
Computer/Internet	Yes	No

18. Rate the participating child's *interest* in learning about endangered animals: (circle one)

1	2	3	4	5
1=No				5=Really
Interest				Interested

19. Rate the participating child's *interest* in doing things to help endangered animals: (circle one)

1	2	3	4	5
1=No				5=Really
Interest				Interested

20. Rate the participating child's *knowledge* about endangered animals: (circle one)



## Appendix B: Interview Protocol

To begin, the interviewer will state: Thank you for coming to talk with me. Today I'm going to ask you a bunch of questions about animals. There are no right or wrong answers. This is just about what you think and feel, and what matters to you. Sometimes I am going to ask "why" or "how come" and this is so that I can learn even more about what you think. Sound good?

1. Do you know what an endangered animal is? What?
2. What are some animals that are endangered?
3. Do you know what animal extinction is? What?
  - a. Probe: Can an animal that is extinct ever come back?
4. What are some animals that have gone extinct?

The experimenter will then state: *Thank you. (Yes) An endangered animal is when there are very few of one type of animal left in the world, so few that the animal is in danger of going extinct. An animal is extinct when there are no more animals of that type of animal left in the world. Once an animal is extinct in the world it will never come back. It is gone forever.*

5. Does it matter to you if an animal becomes endangered? Why or why not?
6. Does it matter to you if an animal becomes extinct? Why or why not?
7. Do you know what causes animals to become endangered? What?
8. What are some (other) human activities that can lead to an animal becoming endangered?

The experimenter will then state: *Now I'm going to ask you some questions about a wolf, the endangered gray wolf. The gray wolf was once found to live all over the world. In many places in the world the gray wolf can no longer be found in the forests and mountains where it once lived. Here in Washington State the gray wolf is now an endangered animal. There are only about 50 wolves living wild in our state.*

9. Tell me what you know about the gray wolf.
10. Is it alright or not alright for people here in Washington State to kill the gray wolves?

Why or why not?

11. Let's say that there was a law here in Washington State that allows people to kill the gray wolf. With this law in place, would it then be alright or not alright for people here in Washington State to kill the gray wolves? Why or why not?
12. Let's say that far away in the country of Greenland people kill the endangered gray wolves. Would it then be it alright or not alright for people in Greenland to kill the gray wolves? Why or why not?
13. Should the gray wolf be allowed to be wild and live free? Why or why not?

The experimenter will then state: *Now I'll ask you a couple of questions about animal rights.*

14. What does it mean for an animal to have a right?
15. Do you think animals have rights or do not have rights? Why or why not?
  - a. Probe (if states animal has rights): Which rights do animals have?
16. Do you think that gray wolves have rights, or do not have rights? Why or why not?
  - b. Probe (if states wolves have rights): Which rights do a gray wolf have?
17. Do you think that gray wolves have the right to not be killed? Why or why not?
18. Do gray wolves have the right to be wild? Why or why not?

The experimenter will then state: *Earlier I had asked you to tell me what you know about the gray wolf.*

19. I would like to know more about where you have heard about the gray wolf:
  - a. Have you heard about the gray wolf at school, in books or on tv, or in the news.
  - c. Have you ever talked about the gray wolf with someone, such as your parents, teachers, or friends?
  - d. Did you ever hear that the gray wolf may no longer be called an endangered animal?

- i. How did you know about that?

The experimenter then states: Earlier I asked you to tell me what you know about endangered animals and animal extinction. Tell me one last time what you know.

20. What is an endangered animal?

21. What is animal extinction?

- a. Probe: Can an animal that is extinct ever come back?

The experimenter then states: *Thank you. Only a few more questions and then we are all done.*

22. Are you afraid of the gray wolf? Why or why not?

23. Is the gray wolf a dangerous animal? Why or why not?

The experimenter then states: *OK, one last question and then we are all finished:*

24. Let's say that you had the power to protect the endangered gray wolves from going extinct. How would you protect the gray wolves?

**Appendix C: Interview Coding Sheet**

**Wolf Study**

Subject #: \_\_\_\_\_

Coder: \_\_\_\_\_

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

#	Question	EVALUATION	
1	endangered animal is?		
2	animals endangered		
3	animal extinction		
P	PROBE		
4	animals that have gone extinct?		
5	Does it matter endangered?		
6	Does it matter extinct?		
7	causes animals endangered?		
8	human activities lead animal endangered?		
9	gray wolf.		

<b>10</b>	alright or not alright Washington			
<b>11</b>	Let's say that there was a law ...would it			
<b>12</b>	Let's say in Greenland			
<b>13</b>	Should be wild and live free?			
<b>14</b>	animal right?			
<b>15</b>	have rights or do not have rights?			
<b>16</b>	gray wolves have rights?			
<b>17</b>	right to not be killed?			
<b>18</b>	right to be wild?			
<b>19</b> <b>a.</b>	heard about the gray wolf		<b>c.</b> no longer be called an endangered	

<b>b.</b>	talked about the gray wolf		d. How did you know about that?	
<b>20</b>	endangered animal?			
<b>21</b>	animal extinction?			
<b>P</b>	PROBE:			
<b>22</b>	Are you afraid			
<b>23</b>	Is dangerous			
<b>24</b>	How would you protect the gray wolves?			

**Appendix D: Coding Manual**  
**for “Children’s Environmental and Moral Conceptions**  
**of Protecting an Endangered Animal” Study**  
(adapted from Kahn and Lourenço, 2002, as cited in Kahn, 1999)

General Notes

1. Code each interview from beginning to end. Sometimes the participant or interviewer will make a reference to reasoning generated at an earlier point in the interview, which the coder will need to recognize while coding.
2. Due to the hierarchical design of the coding manual, code to the lowest level in any given category.
3. Uncodable (0): This category should be used for all uncodable evaluations and justifications.
  - a. The response is too unintelligible or incomplete to code.
  - b. Forcing the response into an existing category would distort the meaning of the response.
  - c. The participant answers a question other than the one that was asked.
  - d. The justification coded follows an uncodable evaluation.
  - e. The participant gives an “I don’t know” justification.
4. Missing Data (99): This category should be used when the participant does not respond to a question.
5. Not Asked (98): This category should be used if the interviewer does not ask a protocol question
  - a. 98. 1 Not asked according to protocol
  - b. 98. 2 Not asked - forgotten
6. For many categories and subcategories examples are provided to assist in the conceptual comprehension of the coding category.
  - a. For these examples, the interviewer is depicted in ALL CAPITALS. Ellipses (...) indicate that a portion of the interview were omitted for the clarity of the example. Parentheses around an underline [i.e., (\_\_\_\_)] indicate an inaudible portion of the interview, where the length of the underline approximates the duration of the inaudibility.
  - b. Some categories may not include examples. This is due to fact that few or no examples emerged in the half of the data set used to construct the coding manual. The categories were retained to account for the potential that such forms of reasoning would emerge in the second half of the data and in future studies.
7. Some participants are more prone than others to phrase the response in a hesitant manner – for example, “probably so” “maybe yes” and “perhaps not.” Where the positive and negative connotation of such a response is clear, code as if it were expressed as a definite yes or no.

## EVALUATION CODING MANUAL

### Evaluation Coding Notes

1. Only code the same category once for each evaluation.
2. Responses to several questions can be coded as “incorrect” (i.e., questions: 1, 3, 7, 8, 9, 20, and 21). If the coder is unsure of whether the information is correct or incorrect they are to search the internet for the correct response. Do not code as incorrect if there is substantive controversy over the information (e.g., Do not code “howls at the moon” as incorrect, as it remains unclear if wolves in fact howl at the moon).
3. For questions that involve content coding (i.e., questions 1, 2, 7, 8, 9, 14, 15, 16, 19, 20, 21, and 24), multiple coding is possible (e.g., for question 1: “That means, um, that there isn’t very many animals and a lot of people are killing them and they are dying.” #23 would be coded as 1. 1, 1. 3, and 1. 4), EXCEPT when the code is “No”, “Only incorrect information,” “Don’t know,” “Have not heard/talked...” (i.e., question 19), or “Would not protect” (i.e., question 24); in those cases, code only “No,” “Only incorrect information,” “Don’t know,” “Have not heard/talked...”, or “Would not protect.”

### Evaluation and Content Coding Categories (with examples)

1. Do you know what an endangered animal is? What?
  - 1.1. Correct Definition
    - 1.1.1. Unelaborated (Very few individuals of a species remain) (e.g., “Um. . . animals that, they aren’t very many of” #6)
    - 1.1.2. Elaborated description
      - 1.1.2.1. In danger of going extinct (e.g., “It’s an animal that is not quite, it’s species, is not gone, but cl-, but threatened of being extinct.” #21; “an animal that’s...well, it’s danger of being extinct” #39)
      - 1.1.2.2. Ongoing loss of individuals (including animals are being killed or are dying; if agents of this loss are mentioned, double code with 1. 1. 4 Anthropogenic causes and 1. 1. 5 Natural causes) (e.g., “It’s an animal that are being killed a lot.” #22)
      - 1.1.2.3. Anthropogenic causes (e.g., “It’s something that people are trying to kill...” #9)
      - 1.1.2.4. Natural causes (including natural forces, other animals, and disease)
      - 1.1.2.5. Effects of biodiversity loss (including effects to food chain)
      - 1.1.2.6. Conservation issues (including policy and conservation/protection attempts) (e.g., “...sometimes, a lot of people work together to help save those animals, so they come back.” #35).
  - 1.2. Incorrect Definition
  - 1.3. Don’t know
2. What are some animals that are endangered? (Note: If state’s “I don’t know” code as zero)  
\_\_\_\_\_ Number of unique species mentioned. (Note: if child states a class or group of animals, e.g., “types of birds” count as one, unless the child then lists several types of birds, at which point code each type of bird listed and do not include the general class/group of “types of birds” in count.)

3. Do you know what animal extinction is? What?
  - 3.1. Correct Definition
    - 3.1.1. Unelaborated (No individuals of a species are left in the world) (e. g. , “When all of the species is not alive. ” #17; “When that species is wiped out, gone. There are no more left of it. ” #21; “it’s no longer on planet Earth” #39)
    - 3.1.2. Elaborated definition
      - 3.1.2.1. Anthropogenic causes (e. g. , “... they, they built farms and houses...” #22)
      - 3.1.2.2. Natural causes (e. g. , “And an animal extinction is when, there used to be a whole lot of them, like, uh, dinosaurs. But, now they’re all gone, for, like, Ice Age or something...” #32)
      - 3.1.2.3. Effects of biodiversity loss (including effects to food chain)
      - 3.1.2.4. Conservation Issues (including policy and conservation/protection attempts) (e. g. , “...How we should be taking better care of our ecosystem. ” #30)
  - 3.2. Incorrect Definition (e. g. , “Like um..., if they don’t have a much, much um, animals in there. Uhhh [thinking], kinda, in the species” #7; “using their amazing powers. ” #16)
  - 3.3. Don’t know
  - 3.4. Probe: Can an animal that is extinct ever come back?
    - 3.4.1. Yes
      - 3.4.1.1. Yes – Unelaborated
      - 3.4.1.2. Yes – Scientific/technological advances (e. g. , “Um, no, unless, scientists bring it back. HOW MIGHT THEY DO THAT? Uh, by I think mixing the genes of an extinct thing with one that’s already living, so the extinct one, um, or the, um, the living one is almost exactly the extinct one. ” #47)
      - 3.4.1.3. Yes – Biological/re-evolution
    - 3.4.2. No (e. g. , “No. ” #22; “I think maybe, um, maybe some types of that animal may be able to come back but I don’t think the actual species can come back. OK, CAN YOU GIVE ME AN EXAMPLE OF WHAT YOU MEAN BY TYPES OF ANIMAL? So um, maybe the dinosaurs died out, but there were still the flying birds, so now that’s what the birds are now, so. ” #35)
    - 3.4.3. Don’t know
4. What are some animals that have gone extinct? (Note: If state’s “I don’t know” code as zero)
 

\_\_\_\_\_ Number of unique species mentioned. (Note: if child states a class or group of animals, e. g. , “types of birds” count as one, unless the child then lists several types of birds, at which point code each type of bird listed and do not include the general class/group of “types of birds” in count).
5. Does it matter to you if an animal becomes endangered?
  - 5.1. Matters
  - 5.2. Doesn’t matter
  - 5.3. Don’t know

Why or why not?

