Social and Psychological Drivers of Public Involvement in Large Carnivore Management

DISSERTATION

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By

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Abstract

Large predators are returning to ecosystems in the U.S., and their conservation is an ongoing, perhaps symbolically-driven challenge for wildlife agencies. Current research on public tolerance of carnivores is limited by scale, little theoretical direction, and difficult to replicate measures. Addressing the issue of symbolic meaning, we coded qualitative responses to an open ended survey question regarding salient thoughts and images of wolves for concrete and abstract content. We found that most respondents think of wolves abstractly, though residents of the Northern Rocky Mountains were almost evenly split between abstract vs. concrete thoughts about wolves, and individuals strongly identifying as hunters, gun rights advocates, property rights advocates, or farmer/rancher were more likely to think of wolves concretely. Next, we address existing limitations in current research with two studies that bring theories of risk and decision making to bear on policy-relevant behaviors indicating stewardship and intolerance for wildlife. Modeling wolves as a hazard, we consider the impact of affect, knowledge, risk and benefit on tolerance for wolves among an issue public. We found both stewardship and intolerant behaviors to be well predicted by our model among this sample (r² > .85), and in particular, we found affect for wolves and perceived benefits of recovery to be the most predictive of behavior. In a public sample, a modified hazard model poorly predicts intolerance, but predicted 22% of the variance in stewardship, driven primarily by perceived benefits, which were in turn predicted by trust in the managing agency and positive affect for wolves. Together, these studies indicate some potentially motivated reasoning among the issue public, whose behavioral intentions were largely predicted either directly or indirectly by affect, and
emphasize the overall importance of benefits in predicting tolerance. Conflict over carnivore management will require more than simple outreach to the public for resolution. Trusted agencies leveraging perceptions of benefit might increase tolerance for carnivore conservation, but addressing concrete risks among those with more negative affect will still be necessary. This research suggests that where the wild things will be is where there is a holistic approach to stakeholder engagement.
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Chapter 1: Introduction and Literature Review

Introduction

Large predators are slowly returning as top-level carnivores in ecosystems in the US and elsewhere (Chapron et al., 2014; Enserink & Vogel, 2006), and their conservation is an ongoing challenge for wildlife management agencies (Primm & Clark, 1996). Given their typically large home ranges that often extend beyond publicly-owned lands, understanding public tolerance for carnivore conservation will prove crucial for improving conservation outcomes of these species. Current knowledge focuses extensively on the impact of risk perceptions on tolerance or acceptance of carnivores (Bright & Manfredo, 1996; Gore, Knuth, Curtis, & Shanahan, 2007; Gore, Knuth, Curtis, & Shanahan, 2006; Riley & Decker, 2000; Slagle, Bruskotter, & Wilson, 2012), though some research has investigated the impacts of control (Zajac, Bruskotter, Wilson, & Prange, 2012), trust (Carter, Riley, & Liu, 2012; Zajac et al., 2012), affect (Bright & Manfredo, 1996; Glikman, Vaske, Bath, Ciucci, & Boitani, 2012; Vaske, Roemer, & Taylor, 2013), and symbolism as well (Bright & Manfredo, 1996; Wilson, 1997). Generalized understanding of the drivers for public tolerance of carnivores is lacking, and current research is limited by scale, little theoretical direction, divergent measures, and few efforts to apply models to human behavior that impacts conservation outcomes. The present research is informed by psychological theories and measurement of human behavior and investigates models of tolerance for predator populations. The findings here may be extended to other species, and perhaps other contexts as well. The theoretical underpinnings of the psychological models of tolerance tested here may
suggest guidance for crafting and testing outreach aimed at shaping public tolerance for predators.

The Endangered Species Act of 1973 (ESA) charges both the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service with protecting and recovering those native species deemed “endangered” or “threatened”. Aldo Leopold, a highly influential thinker in wildlife management, famously said that the first rule of tinkering is the keeping of all the parts, in reference to the management of wildlife and their habitats (Leopold, 1949). The ESA codifies this idea, and wisely or foolishly, nowhere does the language in the ESA exclude from protection predators that are potentially dangerous to human lives or property. This places USFWS directly in the crossfire of individuals advocating for the ESA’s full implementation (i.e., recovery on an ecological scale) and those advocating for an exception to the rule for species who can pose considerable risk to human populations. Although this theme is recurrent with other predator species like the grizzly bear (Ursus arctos horribilis) and the Florida panther (Puma concolor coryi), the gray wolf (Canis lupis) serves as the case study here because of its nearly-national scale historic range, and its current status as endangered in all or parts of 42 states (United States Fish and Wildlife Service, 2012).

While the battle wages on in terms of listing the gray wolf, wolf subspecies, and distinct population segments, understanding the drivers of public support and opposition to the recovery of these predator species may enable agencies to craft more effective policies and management plans regarding predator conservation. Moreover, successful conservation of top predator species may contribute to conservation of other threatened species and ecosystems through the effects of trophic cascades (Ripple & Beschta, 2012), where recovered carnivores affect prey species behavior, which in turn impacts plant community composition, which may then impact water quality, and so on.
The present research aims to explore the range of factors contributing to public tolerance for carnivores. One study focuses on the