[insert justification manual]

6. Does it matter to you if an animal becomes extinct?
  - 6.1. Matters
  - 6.2. Doesn't matter
  - 6.3. Don't know

Why or why not?

[insert justification manual]

7. Do you know what causes animals to become endangered? What? (Note: code to the subcode level if possible; multiple coding possible, do not code 7. 1 and 7. 1. 1 = can code 7. 1 and 7. 2. 1 e. g. , “they can die of nature causes but they can also die off from all the habitat destruction”)
  - 7.1. Natural causes
    - 7.1.1. Natural forces (including volcanoes, hurricanes) (e. g. , “Something like, for example, a volcano erupts. ” #17; “Sometimes it could be like an ice age...” #32)
    - 7.1.2. Other animals
    - 7.1.3. Disease
  - 7.2. Anthropogenic Causes
    - 7.2.1. Habitat Destruction
      - 7.2.1.1. Human development
      - 7.2.1.2. Pollution
      - 7.2.1.3. Climate Change
    - 7.2.2. Trap/Hold captive
    - 7.2.3. Killing (including hunting, poaching, killing for sport) (e. g. , “I know for the American gray wolf they um, the (\_\_\_) farmers try and kill them because they're worried about their livestock so when their livestock, like a hen goes missing, then if they see it, they may shoot it, or something like that. ” #35)
    - 7.2.4. Use of natural objects (e. g. , animal or plant parts) as resources for food or goods and materials (“people are hunting a lot of them like pandas and cause they really like their coats or whatever. I think it's rhinos too, cause their ivory husks, elephants, it's either elephants or rhinos, it's elephants, both, I think it's both, pretty sure it's both. ” #32).
  - 7.3. Only incorrect information
  - 7.4. Don't know.
8. What are some (other) human activities that can lead to an animal becoming endangered? (Note: code to the subcode level if possible; multiple coding possible, do not code 8. 1 and 8. 1. 1)
  - 8.1. Natural causes
    - 8.1.1. Natural forces (including volcanoes, hurricanes)
    - 8.1.2. Other animals (e. g. , “Other animals who eat those animals. ” #6)
    - 8.1.3. Disease
  - 8.2. Anthropogenic
    - 8.2.1. Habitat destruction
      - 8.2.1.1. Human development (e. g. , “Building like houses and stuff, cause then um, the animals that live there, don't have a home there anymore. ” #25)

- 8.2.1.2. Pollution (e. g. , “Like um fuel that comes out and smoke. . . ” #9; (e. g. , “pesticides on your lawn, that could go into your ocean and could kill ocean animals. ” #32)
  - 8.2.1.3. Climate Change
  - 8.2.2. Trap/Hold captive
  - 8.2.3. Killing (including hunting, poaching, killing for sport) (e. g. , “And also just for pride. MMHMM [OK]. CAN YOU TELL ME MORE ABOUT THAT? Uh well, some animals are killed for their fur and some, like cows, are killed for their beef or meat. And some are just killed for sport, like fish. ” #39)
  - 8.2.4. Use of natural objects (e. g. , animal or plant parts) as resources for food or goods and materials (e. g. “Pollution and killing the animals. And also just for pride. MMHMM [OK]. CAN YOU TELL ME MORE ABOUT THAT? Uh well, some animals are killed for their fur and some, like cows, are killed for their beef or meat. And some are just killed for sport, like fish.... ” #39, *double coded with 8. 2. 3 killing and 8. 2. 1. 2 pollution*).
  - 8.3. Only incorrect information
  - 8.4. Don’t know
9. Tell me what you know about the gray wolf.
- 9.1. Behavior
    - 9.1.1. Eating (including hunting, killing, foraging)
    - 9.1.2. Running (including speed)
    - 9.1.3. Defecating
    - 9.1.4. Communication (including howling, scent)
    - 9.1.5. Pack hierarchy (including establish, maintain)
    - 9.1.6. Reproduction (including mating, birthing, pup rearing)
    - 9.1.7. Dangerous/aggressive (wolf to human)
    - 9.1.8. Dangerous/aggressive (wolf to other nonhuman animals; including fighting)
    - 9.1.9. Lifespan
  - 9.2. Habitat
  - 9.3. Isomorphism with domesticated dog
  - 9.4. Conservation issues
    - 9.4.1. Endangered status (“e. g. , ...very few...” #6; “a hundred years ago, they used to be all over the country” #46)
    - 9.4.2. Causes of endangered status (including habitat destruction, farmers killing) (e. g. , “Not really, all I know is that people have been shooting. ” #30; “they put like bounties on them and they said, I mean no, they had a, what do you call them, they put like money on them and they said if you go shoot them, like, if you kill them, then, we’ll give you money. ” #46).
    - 9.4.3. Conservation efforts (e. g. , “...you can adopt one. ” #14; “my teacher made us write letters to the government of Washington to save the gray wolf. ” #32).
    - 9.4.4. Conservation policy (e. g. , “Um, ah, I think they passed a law that farmers can shoot the wolves when they are attacking their cows and chickens and things. ” #47).
  - 9.5. Only incorrect information (e. g. “they’re an animal that I think they are trying to protect us or something...”).

9.6. Provides only information that was already stated by the experimenter (use if clearly parroting)(e. g. , only say “it’s an endangered animal”; “I’m guessing it’s a gray wolf“ #39).

9.7. Don’t know

10. Is it alright or not alright for people here in Washington State to kill the gray wolves?

10.1. Alright

10.2. Alright Conditional (e. g. , “Well, if there was a wolf like attacking something. . .” #46)

10.3. Not alright

10.4. Don’t know

Why or why not?

[insert justification manual]

11. Let’s say that there was a law here in Washington State that allows people to kill the gray wolf. With this law in place, would it then be alright or not alright for people here in Washington State to kill the gray wolves?

11.1. Alright

11.2. Alright Conditional (does not include case where “alright” due to law. )

11.3. Not alright

11.4. Don’t know

Why or why not?

[insert justification manual]

12. Let’s say that far away in the country of Greenland people kill the endangered gray wolves. Would it then be it alright or not alright for people in Greenland to kill the gray wolves? Why or why not?

12.1. Alright

12.2. Alright Conditional

12.3. Not alright

12.4. Don’t know

Why or why not?

[insert justification manual]

13. Should the gray wolf be allowed to be wild and live free?

13.1. Yes

13.2. No

13.3. Conditional Yes (e. g. , “Mhmm[yes]. But not like, like um, we should let them have their room...but not like take over more of it...” #7; “Um, well, yes and no...” #46)

13.4. Don’t know

Why or why not?

[insert justification manual]

14. What does it mean for an animal to have a right? (Examples of uncodable responses: “Do not kill them and they, they’ll thank you.” #16; “Well, when you say animal rights, I think of things that are right for animals to do.” #13 – unclear if participant means things that are “alright or not alright to do” or things the animals needs to do, such as eating. )
  - 14.1. Provides specific types of rights
    - 14.1.1. To eat/hunt/kill/forage
    - 14.1.2. To companionship
    - 14.1.3. To mate/reproduce/care for young (e. g. , “To have babies. . . ” #9)
    - 14.1.4. To habitat (including territory) (e. g. , “have their own place and like...like have the right to stay there” #7; “right of passage to own like land” #49)
    - 14.1.5. To play/exercise
    - 14.1.6. To welfare (including right to live, right to not be killed) (e. g. , “They have rights that keep them safe, that keep them healthy...” #6)
    - 14.1.7. To autonomy (right to decide issues about self, what to eat, where to live, what to do) (includes physical freedom. )
    - 14.1.8. To privacy
  - 14.2. Rights are privileges (e. g. , “It should be able to do something. ” #25)
  - 14.3. Rights are rules
  - 14.4. Isomorphism/Transmorphism with humans (e. g. , “...they have rights just like us.... there are certain things we can do and those are our rights, so they should have certain things that they can do. ” #30; For an animal to have a right it’s like, for us to be able to eat cheese. WHAT DOES THAT MEAN? Well, we can eat cheese freely and ah, animals can eat grass or whatever they eat freely, without us harming them. ” #32 – multiple codes with 14. 1. 6 and 14. 1. 7)
  - 14.5. Rights are limited – granted only to certain animals (e. g., wild animals #46)
  - 14.6. Rights are limited – conditional on animal’s behavior
  - 14.7. Don’t know
15. Do you think animals have rights or do not have rights? Which rights do animals have? (Example of uncodable: “Because.... they don’t have pencils” #3)(Coding process specific for coding questions 15 and 16: read the entire question, including their assessment of if they have rights, why they have rights, what rights they have, why they have those rights – read through once, then go through and code the specific rights they have attributed, then go through and give the applicable justifications. )
  - 15.1. Yes
    - 15.1.1. Unelaborated
    - 15.1.2. To eat/hunt/forage
    - 15.1.3. To companionship
    - 15.1.4. To mate/reproduce/care for young
    - 15.1.5. To habitat (e. g. , “right to own land” #49)
    - 15.1.6. To play/exercise
    - 15.1.7. To welfare (including right to live)

- 15.1.8. To autonomy (right to decide issues about self, what to eat, where to live, what to do) (includes physical freedom. ) (e. g. , “To run free and wild. To.... . not be slaves.... ” (#6); “...be free. ” (#7); “to do whatever they really want to do. ” (#13)
- 15.1.9. To privacy (“they have the right to have their own personal things, like, you can’t just like stare at it” #32)
- 15.1.10. States that animals should have rights, but are not generally granted rights
- 15.2. Rights are limited – granted only to certain animals (e. g. , wild (#46)
- 15.3. Rights are limited – conditional on animal’s behavior (e. g. , “I think they do have rights, I just don’t think they have very strong rights. Like they can’t necessarily talk, so they can’t so they can, they can do it for their own behavior, but you know they can’t talk English, so they can’t say, or they, so they can’t vote. ” #35’ “some animals do have rights.... probably because they don’t bother the humans. ” #39)
- 15.4. No
- 15.5. Don’t know

Why or why not?

[insert justification manual]

16. Do you think that gray wolves have rights, or do not have rights? Which rights does a gray wolf have?

- 16.1. Yes
  - 16.1.1. Unelaborated (e. g. , “...they can have their natural rights. ” #35)
  - 16.1.2. To eat/hunt/forage (e. g. , “to eat what they want to eat. ” #39 *double code autonomy*)
  - 16.1.3. To companionship
  - 16.1.4. To mate/reproduce/care for young
  - 16.1.5. To establish/maintain packs
  - 16.1.6. To habitat (e. g. , “right to land” #49; “to live in the wild” #38)
  - 16.1.7. To play/exercise
  - 16.1.8. To welfare (including right to live) (e. g. , “...people not killing the babies. ” #9; “not be bothered by people. ” #47)
  - 16.1.9. To autonomy (right to decide issues about self, what to eat, where to live, what to do) (includes physical freedom. ) (e. g. , “To run free and wild. And not be held captive. ” #6; “...be free. ” #7)
  - 16.1.10. To privacy (“to have it’s own privacy. ” #32)
  - 16.1.11. States that wolves should have rights, but are not generally granted rights
- 16.2. Rights are limited – granted only to certain animals (e. g. , wild animals - #21)
- 16.3. Rights are limited – conditional on animal’s behavior
- 16.4. No
- 16.5. Don’t know

Why or why not?

[insert justification manual]

17. Do you think that gray wolves have the right to not be killed?

- 17.1. Yes

- 17.2. No
- 17.3. Conditional (e. g. , “if they’re not doing anything like bad, like hunting livestock. Cause also people pay money for that and they pay money for their animals and it’s kind of like stealing... if they are not doing anything bad then... they shouldn’t be hunted, that’s be bad to hunt them. ” #46)
- 17.4. Don’t know

Why or why not?  
 [insert justification manual]

18. Do gray wolves have the right to be wild?

- 18.1. Yes
- 18.2. No
- 18.3. Conditional Yes (e. g. , “yes, but not, like, um, to take over everything else...but they do have the right to be wild. ” #7; “...maybe not in urban places because it’s dangerous...” #30; “I think it should but, actually um, um, um, I think that it, should but like not like on the streets of the city. ” #52; “ Yes. Well it depends what wild means, if wild means, you know, crazy, well then they don’t really have that right. But you know if it’s to be wild and what they normally do, then I think they do, cause what I normally do is maybe sit down in the summer read a book outside. ” #35)
- 18.4. Don’t know

Why or why not?  
 [insert justification manual]

19. I would like to know more about where you have heard about the gray wolf:

- 19.1. Have you heard about the gray wolf at school, in books or on tv, or in the news.
  - 19.1.1. School
  - 19.1.2. Book(s)
  - 19.1.3. Television
  - 19.1.4. News
  - 19.1.5. Internet
  - 19.1.6. Zoo
  - 19.1.7. Entertainment facility (other than zoo) (e. g. , “Gray Wolf Lodge!” #32)
  - 19.1.8. Have not heard about gray wolf
- 19.2. Have you ever talked about the gray wolf with someone, such as your parents, teachers, or friends?
  - 19.2.1. Parent(s)
  - 19.2.2. Other family member(s)
  - 19.2.3. Teacher(s)
  - 19.2.4. Friend(s)
  - 19.2.5. Zookeeper/Tour guide
  - 19.2.6. Have not talked about the gray wolf with anyone.

- 19.3. Did you ever hear that the gray wolf may no longer be called an endangered animal?
  - 19.3.1. Yes
  - 19.3.2. No
  - 19.3.3. Don't know
  
- 19.4. How did you know about that?
  - 19.4.1. School/teacher(s)
  - 19.4.2. Home/Parent(s)
  - 19.4.3. Friend(s)
  - 19.4.4. Zookeeper/Tour guide
  - 19.4.5. TV/News/Internet
  
- 20. What is an endangered animal?
  - 20.1. Correct Definition
    - 20.1.1. Unelaborated (Very few individuals of a species remain) (e. g. , “an animal that there hardly any of. ” #6).
    - 20.1.2. Elaborated description
      - 20.1.2.1. In danger of going extinct (“Endangered animal is an animal that um, um, is going to e.... . extinct. ” #7; “An endangered animal is an animal threatened to become extinct, wiped out, none of it left. ” #52)
      - 20.1.2.2. Ongoing loss of individuals (boundary: “something that is gonna die” #3)
      - 20.1.2.3. Anthropogenic causes
      - 20.1.2.4. Natural causes
      - 20.1.2.5. Effects on Ecosystem (including effects to food chain) (e. g. , “...that breaks up the food chain, which endangers other animals. ” #35)
      - 20.1.2.6. Conservation issues (including attempts) (e. g. , “...and needs kind of special attention, or care to help it go back...” #35)
  - 20.2. Incorrect Definition
  - 20.3. Don't know
  
- 21. What is animal extinction?
  - 21.1. Correct Definition
    - 21.1.1. Unelaborated (No individuals of a species are left in the world) (e. g. , “When the animal is gone. ” #7)
    - 21.1.2. Elaborated description
      - 21.1.2.1. Anthropogenic causes (e. g. , “When an animal is dead and it can't come back because of humans...” #35)
      - 21.1.2.2. Natural causes (e. g. , “...maybe it's because of a meteorite. . ” #35)
      - 21.1.2.3. Effects of biodiversity loss (including effects to food chain)
  - 21.2. Incorrect Definition (e. g. , “I think it's alive?” #3)
  - 21.3. Don't know
  
  - 21.4. Probe: Can an animal that is extinct ever come back?
    - 21.4.1. Yes – unelaborated

- 21.4.1.1. Yes – Scientific/technological advances (including through gene splicing) (e. g. , “Um, I think, mixing, or taking the genes and kind of mixing it with a similar animal, so that similar animal becomes that extinct animal. ” #47)
  - 21.4.1.2. Yes – Biological/re-evolution (e. g. , “If like some of the animals, that need that animal, make another one of that animal... Like monkeys, like scientists think that we are made out of monkeys, like even though there are hardly any left, monkeys make, maybe can make more. ” #6)
  - 21.4.2. No
  - 21.4.3. Don’t know
22. Are you afraid of the gray wolf? Why or why not? (Note: multiple codes possible within 22. 1 OR within 22. 2, but not between 22. 1 and 22. 2)
- 22.1. Fear of gray wolf exists
    - 22.1.1. Generally afraid of animals.
    - 22.1.2. If they were to encounter in the wild (e. g. , “Um...not really, but like, if I met it in personal [sic], I would be kind of scared. ” #7)
    - 22.1.3. Physical appearance (e. g. claws or teeth) (e. g. , “they do have like claws and stuff...but they only attack you if you attack them, or if they are frightened” #47 – double coded with 22. 1. 7)
    - 22.1.4. Fear of attack (self or other) (e. g. , “Because it might kill your pets” #3; “cause it could eat me. ” #14; “it can hurt me badly” #38)
    - 22.1.5. Predators/Carnivores (without direct reference to attacking self/others) (e. g. , “cause it eats meat. ”#13)
    - 22.1.6. Fear of disease
    - 22.1.7. Attack in self-defense/when provoked (“If you attack it, it’s very dangerous. ” #17; “Maybe if you anger it, like bears. WHY? Cause it has its own natural instincts to hurt if you hurt them they hurt you. ” #32)
  - 22.2. Not afraid of gray wolf.
    - 22.2.1. Generally not afraid of animals
    - 22.2.2. Do not encounter in wild/Only encounter in zoos
    - 22.2.3. Physical appearance (e. g. , cute and fuzzy) (e. g. , “they’re cute, not scary. ” #6)
    - 22.2.4. It would not attack a person (e. g. , “Because they’re only wolves and um, wolves are more afraid of us then we are of them. ” #49; boundary example: “they are trying to protect us. ” #13)
    - 22.2.5. Attack in self-defense/when provoked (e. g. , Because they are really not trying to hurt you, they just they are trying to protect themselves. #9; “I guess probably because they wouldn’t hurt us if we didn’t hurt them. ” #30; “gray wolves are wild... and they think, you don’t bother them, they won’t bother you. ” #39).
23. Is the gray wolf a dangerous animal? Why or why not? (Notes: 1. multiple codes possible within 23. 1 OR within 23. 2, with the exception of 23. 1. 2 and 23. 1. 6, 2. Multiple coding not possible between 23. 1 and 23. 2)
- 23.1. Yes
    - 23.1.1. Physical appearance (e. g. claws or teeth)

- 23.1.2. Fear of attack (self or other) (e. g. , “Because you...people might go too far and they might get dead” #3; “Cause it could kill you. ” #23; “it can easily kill people” #38)
- 23.1.3. Predators/Carnivores (without direct reference to ‘attacking’ self/others)(e. g. , “it could kill things” 46)
- 23.1.4. Fear of disease
- 23.1.5. Aggressive pack behavior
- 23.1.6. Conditional Yes – If provoked/attack in self-defense (e. g. , “I think it can be if you bother it a lot. And it doesn’t like you. But, not really. “ #39; “Well, they might or might or not, depending, on where I am. Cus if I’m like, if it’s a female and I’m near the nest, and um, she, and her um, pups are there, then she might kill me cus she thinks I’m an intruder. ” #49; “I don’t think so. But it probably could be if you tried to hurt it. ” #30; “yes if you bother it. ” #47)
- 23.2. No
  - 23.2.1. Do not encounter in wild/Only encounter in zoos
  - 23.2.2. Physical appearance (e. g. , cute and fuzzy)
- 24. Let’s say that you had the power to protect the endangered gray wolves from going extinct. How would you protect the gray wolves?
  - 24.1. Inform the public (e. g. , “By telling people not to litter and telling people not to, um, kill them...” # 41)
  - 24.2. Create a law (e. g. , “...probably by making a law that you can’t kill them...” #30)
  - 24.3. Punish those that harm (e. g. , “... that they would be be put in a hell. That means a prison. OK. And a a prison of fire. ” #16)
  - 24.4. Create a reserve
    - 24.4.1. Unelaborated (e. g. , “...put them in like a national park...um, you can’t hunt animals so if they’re th, if they’re in a national park, they can be safe there. ” #31; “keeping them in a place, where...and there is lots of food and there are lots of animals, um, that aren’t very powerful”)
    - 24.4.2. With human caretaking (e. g. , “...I would keep them in the shelter, take care of them...” #22; “I’d take care of the gray wolf’s babies. HOW WOULD YOU DO THAT? I would make like a place where no one could build um houses and then make it for the gray wolf’s babies. ” #25; “...I would put paint over it and I would put a chimney over it and I would make a little house...and then when they need to get some food, I could go buy a bunch of food and then give them to the wolves, like killed rabbits.... and they’re be a firepit...”#12; “...I’d protect it like building a space...and add a trees and leaves and I’d feed them as much food as possible. ” #13; “Well, I would probably like take a patch of land, like forest, and then put them there, and then make sure that around it, nobody was there and like fence it and kind of make like a giant zoo for them, and then just feed them...” #46. )
    - 24.4.3. Autonomy/sovereignty (e. g. , “”...set up like a little area where they can run freely...” #32; ...more wolves in the wild, than in zoos, less zoos in the world, so that there are more wolves in the wild, than I’d mostly let them live, how they want to live, not how humans want to have them, like in zoos, or in their tummy, their stomach. ” #21; “by putting them in like a wildlife area where you’re not allowed to

hunt, or bring any guns in... like it's just a wild, but the animals are safe inside of it and they still, they get their own resources..." #43)

- 24.5. Would use super powers (e. g. , "uh, make a giant force field. " #17; "probably like no bullet could touch their skin or something. " #50)
- 24.6. Would not protect (e. g. , "By killing them. " #3)
- 24.7. Don't know

## JUSTIFICATION CODING MANUAL

### Justification Coding Notes

1. Participants can provide more than one justification for an evaluation. Code all significant justifications instead of only the most predominate one.
2. Do not code justifications that the participant uses on the basis of a misunderstanding of the question.
3. If in justifying an evaluation there is both an elaborated and unelaborated justification, code only the elaborated justification.
4. Do not code a given justification more than once for each evaluation.
5. In interpreting a response it may be required to read beyond the particular question and review the preceding and following questions, or the overall tenor of the responses that arises over the entirety of the interview. In such cases when an unclear justification is clarified later in the interview, it is permissible to re-code evaluations, but use this rule judiciously and conservatively.

### Outline of Coding Categories

1. Harm to Nature
  - 1.1 Harm to Animals
  - 1.2 Harm to Vegetation
  - 1.3 Harm to Nonliving Parts of Nature
  - 1.4 Harm to Species
  - 1.5 Harm to Natural Processes
    - 1.5.1 Food Chain
    - 1.5.2 Ecosystem
2. Anthropocentric
  - 2.1 Punishment Avoidance
  - 2.2 Personal
    - 2.2.1 Predilections
    - 2.2.2 Interests
    - 2.2.3 Projects
  - 2.3 Relational
    - 2.3.1 Physical
    - 2.3.2 Companionship
    - 2.3.3 Caretaking
  - 2.4 Welfare
    - 2.4.1 Unelaborated
    - 2.4.2 Individual's Welfare
      - 2.4.2.1 Physical
      - 2.4.2.2 Material
      - 2.4.2.3 Psychological
      - 2.4.2.4 Educational
    - 2.4.3 Other's Welfare
      - 2.4.3.1 Physical
      - 2.4.3.2 Material
      - 2.4.3.3 Psychological

- 2.4.3.4 Educational
- 2.4.3.5 Societal Welfare
- 2.4.3.6 Systemic Welfare
- 2.4.3.7 Generational Welfare
- 2.4.4 Justice
  - 2.4.4.1 General
  - 2.4.4.2 Contextualized by Welfare
  - 2.4.4.3 Contextualized by Telos
  - 2.4.4.4 Isomorphic
    - 2.4.4.4.1 Direct
    - 2.4.4.4.2 Condition
  - 2.4.4.5 Transmorphic
    - 2.4.4.5.1 Compensatory
    - 2.4.4.5.2 Hypothetical
- 2.4.5 Aesthetic
- 3. Biocentric
  - 3.1 Intrinsic Value of Nature
    - 3.1.1 General
    - 3.1.2 Biological Life
    - 3.1.3 Inanimate Objects
    - 3.1.4 Natural Processes
      - 3.1.4.1 Food Chain
      - 3.1.4.2 Ecosystem
    - 3.1.5 Telos of Nature
    - 3.1.6 Isomorphic
      - 3.1.6.1 Direct
      - 3.1.6.2 Conditional
    - 3.1.7 Transmorphic
      - 3.1.7.1 Compensatory
      - 3.1.7.2 Hypothetical
  - 3.2 Harmony
    - 3.2.1 Relational
      - 3.2.1.1 Psychological Rapport
      - 3.2.1.2 Preservation
    - 3.2.2 Compositional
  - 3.3 Justice
    - 3.3.1 General
    - 3.3.2 Contextualized by Welfare
    - 3.3.3 Contextualized by Telos
    - 3.3.4 Isomorphic
      - 3.3.4.1 Direct
      - 3.3.4.2 Conditional
    - 3.3.5 Transmorphic
      - 3.3.5.1 Compensatory
      - 3.3.5.2 Hypothetical

**Coding Categories (with examples and definitions)**

## 1. Harm to Nature

A concern for the harm caused to nature. No reference is made to whether that concern derives from an anthropocentric or biocentric orientation. Notes: (a) this category is a minimal code, meaning that if it is used in conjunction with either anthropocentric or biocentric reasoning, then code only the latter reasoning.

### 1.1 Harm to Animals

An appeal is made to the welfare of animals. Notes: (a) If it is unclear whether the response refers to plants or animals (e. g. , a reference to “living things”) then code responses to “harm to animals” – a more conservative code. (e. g. “Why is it bad? The fish vanished...I think they all died. ” (Kahn, 1999, p. 235).

[It matters to me if an animal becomes extinct] because it...  
(pause) can die. (#3, Q5)

[Alright to kill the gray wolf because] if cats and dogs go too far,  
they might kill them. ( #3, Q12)

### 1.2 Harm to Vegetation

An appeal is made to the welfare of plants, including such vegetation as grass, vegetables, flowers, and trees.

### 1.3 Harm to Nonliving Parts of Nature

An appeal is made to the welfare of nonliving parts of nature, including rocks, mountains, and oceans. While such parts may contain living things, the parts themselves are not living. (e. g. , “[It’s not all right if a person throws trash in the Rio Tejo] because it will pollute the water of the Tejo River. ” (Kahn, 1999, p. 235).

### 1.4 Harm to Species

An appeal is made that extends beyond the concern for the welfare of individual animals, or groups of animals, to the concern for the entirety of the group on the species level. Note (a) Do not double code this category with 1. 4 (harm to natural processes), but code only 1. 5. (e. g. , Because their species would become extinct. ” (Kahn, 1999, p. 236)

[Animals have rights] because they will be extinct. #16, Q15

The there is less of them and they are endangered...then there is more higher chance that they will become extinct- extinct-“ #9, Q11

it won’t come back and you probably won’t see it again” #9, Q6  
*conservative code due to difficulty in discerning whether concerns centered around people not seeing the wolves or the wolves not existing.*

## 1.5 Harm to Natural Processes

An appeal is made that incorporates aspects of harm to animals, plants, nonliving parts of nature, and species, but embeds these aspects within an understanding of a larger systems perspective. Notes: (a) If reasoning of this form includes a reference to humans then code in its appropriate anthropocentric category.

### 1.5.1 Food Chain

An appeal to the interconnected parts of the ecological community, largely by means of a descriptive hierarchy.

Cus the um, gray wolf will be extinct, tinct. And that'll cause the overpopulation- MMHMM [OK] -of the, um, prey. (#49, Q4)

They could become extinct then, some stuff might get overpopulated (#38, Q16)

### 1.5.2 Ecosystem

An appeal to a system of interconnectedness and dependencies that establish natural balances, sometimes through a discussion of habitat. Notes: (a) If a discussion of species includes reference to a systems perspective, code here. (e. g. , “[Deforestation is a problem] because a person, when he cuts trees down causes that we have fewer plants, and plants generate oxygen, and that way there is less oxygen in the world. ” (Kahn, 1999, p. 236).

[Not alright to kill the gray wolves] Cus, they help our planet- YEAH? -Earth. MMHMM [Yes]. HOW? By, um, killing, they kill some animals, who kill animals that are important. (#6, Q10)

Animals help our planet Earth...giving birth...doo[poop] makes the soil better. ” #6, Q12

Cause they help our planet. #6, Q11

## 2. Anthropocentric

An appeal to how impacting the environment affects human beings. The environment is given consideration, but only because of human consequences. Notes: (a) Also code as anthropocentric if the justification refers to the avoidance of harm to people, e. g. , “it’s OK, for bugs to die because then these bugs can’t bite people. ”

### 2.1 Punishment avoidance

An appeal to punishment or its avoidance. Notes (a) If punishment avoidance is embedded in dialogue with another justification (e. g. , other’s welfare) then code the other justification only. On the other hand, if only punishment avoidance is juxtaposed with another justification, then code both.

### 2.2 Personal

An appeal to the personal predilections, interests, and projects of self and others.  
Notes: (a) Code only the highest subcategory (e. g. , if both 2. 2. 2 and 2. 2. 3 reasoning invoked, code only 2. 2. 3)

**2. 2. 1 Predilections** An appeal to largely unelaborated likings. Notes: (a) Minimal code – do not use this code if any other anthropocentric or biocentric code is used. (e. g. , “because I love fish. ” (Kahn, 1999, p. 237).

[It matters to me if an animal becomes endangered] because, um, I care about animals. (#6, Q5)

’cause they’re cute” #6, Q6

‘cause I love animals #7 Q7

‘Cause I really like animals. #12 Q5

I care about all the animals. #16, Q6

[It matters if an animal becomes endangered] cause there’s very few left on the earth and most people care about animals. #13, Q5

[Not alright to kill] because I don’t want animals to die...I can’t see him on earth again. ” (#16, Q10).

[Not alright to kill] because I like animals alive. (#16, Q11)

[It matters if an animal becomes endangered] cause there’s very few left on the earth and most people care about animals. (#13, Q5)

**2. 2. 2 Interests** An appeal to fun, enjoyment, satisfaction, or recreation. (e. g. , “Garden’s are important for people to enjoy them. ” Kahn, 1999, p. 236).

**2. 2. 3 Projects** An appeal to interests that form part of a full-bodied conception of self. (e. g. , [Gardens are important because] people get to know each other in the gardens. ” Kahn, 1999, p. 238).

## **2.3 Relational**

An appeal to a relationship between humans and nature, but wherein the relationship fundamentally serves human needs.

**2.3.1 Physical** An appeal to one or more activities that structure a relationship. (e. g. , “[Domestic animals are important because] we can play with them. ” (Kahn, 1999, p. 238)

**2.3.2 Companionship** An appeal to the benefits of companionship that nature accords to humans. Notes: (A) When physical and companionship reasons are combined, code only as companionship. (e. g. , [Plants] are important because as with the animals they keep us company. ” (Kahn, 1999, p. 238).

[It matters to me if an animal becomes extinct] Cause, when I grow up, animals are like my friends, (#22, Q6)

[It is not alright to kill the gray wolves in Greenland] because they could go into extinction. And people couldn't relate to them or stuff... (#31, Q21)

I just don't think that it's okay to kill other animals. Cause then humans are living on earth all by themselves. AHHH. It's gonna be like, all the animals are extinct, humans will be all by themselves and that's gonna be pretty lonely. YEAH? With no pets. (#50, Q12)

**2.3.3 Caretaking** An appeal to taking care of aspects of nature as one might take care of a person. (e. g. , “[Domestic animals are important] because we can give love to animals. (Kahn, 1999, p. 239).

## 2.4 Welfare

An appeal to the welfare of human beings. Note: (a. ) If physical welfare justifications overlap with material welfare, code only as physical

**2.4.1 Unelaborated** An appeal based on a general statement of welfare that is otherwise unelaborated, often in the form of references to the potential for harm, yet distinct from considerations of harm as a non-issue, not possible or not a consideration in this instance. This unelaborated category is particularly important for reasoning around pets and livestock. In those cases it is sometimes unclear if the child is referring to a material harm (e. g. , a death of the livestock - where in some cases that concern is clear) or psychological harm (e. g. , death of pet - where in some cases that concern is clear). Here is a boundary example of unelaborated anthropocentric welfare: “[Alright to kill the gray wolves] because we don't want it to get any pets. ” Here the participant is talking about people's pets but it is unclear if it is a concern for the psychological welfare of people (a clear example of psychological harm is when the kids talk about concern for pets, as their death would make people upset: “[It's alright to kill the gray wolves] because they'll kill cats.... because people might miss their cats. ”). In another case, a participant states: “[It's alright to kill the gray wolves because] if cats and dogs go too far, they might kill them. ” In this case the concern for cats and dogs is not clearly tied to anthropocentric, so it is coded as a 1. 1 Harm to Nature (Harm to animals).

[Alright to kill the gray wolves] because we don't want it to get any pets. (#3, Q10)

If people kill the wolves, pets will be fine. #3 Q17

Cause they could be dangerous (#23, Q10)

**2.4.2 Individual's Welfare** An appeal that is centrally concerned with the welfare of the self. Notes: (a) Only code as individual's welfare if it is clear that the appeal is self-centered, otherwise consider other's welfare.

**2.4.2.1 Physical** An appeal to the self's physical welfare. (e. g. , "It is bad [to hurt the birds by means of pollution] because I cause harm to the environment that is around me, I am causing harm to myself." (Kahn, 1999, p. 239).

**2.4.2.2 Material** An appeal to the self's material welfare.

**2.4.2.3 Psychological** An appeal to the self's psychological welfare, including emotional states: Notes: (a) IF the appeal has more of a relational sense to it, consider the companionship code or the biocentric relational code of psychological rapport, X. (e. g. , "[Garden's are important because] I speak for myself: When I am tired or stressed, it is relaxing to sit under a tree, in a garden in the middle of town...." (Kahn, 1999, p. 240).

Because I'm sad if all the animals extinct. #16, Q5

"kind of sad...I love animals and don't want...extinct. #7, Q5

**2.4.2.4 Educational** An appeal to the self's educational welfare.

[It matters to me if an animal becomes extinct] cause I watched, sometimes I watch animal things and I keep on seeing people killing animals so I keep on going to a national geographic and watch it just so I can learn about animals. (#22, Q6)

**2.4.3 Other's Welfare** An appeal to the welfare of other human beings. While the self can be included in this group, especially with inclusive pronouns (e. g. , "we," "our," and "us"), the self is not the primary consideration.

**2.4.3.1 Physical** An appeal to the physical welfare of other human beings. Notes: (a) If the justification overlaps with material welfare, code only physical welfare. (e. g. , [Plants are important] because they generate oxygen. Without them we wouldn't live." (Kahn, 1999, p. 240).

[Gray wolves should be wild] because they can kill people. (#3, Q13) *boundary case, more clear in the tenor of interview, wherein the reasoning captures the idea that it is best to keep wolves wild and not in homes, so to not harm people.*

[It's okay to kill the gray wolves] cause um from killing other people from other states or killing people that we really like. (#23, Q11)

[The gray wolf should not be wild] because it's wild and it could kill a lot of people. (#23, Q13)

[It's not alright to kill the gray wolf] ...because they can protect us and keep us safe from other animals that can kill us. (#13, Q10)

**2.4.3.2 Material** An appeal to the material and economic welfare of human beings. (e. g. , [Plants are important because] some give glue, give us paper, many things that we use in our daily life. ” (Kahn, 1999, p. 240).

Wolves could give you something really special, like a fur coat. #12, Q10.

**2.4.3.3 Psychological** An appeal to the psychological welfare of human beings, including higher order emotional states, such as comfort, peace, security, calmness, and mental health. (e. g. , “[Plants are important] because they give us spiritual peace. ” (Kahn, 1999, p. 241).

[It's alright to kill the gray wolves] because they'll kill cats... because people might miss their cats. (#3, Q17)

[It's not alright to kill the gray wolf] cause then they'll be extinct and we'll never see them again...than whoever likes gray wolves would be upset and they won't be happy. (#22, Q10)

**2.4.3.4 Educational** An appeal to the potential for humans to learn from nature, and for nature to benefit others' overall development. Notes: (a) If the educational nature of the response is embedded within a concern for physical harm – e. g. , the curing of a disease – code only physical welfare. (e. g. , [Gardens are important] because that way we still have an idea of what life was some years ago, many years ago. ” (Kahn, 1999, p. 242).

[It matters if an animal becomes endangered] .... because it's gone, so there's not, nothing to learn about it. (#43, Q5)

[It matters if an animal becomes extinct] cus, um, they'll be no more of that animal on Earth. And they'll affect school, cus, if a teacher or something wants to do a, um, like a report, on that animal. But it's extinct, it'll um lower the, um, education. (#49, Q6)

**2.4.3.5 Societal Welfare** An appeal to the welfare of a society, nation, or planet as a whole. (e. g. , "Because... [certain trees] are a national treasure, they are things that can't be seen anymore." (Kahn, 1999, p. 242)

WHY DO YOU THINK THEY HAVE RIGHTS? I think they have rights because um, they like protecting other countries and countries we live in. (#13, Q15)

[Wolves have a right to be wild] So that they can, can stay and, and um, then they will not disturb us. (#7, Q18)

It could um, could be the cure for cancer, so that's really big, so that's important, cause many people are affected by cancer every year. (#32, Q2)

**2.4.3.6 Systemic Welfare** An appeal that embeds concern for human welfare within a larger systemic context, including social systems (such as those that are political and economic), ecological systems (that appeal to how the welfare of humans is affected due to understanding how the interconnectedness and dependencies of ecological systems can establish natural balances across geography and time), and the coordination of social and economic systems. Notes: (a) This code does not pertain to individual biological systems such as the human body. (Kahn, 1999, p. 243).

[Wolves have rights] because they help us... they're food for plants. And they fertilize plants. (#14, Q17)

[It matters if an animal is endangered] because, animals can be important, um, like, in the human, um, like, the human cycle. So, like what we eat and stuff. (#31, Q5)

Cus, if it becomes extinct, there will be no more. And, there'll like, there'll be like an overpopulation of um, the type of animal that the gray wolf kills. MMHMM [GO ON]. And then that'll lead to less and less fertilization in the Earth. MMHMM [OK]. AND SO WHAT IF THAT HAPPENS? Then, the Earth will bend (sic), the humans will be affected cus there \_\_\_\_\_, there might not be enough oxygen from the plants being, um, gone. (#49, Q10)

Because, if an animal becomes endangered and if and if all the animals become endangered and people keep killing animals, then eventually there might be no more animals left. Then if there are

no animals, things like insects would start taking over and the things that eat insects like birds and stuff would be extinct so insects would just overwhelm the world. And there wouldn't be enough bug killer and bug spray to defeat them. AND WOULD IT BE A PROBLEM OR NO PROBLEM IF THERE WAS A WHOLE BUNCH OF INSECTS LIKE RULING THE WORLD AND TAKING OVER LIKE YOU SAID. Basically, a pro-, it'd be definitely a problem if they'd try to rule the world because then they would rule over humans. (#21, Q5)

Well, sometimes animals can help the earth. Like trees help the earth by taking in carbon dioxide and breathing out oxygen, if there's no trees they don't put out no oxygen, so there's no new oxygen, then the pollution swarms in and we have to wear gasmasks. (#50, Q11)

that might mess up the food web- OHHH? [INTERESTED]-the food chain. TELL ME MORE ABOUT THAT- Well.... -WHAT DOES THAT MEAN? But, the food chain, some animals are critical to it and if one animal cannot feed on that animal, um, then they're gonna be in endangered and soon go extinct too. MMHMM [OK]. AND IS THAT A PROBLEM? Yes. WHY? Cus the food chain is gonna keep on getting smaller and smaller. And animals are gonna start getting less and less to eat. SO, WOULD THAT BE A PROBLEM? Yes. WHY? Cus, um, every animal would eventually become extinct. SO, WHAT IF ALL THE ANIMALS WERE EXTINCT? Um... then all the humans would die. (#39, Q5)

#### **2.4.3.7 Generational Welfare** An appeal to the welfare of future generations.

Notes: (a) This code overrides any particular type of welfare. For example, material generational welfare would be coded here, not under material welfare; (b) This category does not refer to past generations. (e. g. , “[Because] it belongs to everybody, it is ours as a nation, it is ours as Europe, it is ours now, it is ours as [it was] our forefather's and the next generation's. ” (Kahn, 1999, p. 243).

Cause we don't want many animals to become endangered. Cause when we grow up and we have kids then we won't want then we will want our kids to actually see the animals that we saw. (#52, Q5)

## **2.5 Justice**

An appeal that humans have rights, deserve respect, fair treatment, ownership of property, and/or merit freedom.

### **2.5.1.1 General** A largely unelaborated appeal to rights, respect, fairness, ownership, and freedoms. Notes: (a) If societal considerations are part of

justice, do not code as societal but only as justice. (e. g. , “We don’t have the right to do that, it is going to destroy the ecosystem and we are part of the ecosystem. We are going to be harmed also, as it is happening already to us. ” P. 243; “It is wrong [for a person to throw trash in the Rio Tejo] because one has no right to make dirty what belongs to everybody. ” (Kahn, 1999, p. 243).

Because... the wolves didn’t do anything to the farmers, so the farmers have no right to hunt the wolves. (#46, Q18)

**2.5.1.2 Contextualized by Welfare** An appeal that establishes fundamental linkages between justice and welfare reasoning, including appeals to unjustified harm. (e. g. , “[It would matter to me if people were affected by throwing garbage in the river] because people should be free, right? That is [something] necessary to everybody, and one’s freedom means that they have [certain] conditions to live their lives. ” (Kahn, 1999, p. 244)

**2.5.1.3 Contextualized by Telos** An appeal that establishes fundamental linkages between justice and telos, including the right to a flourishing life, the right to fulfilling a design or purpose. Notes: (a) This category can be double-coded with either isomorphic or transmorphic justifications.

**2.5.1.4 Isomorphic** An appeal to a correspondence between two or more humans.

**2.5.1.4.1 Direct** Humans are viewed as essentially similar to one another, and sometimes the relevant properties are specified.

**2.5.1.4.2 Condition** An appeal that establishes an if-then conditional judgment that leads to personal perspective-taking, though the judgment is not yet universalized.

**2.5.1.5 Transmorphic** An anthropocentric isomorphism is established, and then extended.

**2.5.1.5.1 Compensatory** Humans are viewed as both similar and different to one another, yet the qualities that establish similarity are overriding in establishing an anthropocentric justice orientation.

**2.5.1.5.2 Hypothetical** An appeal that establishes a hypothetical situation that leads through reflective moral impartiality to what is viewed to be a universally compelling conclusion.

## 2.6 Aesthetic

An appeal to the preservation of the environment for the viewing or more broadly, sensorial pleasure of humans. (e. g. , [Plants are important to me] because they are beautiful. ” (Kahn, 1999, p. 245).

[It’s not alright to kill the gray wolf] because then people won’t be able to see as much of them. YEAH. DO YOU THINK PEOPLE WILL WANT TO SEE AS MUCH OF THEM? Hmmm hmmm [yes]. HOW COME? Just because they are beautiful. (#9)

Sometimes it’s pretty and animals are roaming and bees are smelling the flowers. #13, Q6.

### 3. Biocentric

An appeal to the moral standing of a larger ecological community of which humans may be a part.

#### 3.1 Intrinsic Value of Nature

An appeal that nature has value, and the validity of that value is not derived solely from human interests. Notes: (s) (a. ) The categories are hierarchically integrated, so only code the highest category, with this one exception: categories 3. 1. 2 and 3. 1. 3 can be double-coded; (b. ) Intrinsic Value can be coded with Isomorphic or Transmorphic reasoning.

**3.1.1 General** An appeal to general, implicit, or unspecified values about nature (“Because the water is good”). Notes: (a) If unelaborated rights and respect reasoning is embedded in reasoning about values, then code as rights. (b) Minimal code.

**3.1.2 Biological Life** An appeal to the intrinsic value of biological life. (e. g. , [Wild animals are important because] every living being has to have the opportunity to be alive. ” (Kahn, 1999, p. 246; “[Wild animals are important because] they are the essence, the basics. ” (Kahn, 1999, p. 246; “It is important to have some [wild animals] in order to continue to have [them] always. ” (Kahn, 1999, p. 246).

[Animals] should have rights. OK, WHY? Um...because, they’re living things. (#39, Q15)

I think they do have rights. WHY? Um, because they are living things, and all living things should have rights. (#47, Q15)

LET’S SAY THAT THERE WAS A LAW HERE IN WASHINGTON STATE THAT ALLOWS PEOPLE TO KILL THE GRAY WOLF WITH THIS LAW IN PLACE, WOULD IT THEN BE ALRIGHT OR NOT ALRIGHT FOR PEOPLE IN WASHINGTON STATE TO KILL THE GRAY WOLVES? I

don't think it still would be alright, because although they made this law, I mean, it would be legal, and so in one case it would be alright, but there're still an animal and they still, well, you know, are living, and that would be, well, they would become more scared, and then, and the law may not be right, although it is a law. (#35, Q11)

[Gray wolves should be allowed to be wild and live free because] we should let them have their room. \_\_\_\_\_ but not like take over more of it.... YEAH? HOW COME? Because, as um, we should as um, let all animals have um, be alive and stay where they are. YEAH? WHY DO YOU THINK THAT? Because I love animals. (#7, Q13) *Not coded as Anthropocentric-Personal-Predilections, a minimal code, due to biocentric code (see note in 2. 1. 1).*

[The gray wolves should be allowed to be wild and live free] because, it's like...um, because it's a living thing. And sort of needs to be wild and free to live. (#39, Q13)

[Gray wolves should be allowed to be free] because it doesn't want to be locked up and caged. WHY DOESN'T IT? Cause it doesn't have time to roam around. That's what it likes. (#17, Q10)

Because they're living things and all living things should have rights. WHY? Because they should be able to eat when they want, hunt when they want, and stuff like that. (#47, Q16)

Because they don't want to be killed...they don't want to die. #17, Q17

**3.1.3 Inanimate Objects** An appeal to the intrinsic value of nonbiological natural objects (e. g. , water, rocks, and mountains), including appeals that derive their biocentrism through attributing feelings and emotions to natural objects (e. g. , “the mountain doesn't want the cutters to cut down trees because it's probably be, like, felt”).

**3.1.4 Natural Processes** An appeal that is based on the validity and inherent worth of natural processes.

**3.1.4.1 Food Chain** An appeal to the intrinsic value of natural processes by means of a descriptively characterized food chain. (e. g. , “[wild animals are important] because they are part of our planet and have their place in the food chain. ” (Kahn, 1999, p. 246)

[Gray wolves should be wild and free] because it's some animals food. (#14, Q13)

Well, if there was a law, I guess it'd be ok, but it's still not alright, but I still wouldn't do it. OK, WHY NOT? Cause they're a part of, they're part of the food chain, so. OK, CAN YOU TELL ME MORE ABOUT THAT? The zebra eats grass, the lion eats a zebra, the lion, the turkey vultures eat lions, turkey vultures, I don't know, and they turkey vultures die and they go back to the soil and the soil just goes into the grass and then the... then they turn and they come back down so there's a pile of them and it goes into the soil grows grass and then it starts all over again. NICE. And like the the worms are in the soils and the birds eat the worms and then like turkey vultures eat birds. SO IS THE FOOD CHAIN IMPORTANT? Yes. HOW COME? Uh, let's say there wasn't anymore grass, so then they um, I don't know what I used after grass, I used the zebras and so then the zebras don't have anything to eat and so then all the zebras would die and then cause the lions don't have any more zebras to eat and the lions would die and cause the turkey vultures didn't have any lions to eat, the turkey vultures would die and we would have no more grass. (#32, Q11)

[It matters if an animal becomes endangered] because it um, it'll affect the um, whole world, because of the food chains. OK. And-TELL ME ABOUT THAT. It's when they, um, it all starts with the Sun. And then like, it goes to the grass, where the photosynthesis and then, if the deer become extinct, they'll be no, um, herbivores to eat the grass and the, um, animals that prey on the deer, well, probably won't have that much food left. MMHMM [OK]. SO WHY DOES THAT MATTER? Because then more and more animals will die and become endangered and extinct. (#49, Q5)

**3.1.4.2 Ecosystem** An appeal to a system of interconnectedness and dependencies that establish natural balances across geography and time. (e. g. , “[Wild animals are important] because they represent a natural balance.” (Kahn, 1999, p. 247; “[It's not all right to cut the trees] because it destroys all the ecosystem that is interconnected. For instance, the animals that live around those trees, if they are cut down, they disappear and affect the whole ecosystem.” (Kahn, 1999, p. 247).

[It matters to me if an animal becomes endangered] Cause some of the animals help the earth. HOW SO? Some of them fertilize the plants and when they die, um, helps some of the plants grow, their poop does it too. (#14, Q4)

**3.1.5 Telos of Nature** An appeal to the design or purpose in natural objects, processes, or occurrences, including (a) appeals based on a sense of metaphysics, balance, completeness, aesthetics, or religion, and (b) appeals to the original state of nature (an “is”) to justify its continuation (an “ought”). (e.g., “I think that [wild animals] are important because if someone created them it is because they have some kind of role, therefore they are important.”

(Kahn, 1999, p. 247; “[It is bad to throw trash in the Rio Tejo] because the water, the ocean was not created to have trash thrown into it.” (Kahn, 1999, p. 247; “[Wild animals] are important because they are a patrimony of humanity. They are the result of millions of years of evolution. Of course they are important. (Kahn, 1999, p. 247”)

[Gray wolves should be wild] because, that’s where they’re supposed to be wild things, I guess, and I think they should be able to live there. (#30, Q18)

Cause wolves are wild animals, wild animals live wild, and they live in like Greenland, Washington, and they should live wild like they always do. (#22, Q13)

[The gray wolves should be allowed to be wild and live free] cus it was a wild animal to begin with. And if it’s not wild, then it’ll lose its, um, instinct. (#49, Q13)

[The gray wolves should be allowed to be wild and live free] I don’t think it should be kept in backyard, but ah, um, and it shouldn’t be fenced off, because this is nature, and this is what nature does, I mean, I don’t think that the wol- cause if they are put in fenced off areas then they can’t they they have if they have really big territories then they may like, in the zoo, like animals pace, and that usually means cause that they’re bored and they don’t know what to do. And that would be a bit like an animal in captivity, then it’s not itself, it’s just something that it’s made to be. . . (#35, Q13)

[It’s not alright to kill the gray wolf] because, it’s, cause if they have a shorter lifespan shouldn’t they use up their lifespan accordingly, like the way they’re supposed to do and the way they used to? WHAT DO YOU MEAN BY THAT? Well, if they’re living, they have things that, just because that’s what they’re supposed to do ... (#35, Q10). *Double coded with 3. 1. 2*

[Gray wolf has right to wild] because they are wild animals and not like domesticated. (#47, Q18)

[Animals have rights] because that’s how their ancestors put it all together and that’s how that’s how they found a way to do things, or that’s just how they put it all together. (#35, Q15)

[Gray wolves have the right to be wild] because they were wild to begin with. (#49, Q18)

[Gray wolves have the right to be wild] because they’re wild animals and that’s like in their blood. (#39, Q18)

**3.1.6 Isomorphic** An appeal that is based on recognizing a correspondence between the intrinsic value of humans and those of other natural biological or nonbiological entities.

**3.1.6.1 Direct** Humans and nature are viewed as essentially similar, and sometimes the relevant properties are specified. Accordingly, an appeal is made that nature thereby deserves the same values considerations as humans.

[It's not alright to kill the gray wolf because] they are living things too like us, ... they can think too and they know when they are being hurt. (#47, Q10) *double coded with 3. 1. 2*

Because well it's basically like killing anything else or anyone else and that's not allowed...because they're living things...because they're just like you and you wouldn't want people coming around and killing you (#30, Q10) *double coded with 3. 1. 2*

It's their habitat and that's where they live and they should be able to live there. WHY? Because, if they couldn't it would be like telling someone they can't live in their house anymore...it would just be very, not very nice. (#30, Q13) *double coded with telos (not coded in justice categories, cause the 'should' is more a reflection of the question and evaluation, not the essence of the reasoning.*

...cause, animals are like I study that we're animals, so... when I get older I'm gonna go around the world and tell people, that you're an animal, if you're gonna kill animals then you're killing your own kind. (#22, Q5)

...when we take over its territory, then it's not sure what to do and it could move away, but if it is a mother and it has pups then it may then it can't really or if it's the male of the pack, then you can't really, I mean you can move away but it's harder to because of I mean, that's kind of like, my dad saying, oh we got to move, because they are too many bears in our neighborhood, so we have to move somewhere else. (#35, Q10)

[Animals have rights because they are living things and] .... every living thing has a purpose on Earth.... CAN YOU MAYBE GIVE ME AN EXAMPLE OF WHAT YOU MEAN? Like, we have a purpose to be here and so does the animals. (#38, Q15)

**3.1.6.2 Conditional** An appeal that establishes an if-then conditional judgment of value that leads to personal perspective-taking, though the judgment is not yet universalized.

**3.1.7 Transmorphic** A biocentric isomorphism is established, and then extended. Included here are reasons where in an inequivalent correspondence between nature and humans does not void the mapping of similar value considerations to nature.

**3.1.7.1 Compensatory** Humans and nature are viewed as both similar and different, yet the qualities that establish similarity are overriding in establishing a biocentric justice orientation.

Well, yes, because those animals, they have feelings and they are like us, and they have feelings, and they probably do think and everything, and although they don't have as big of a brain as us, they do have all those things, and those animals are if they are being killed by us, and that's our fault, and so we need to maybe help them. If we're the ones that are doing it. (#35, Q6)

[It's not alright to kill the gray wolves because] they do have a heart and they do have, I mean they do have things to do in their life and although they may not make checklists of what they have to do in that day, they also know well, we need to go, cause that's their instinct, they have to go and find food and in the springtime find a mate and everything...(#35, Q12)

Cause it's kinda cool to see how they are different and how they how they have cool characteristics, like a tail. I like tails. ME TOO (LAUGHS). And really good noses, that smell good and whiskers, it's kind of cool to see a different species. YEAH. WHAT MAKES IT COOL ABOUT SEEING DIFFERENT SPECIES, WHAT IS IT ABOUT THAT? Cause you kinda get to see how other living things are different from you. And how they are kinda the same too.

HUH. HOW ARE THEY KINDA THE SAME TOO? I don't know, sometimes they like, they stand on two legs like humans do or they don't have a tail like humans do. (LAUGH) YUP. And stuff like that. It's kind of cool to see different types of animals. (#50, Q6).

I think they do have rights, I just don't think they have very strong rights. Like they can't necessarily talk, so they can't so they can, they can do it for their own behavior, but you know they can't talk English, so they can't say, or they, so they can't vote, so they don't have their like American right to vote, they have their right to do

what their instinct is, but they don't have rights to choose a leader, it's just, whoever is the strongest. WHY DO YOU THINK THEY HAVE THESE RIGHTS, THAT THEY HAVE? Because that's how their ancestors put it all together and that's how that's how they found a way to do things, or that's just how they put it all together. SO WHICH RIGHTS DO ANIMALS HAVE? They have rights to their territory and if they scent marks, then that's their right of territory, and maybe the territories will overlap, that's well, you know, that territory is their home, so it's no one's and its, although it's territory may overlap that's just nature and that's what they do and it's a bit like us, cause we share fences, so maybe our territory, so maybe our territories overlap a little bit, but uh, it's we hardly ever come together and talk about our fence and how this half is yours and this half is ours, and wolves don't really meet each other on their same territories, so it's not, I mean and then if their right of mating well that's kind of life, that's how they reproduce, and how they get, and so they don't become extinct. (#35, Q15)

**3.1.7.2 Hypothetical** An appeal that establishes a hypothetical situation which leads through reflective moral impartiality to what is viewed to be a universally compelling conclusion.

## **3.2 Harmony**

An appeal to a biocentric conception of harmony between humans and nature.

**3.2.1 Relational** An appeal to a harmonious relationship between humans and nature.

**3.2.1.1 Psychological Rapport** An appeal to an authentic intimacy between the person and the natural.

“because all peoples in the world is in the family... animals is part of our family... cause animals can grow...they grow and they move.” (#16, Q10)

**3.2.1.2 Preservation** An appeal to the less personal, more general form of caretaking for nature.

**3.2.2 Compositional** An appeal to being in balance with nature, through a sense of either proportion (including proportion, moderation, and magnitude of harm), or equality or equity (through direct or indirect compensation or through an abstract understanding of fairness, i. e. , not necessarily “tit for tat”). (e. g. , “[Because] if is not going to be in harmony, it is going, there will be a lack of balance.” (Kahn, 1999, p. 249).

[The gray wolf has the right to not be killed] because if, if, mmm, if we have the right, not to be killed, unless we put ourselves, we go against that, or, unless people go against that right, and if they do go against that right, then that's kind of you know, they've made a bad decision, because everyone has their right to live, including animals. WHY? Because if you don't have one thing, then you don't have another thing, if you didn't have um, if you didn't have the plankton then you wouldn't have whales, if you didn't have whales, then you wouldn't have other things, like, enou-, I don't really know what feeds off whales, but, um, you know if you didn't have that one thing, then you wouldn't have other things because they're also their food source, so say something feed off those wolves, and they, then they would also become endangered, being extinct, so they have their right to live, so everything else has their right. (#35, Q17) *boundary case, in that the food chain balance is bumped up to equity of rights wherein one has rights so that all have rights*

[The gray wolf has the right to be wild] ...because they when they are free they they can live for long time and they'll they'll be nice to us, they didn't kill us, when we do nice things to them. (#16, Q18)

### 3.3 Justice

An appeal that nature has rights, deserves respect or fair treatment, or merits freedom.

**3.3.1 General** An unelaborated appeal to rights, respect or fair treatment and freedom or autonomy. (e. g. ,[Animals] are also part of the world, they have a right to live. ” (Kahn, 1999, p. 250; It is wrong [to cut the trees of a forest down] because it disrespects the life of a plant. ” (Kahn, 1999, p. 250; “[Pets are important] because they also have the right to be free. ” (Kahn, 1999, p. 250).

[It would matter to me if an animal becomes endangered because] well, to me, I don't think it's that fair for animals... (#41, Q5)

[Not alright to kill the wolves] Cus every animal deserves to be on the world HOW COME? Because they're cool, they, they have a life... (#17, Q10)

Um, because they're living things and they deserve to have rights. (#47, Q17)

[Gray wolf should be allowed to be wild and live free] 'cause they're a type of animal and do.... they are not allowed to be slaves. (#6, Q13)

[Gray wolves have the right to be wild] Because... they're living. And they don't want to be locked up. WHAT DO THE GRAY WOLVES WANT? Not to be locked up and to be free. (#17, Q18, p. 7)

[Gray wolves have rights] ...because they're in the forest, and they're alone, and nobody's telling them what to do or anything really. (#46, Q15) *boundary example of an appeal based on autonomy, independence, sovereignty...*

**3.3.2 Contextualized by Welfare** An appeal that establishes fundamental linkages between justice and welfare reasoning, including the right to freedom from unjustified harm, or to the innocence of an agent that has moral standing. Notes: (a) This category can be double-coded with either isomorphic or transmorphic justifications. (e. g. , “[It’s not right to cut the trees because] it causes the destruction of the habitat, it causes the poor trees [to die] that have no fault whatsoever... ” (Kahn, 1999, p. 250; “[It would matter to me if birds were harmed] because I think they should have a right to live; I think that they haven’t done any harm, so I should not do harm to them either. ” (Kahn, 1999, p. 250).

[Gray wolves have the right to be wild because] ...like they didn't do anything, the farmers, I mean the wolves, didn't do anything to the farmers, so the farmers have no right to hunt the wolves. (#46, Q18).

Well maybe they do stuff that's wrong, like attack farmers chickens, but if they aren't the kind of gray wolf that attacks farmers chickens and eating them, like they live in the forest, then I don't think it would be good to do it. AND WHY NOT? Cause they are living a peaceful live. In the forest and they get shot for some reason. (#52, Q12)

Because like they're not doing, like they didn't do anything to you or to anybody else, so why should you do anything to them? #46, Q11

[Gray wolves have the right to not be killed because] ...they weren't doing anything. Well, cause, they never did anything to you, you know. (#46, Q16)

[It's not alright to kill the gray wolf] because, they're well, I just feel like its kinda unfair to them that they keep on dying when people kill them and just endangered them and they become extinct, it's just not fair. (#41, Q10)

SHOULD THE GRAY WOLF BE ALLOWED TO BE WILD AND LIVE FREE? Yeah. WHY? Because if like if it was just it

could be like captured and it could have and like tortured and it like wouldn't be fair for it because it wouldn't like if you like capture a baby gray wolf then it wouldn't be able to learn its regular gray wolf habits and even if it reunited with its pack I think it still it wouldn't know a lot. (#43, Q13)

They have rights. WHY? Because they um, if they are not free, then they'll like learn other habits and then they won't, then if they're set free then they'll just die, cause they are not resourceful in any way probably. (#43, Q16)

[The gray wolf should be allowed to be wild and live free] because, it's just kinda cruel to keep animals like locked up in zoos and cages and stuff, and it's kind of like the saying, if you love something you gotta set it free. (#32, Q13)

**3.3.3 Contextualized by Telos** An appeal that establishes fundamental linkages between justice and telos, including the right to a flourishing life, the right to fulfilling a design or purpose. Note: (a) This category can be double-coded with either isomorphic or transmorphic justifications. Nussbaum's Capabilities Approach is based on the Aristotelian idea of flourishing. This idea holds that a given life form possesses certain capabilities which it has a need to exercise and suggests that limiting the ability for a creature to exercise these capabilities is an injustice. For Nussbaum, dignity is based on natural powers, that is, the very functions of life and autonomy lies in the pursuit of flourishing. She writes: "I believe that thinking of animals as active beings who have a good and who are entitled to pursue it naturally leads us to see important damages done to them as unjust" (p. 302). She argues that animals are subjects who have entitlements to flourishing.

Cus they're a type of animal who deserve to be wild. WHY DO THEY DESERVE TO BE WILD? Cus they've always been wil...wild their whole life...(#6, Q18) *boundary*

Yes. Well it depends what wild means, if wild means, you know, crazy, well then they don't really have that right. But you know if it's to be wild and what they normally do, then I think they do, cause what I normally do is maybe sit down in the summer read a book outside and I have my right to be to draw or my mom has her right to go and if she wants to go and start up her own business, she has her right to do that, and that would mean that the wolves would have their right to go and do the things that they do. (#35, Q18) *double coded with Justice-Isomorphic-Direct*

WHAT DOES IT MEAN FOR AN ANIMAL TO HAVE A RIGHT? Um, it, to me, I think it means, that they like, get to do what they want. Um, and um, they shouldn't be killed or like just

for like the fun of it. They should be able to live free. WHY?  
Because they're wild animals, not domesticated. (#47, Q14)

Um, because they're just like us, and they have a purpose too....  
They have lives too and they deserve to live. ” (#30, Q5) *double  
coded with Justice-Isomorphic-Direct*

DO YOU THINK THE GRAY WOLF HAVE RIGHTS OR DO  
NOT HAVE RIGHTS? I think they have rights of some sort.  
MMMM-K AND UM, WHY? WHY DO THEY HAVE RIGHTS  
OF SOME SORT? Because, as I said they can't vote, but they can  
have their natural rights. AND WHY DO THEY HAVE THEIR  
NATURAL RIGHTS? Cause that's just how the world works and  
that's just how they're gonna not become extinct. TELL ME  
MORE ABOUT WHAT YOU MEAN ABOUT HOW THE  
WORLD WORKS. Well, that's cause, if you're um, it's how,  
humans, how their way is is ta come up with things and do the  
things that we do, but that they're still um, like the way the world  
is to do that, but the way of the world for wolves is also to do what  
they do, so that's kind of what I mean by the way of the world.  
(#35, Q16). *double coded with Justice-Transmorphic*

**3.3.4 Isomorphic** An appeal that is based on recognizing a justice correspondence between humans and other natural biological and nonbiological entities.

**3.3.4.1 Direct** Humans and nature viewed as essentially similar, and sometimes the relevant properties are specified. Accordingly, an appeal is made that nature thereby deserves the same rights and respect as humans. (e. g. , “[It would matter to me that birds were harmed by pollution because] I think that the fish have the right to live as the rest of us [do]. ” (Kahn, 1999, p. 251)

[It matters to me if an animal becomes extinct] because, an animal is like a human. And they're kind of the same. CAN YOU TELL ME MORE ABOUT THAT? Mmmm. WHAT DO YOU MEAN BY, “THEY'RE KIND OF THE SAME?” Well they.... . they have a right to be on planet Earth. (#39, Q6)

[Gray wolves have the right to be free] because they don't like to be pinned up or killed. They like to be free like us. (#47, Q13)

I think animals have rights because its important for animals to be free, like we're a free country and animals should be free too.  
HOW COME? Cause then that's kinda fair, like we're free, we still have laws, but we're free (#32, Q6)

[Animals have rights] because humans are animals, they should be treated equal, like humans, we are animals too, we should, all animals should be treated equal... (#21, Q14)

we can't control animals. WHY NOT? Because animals have their own mind and like you can't say you can't control someone, like you can't say, ok, I want you to go and eat ice cream, when the person is like allergic to ice cream, so you can't say that to animals either (#32, Q16)

**3.3.4.2 Conditional** An appeal that establishes an if-then conditional judgment that leads to personal perspective-taking, though judgment is not yet universalized.

**3.3.5 Transmorphic** A biocentric isomorphism is established, and then extended. Included here are reasons wherein an inequivalent correspondence between nature and humans does not void the mapping of similar biocentric justice considerations.

**3.3.5.1 Compensatory** Humans and nature are viewed as both similar and different, yet the qualities that establish similarity are overriding in establishing a biocentric justice orientation.

Cause animals are creatures just like we are and they have the same rights as we do. HOW COME? Well, not necessarily the same rights, um, to vote, but they have the same rights to live on planet earth. (#52, Q10).

DO YOU THINK THE GRAY WOLF HAVE RIGHTS OR DO NOT HAVE RIGHTS? I think they have rights of some sort. MMMM-K AND UM, WHY? WHY DO THEY HAVE RIGHTS OF SOME SORT? Because, as I said they can't vote, but they can have their natural rights. AND WHY DO THEY HAVE THEIR NATURAL RIGHTS? Cause that's just how the world works and that's just how they're gonna not become extinct. TELL ME MORE ABOUT WHAT YOU MEAN ABOUT HOW THE WORLD WORKS. Well, that's cause, if you're um, it's how, humans, how their way is is ta come up with things and do the things that we do, but that they're still um, like the way the world is to do that, but the way of the world for wolves is also to do what they do, so that's kind of what I mean by the way of the world. (#35, Q16). *double coded with Justice-Contextualized by telos*

**3.3.5.2 Hypothetical** An appeal that established a hypothetical situation which leads through reflective moral impartiality to what is viewed to be a universally compelling conclusion.

**Jolina H. Ruckert, M.A., Ph.D.**  
**Department of Psychology**  
**University of Washington**

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## **Curriculum Vitae**

### **Education**

#### **University of Washington, Seattle, WA**

Doctor of Philosophy in Developmental Psychology

Certificate in Nonprofit Management, Evan's School of Public Affairs

#### **Pepperdine University, Los Angeles, CA**

Masters of Arts, Psychology, Clinical emphasis.

#### **University of Miami, Coral Gables, FL**

Bachelor of Arts *cum laude*

Major: Psychology; Minor: Biology

### **Positions**

#### ***Lead Teaching Assistant 2013-2014***

Psychology Research Methods

University of Washington, Department of Psychology

#### ***Research Assistant, 2006-2014***

University of Washington, Department of Psychology

Human Interaction with Nature and Technological Systems (HINTS) Laboratory

PI: Dr. Peter H. Kahn, Jr.

#### ***Teaching Assistant, 2007-2014***

University of Washington, Department of Psychology

### **Publications**

#### ***Peer Reviewed Journal Articles***

Kahn, P. H., Jr., Kanda, T., Ishiguro, H., Freier, N. G., Severson, R. L., Gill, B. T.,  
**Ruckert, J. H.**, & Shen, S. (2012). "Robovie, you'll have to go into the closet  
now": Children's social and moral relationships with a humanoid  
robot. *Developmental Psychology*, 48, 303-314.

Kahn, P. H., Jr., **Ruckert, J. H.**, Severson, R. L., Reichert, A. L., & Fowler, E. (2010).  
A nature language: An agenda to catalog, save, and recover patterns of human-  
nature interaction. *Ecopsychology*, 2, 59-66.

Kahn, P. H., Jr., Severson, R. L., & **Ruckert, J. H.** (2009). The human relationship with nature and technological nature. *Current Directions in Psychological Science*, 18, 37-42.

#### **Chapter in Edited Volume**

Kahn, P. H., Jr., **Ruckert, J. H.**, & Hasbach, P. H. (2012). A Nature Language. In P. H. Kahn, Jr. & P. H. Hasbach (Eds.), *Ecopsychology: Science, Totems, and the Technological Species*. Cambridge, MA: MIT Press.

Kahn, P. H., Jr., Gill, B. T., Reichert, A. L., Kanda, T., Ishiguro, H., & **Ruckert, J. H.** (2011). Validating characterizations of sociality in HRI. In Dautenhahn, K., & Saunders, J. (Eds.) *New frontiers in human-robot interaction*. John Benjamins Publishing.

Kahn, P. H., Jr., Severson, R. L., & **Ruckert, J. H.** (2010). Experiencing technological nature – and the problem when good enough becomes good. In M. Korthals & P. B. Thompson (Series Eds.), M. Drenthen & J. Keulartz (Vol. Eds.). *New Visions of Nature*. Berlin: Springer.

#### **Peer-Reviewed Conference Proceedings**

Kahn, P. H., Jr., Kanda, T., Ishiguro, H., Shen, S., Gary, H., & **Ruckert, J. H.** (2014). Creative collaboration with a social robot. In *Proceedings of the 2014 ACM Conference on Pervasive and Ubiquitous Computing Adjunct Publication* (pp. TBA). ACM.

Kahn, P. H., Jr., **Ruckert, J. H.**, Kanda, T., Ishiguro, H., Shen, S., & Gary, H. (2014). Will humans mutually deliberate with social robots? In *Proceedings of the 9th ACM/IEEE International Conference on Human-Robot Interaction* (pp. TBA). New York, NY: Association for Computing Machinery.

Kahn, P. H., Jr., **Ruckert, J. H.**, Kanda, T., Ishiguro, H., Gary, H., & Shen, S. (2014). No joking aside – Using humor to establish sociality in HRI In *Proceedings of the 9th ACM/IEEE International Conference on Human-Robot Interaction* (pp. TBA). New York, NY: Association for Computing Machinery.

**Ruckert, J. H.**, Kahn, P. H., Jr., Kanda, T., Ishiguro, H., Shen, S., & Gary, H. (2013). Designing for sociality in HRI by means of multiple personas in robots. In *Proceedings of the 8th ACM/IEEE International Conference on Human-Robot Interaction* (pp. 217-218). New York, NY: Association for Computing Machinery.

Kahn, P. H., Jr., Kanda, T., Ishiguro, H., Gill, B. T., **Ruckert, J. H.**, Shen, S., Gary, H., Reichert, A. L., Freier, N. G., & Severson, R. L. (2012). Do people hold a humanoid robot morally accountable for the harm it causes? In *Proceedings of*

*the 7th ACM/IEEE International Conference on Human-Robot Interaction* (pp. 33-40). New York, NY: Association for Computing Machinery.  
\*Awarded Best Paper HRI 2012.

- Ruckert, J. H.** (2010). Unity in multiplicity: searching for complexity of persona in HRI. In *Proceedings of the 6th ACM/IEEE International Conference on Human-Robot Interaction* (pp. 237- 238). New York, NY: Association for Computing Machinery.
- Kahn, P. H., Jr., Reichert, A. L., Gary, H., Kanda, T., Ishiguro, H., Shen, S. **Ruckert, J. H.**, & Gill, B. T. (2010). The new ontological category hypothesis in human-robot interaction. In *Proceedings of the 6th ACM/IEEE International Conference on Human-Robot Interaction* (pp. 159-160). New York, NY: Association for Computing Machinery.
- Kahn, P. H., Jr., **Ruckert, J. H.**, Kanda, T., Ishiguro, H., Reichert, A. L., Gary, H., & Shen, S. (2010). Psychological intimacy with robots?: Using interaction patterns to uncover depth of relation. In *Proceedings of the 5th ACM/IEEE International Conference on Human-Robot Interaction* (pp. 123-124). New York, NY: Association for Computing Machinery.
- Kahn, P. H., Jr., Gill, B. T., Reichert, A. L., Kanda, T., Ishiguro, H., **Ruckert, J. H.** (2010). Validating interaction patterns in HRI. In *Proceedings of the 5th ACM/IEEE International Conference on Human-Robot Interaction* (pp. 183-184). New York, NY: Association for Computing Machinery.
- Kahn, P. H., Jr., Gill, B. T., Reichert, A. L., Kanda, T., Ishiguro, H., **Ruckert, J. H.** (2010). Validating characterizations of sociality in HRI. In *Proceedings of the Second International Symposium on New Frontiers in Human Robot Interaction* (pp. 50-57). United Kingdom: The Society for the Study of Artificial Intelligence and Simulation of Behaviour.
- Kahn, P. H., Jr., Freier, N. G., Kanda, T., Ishiguro, H., **Ruckert, J. H.**, Severson, R. L., & Kane, S. K. (2008). *Design patterns for sociality in human-robot interaction*. Proceedings of the 3<sup>rd</sup> ACM/IEEE International Conference on Human-Robot Interaction (HRI 2008) (Amsterdam, The Netherlands, March 12-15, 2008). Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE).
- Stanton, C. M., Kahn, P. H., Jr., Severson, R. L., **Ruckert, J. H.**, & Gill, B. T. (2008). *Robotic animals might aid in the social development of children with autism*. Proceedings of the 3<sup>rd</sup> ACM/IEEE International Conference on Human-Robot Interaction (HRI 2008) (Amsterdam, The Netherlands, March 12-15, 2008). Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE).

### **Technical Report**

Kahn, P. H. Jr., Kanda, T., Ishiguro, H., **Ruckert, J. H.**, Gary, H. E., Shen, S., & Maier, R. (2013). Coding Manual for the “Do People Hold a Humanoid Robot Morally Accountable for the Harm It Causes?” Study. Seattle, University of Washington, UW ResearchWorks Archive.

Kahn, P. H. Jr., Kanda, T., Ishiguro, H., **Ruckert, J. H.**, Severson, R. L., Freier, N. G., Gill, B. G., Kane, S. K., Klasnja, P., & Reichert, A. L., (2010). Coding Manual for the “Robovie, You Need to Go into the Closet Now!” Study. Seattle, University of Washington, UW ResearchWorks Archive.

## **Presentations**

### ***Paper and Poster Presentations***

**Ruckert, J. H.** (2014, October). *Children's biocentric moral reasoning about protecting the endangered Gray Wolf*. Paper to be presented at the 20th International Conference of the Society for Human Ecology, Bar Harbor, ME.

**Ruckert, J. H.** (2014, June). *Children's developing conceptions of animal rights* Poster to be presented at the 10th Biennial Society for the Psychological Study of Social Issues convention in Portland, OR.

**Ruckert, J. H.** (2014, June). A teleological account of justice: Children’s developing moral concerns for the nonhuman animal. Poster to be presented at the 40th Annual Meeting of the Society for Philosophy and Psychology in Vancouver, British Columbia.

**Ruckert, J. H.** (2014, May). *Justice for all? Children’s conceptions of animal welfare and rights*. Paper presented at the 44th Annual Meeting of the Jean Piaget Society, San Francisco, CA.

**Ruckert, J. H.** (2013, July). *The Ethnoscience of surfing: Psychology, lexicon and culture*. Paper presented at the 122nd Annual Meeting of the American Psychological Association, Honolulu, HI.

**Ruckert, J. H.** (2013, March). *Designing for sociality in HRI: Strengthening interaction patterns with complex robot personas*. Paper presented at the Pioneer’s Workshop during the 8th ACM/IEEE International Conference on Human-Robot Interaction, Tokyo, Japan.

Kahn, P. H., Jr., Kanda, T., Ishiguro, H., Gill, B. T., **Ruckert, J. H.**, Shen, S., Gary, H., Reichert, A. L., Freier, N. G., & Severson, R. L. (2012, May). *Can a ‘what’ be held morally responsible? – young adults’ conceptions of a humanoid robot that causes harm*. Paper presented at the 42nd Annual Meeting of the Jean Piaget Society, Toronto, CA.

- Kahn, P. H., Jr., Severson, R. L., **Ruckert, J. H.**, & Reichert, A. L. (2009, April). *Robots in the lives of children*. Paper presented at the biennial meeting of the Society for Research in Child Development, Denver, CO.
- Kahn, P. H., Jr., Kanda, T., Ishiguro, H., Freier, N. G., Severson, R. L., **Ruckert, J. H.**, & Gill, B. T. (2009, April). *Children's social and moral relationship with a humanoid robot: Behavior and reasoning*. Poster presented at the meeting of the Society for Research in Child Development, Denver, CO.
- Ruckert, J. H.** (2008, September). *Wild Animals in Captivity? - A Critique of Nussbaum's Capabilities Approach*. Paper to be presented at the Society for Human Ecology Conference, Bellingham, WA.
- Ruckert, J. H.**, & Kahn, P. H., Jr. (2007, June). *Biophilia – Past Conundrums and New Directions*. Paper presented at the Psychology-Ecology-Sustainability Conference, Portland, OR.
- Kahn, P. H., Jr., **Ruckert, J. H.**, & Severson, R. L. (2007, June). *Nature goes digital – Does it matter?* Paper presented at the Psychology-Ecology-Sustainability Conference, Portland, OR.
- Conference Roundtables and Workshops**
- Ruckert, J. H.** (2013, March). *Designing for sociality in HRI: Strengthening interaction patterns with complex robot personas*. Paper presented at the Pioneer's Workshop during the 8th ACM/IEEE International Conference on Human-Robot Interaction, Tokyo, Japan.
- Ruckert, J. H.** (2010, March). *Growing Up With Robots? Social and Moral Development in a Technological World*. Workshop for young innovators in HRI at Advanced Telecommunications Research Laboratory (ATR), Nara, Japan.
- Ruckert, J. H.** (2009, March). *Robotic Technologies in the Lives of Children*. Workshop: 'Social Responsibility in HRI: Conducting our Research, Changing the World' at the 4<sup>th</sup> ACM/IEEE International Conference on Human-Robot Interaction (HRI 2008), San Diego, California, March.
- Kahn, P. H., Jr., Severson, R. L., **Ruckert, J. H.**, & Reichert, A. L. (2008, September). *Technological Nature*. Roundtable at the XVI International Conference of the Society for Human Ecology, Bellingham, WA.
- Kahn, P. H., Jr., Rupp, A., Severson, R. L., McClintock, K., **Ruckert, J. H.**, Stromdahl, P. (2008, September). *Designing for the Biodiversity of Human Experience: A Conversation Between (and with) a Research Lab and Professional Design Firm*. Roundtable at the XVI International Conference of the Society for Human Ecology, Bellingham, WA.

## **Reviewer**

- *Anthrozoos: Journal of the International Society for Anthrozoology*
- *Ecospsychology*

## **Media Outreach**

Jabr, F. (2010). Can a Stroll in the Park Replace the Psychiatrist's Couch? A new generation of psychologists and therapists focus on the relationship between nature and mental health. *ScienceLine*, August 12, 2010. Online at: <http://www.scienceline.org/2010/08/can-a-stroll-in-the-park-replace-the-psychiatrist%E2%80%99s-couch/>

Molinary, R. (2010). Quote for book: *Beautiful you: A daily guide to radical self acceptance*. Seal Press

Stewart, J. (2009). Science in Action: 10/07/2009. *BBC World News*, July, 10, 2009. Online at: <http://www.bbc.co.uk/programmes/p003jkk2>

Dye, L. (2009). Technological nature takes over: With technology invading every aspect of our lives, researchers question the cost. *ABCnews.com*, April 8, 2009. Online at: <http://abcnews.go.com/Technology/DyeHard/story?id=7282121&page=1>

Main, E. (2009). 5 Ways to get more nature into your life. *Rodale.com*, April 23, 2009. Online at: <http://www.rodale.com/nature-and-stress-relief?page=0%2C0>

## **Teaching**

***PSYCH 209: Research Methods; Lead Teaching Assistant to Dr. Jacquie Pickrell and Ann Voorhies  
Fall, 2013; Winter, 2014; Spring, 2014***

Duties include construction of section teaching material, course homework and final projects, grading rubrics, and exams, organizing and maintaining course website, online surveys, grade databases, leading graduate student teaching assistants in instruction of course material, and mediating conflicts.

***PSYCH 257: Psychology of Gender; Teaching Assistant to Dr. Ann Voorhies  
Winter, 2014***

Duties included conducting two weekly discussion sections, developing section lesson plans, midterm and final exam questions, assisting students in course projects.

***PSYCH 200: Comparative Animal Behavior; Teaching Assistant to Dr. Yamile Molina  
Summer, 2010***

Duties included conducting weekly discussion section, developing and conducting final exam review, assisting students in quarter long research project and grading final project papers.

***ENVIR 100: Environmental Studies; Teaching Assistant to Dr. Peter Kahn and Dr. Sonya Remington  
Spring, 2010***

Duties included conducting three weekly discussion sections, developing a intensive quarter long group poster project and individual paper assignment, developing section lesson plans, midterm and final exam questions, developing and conducting final exam review, assisting students in quarter long research project and grading final project papers.

***PSYCH 209: Research Methods; Reader for Dr. Yamile Molina  
Spring, 2010***

Duties included grading and providing extensive feedback on final projects.

***PSYCH 209: Research Methods; Teaching Assistant to Professor Sarah Rasc, PhC  
Summer, 2009***

Duties included conducting four weekly discussion sections, developing and conducting midterm and final exam reviews, assisting students in quarter long research project and grading final project papers.

***PSYCH 414: Social and Personality Development; Reader for Berit Olsen, PhC  
Winter, 2009***

Duties included editing students draft papers, providing extensive feedback on drafts and final papers and grading final submissions.

***PSYCH 202: Biopsychology; Teaching Assistant to Dr. Jeansok Kim  
Spring, 2008***

Duties included conducting four weekly discussion sections, assisting in developing lesson plans for the weekly sections, developing 3 quiz assignments, developing midterm and final exam questions and assisting in grading midterms and the final exam (including grading essay questions).

***PSYCH 345: Social Psychology; Teaching Assistant to Dr. Jonathon Brown  
Summer, 2007***

Duties included conducting two weekly discussion sessions, developing lesson plans and review materials for weekly sections, developing quiz questions and grading three writing assignments.

***Guest Lecturer***

- \* “Children’s Environmental and Moral Conceptions of Protecting an Endangered Species” in ENVIR 495: Ecopsychology, University of Washington (Spring, 2014)
- \* “Human Relationship with Nature and Technology” in PSYCH 101: Foundations of Psychology, University of Washington (Spring, 2014)
- \* “Research in the Real” in PSYCH 209: Research Methods, University of Washington (Spring, 2014)
- \* “Ethics in Psychological Research” in PSYCH 209: Foundations of Psychological Research, University of Washington (Winter, 2014)
- \* “Indigenous Psychology and the Human Relationship with Fire” for Antioch University Masters in Ecopsychology Seminar, Antioch University (Fall, 2012)
- \* “Moral reasoning, culture, & evolution” in PSYCH 478: Cultural Psychology, University of Washington (Fall, 2010)
- \* “A Nature Language” for Antioch University Masters in Ecopsychology Seminar, Antioch University (Fall, 2010)
- \* “Theory and research: Presenting empirical findings” in PSYCH 200: Comparative Animal Behavior, University of Washington (Summer, 2010)
- \* “Moral understanding: Domain theory and the child’s moral relationship to nature and robotic others” in PSYCH 306: Developmental Psychology, University of Washington (Summer, 2010)

***Mentoring Experience***

<b>Dates</b>	<b>Name</b>	<b>Program</b>	<b>Outcomes</b>
2013 - present	Trish Nesh	Undergraduate Research Assistant	Gained experience in coding manual development and data analysis.
2013 - 2014	Michael Hennings	Undergraduate Research Assistant	Gained experience in interview methodology.
2013 - 2014	Tanya Gonzalez	Undergraduate Research Assistant	Gained experience in developing research papers.
2012 - 2013	Xinglu Yao	Undergraduate Research Assistant	1 research conference presentation
2009-2011	Lorin Dole	Undergraduate Research Assistant	1 peer-reviewed publication; accepted to graduate school

***Grants and Awards***

Distinguished Graduate Award for Graduate Students (2014)  
 UW Department of Psychology

Bolls Fellowship (2013)  
 \$1,250 Research Grant  
 UW Department of Psychology

APA Travel Award (2013)  
\$300 plus conference registration  
American Psychological Association

HRI Pioneers Grant (2013)  
\$1750 Travel Award  
National Science Foundation

Bonderman Fellowship (2010)  
\$20,000 Exploration Grant  
University of Washington

Graduate School Fund for Excellence and Innovation Travel Award (2009) (2013)  
\$1100 airfare for conference attendance  
University of Washington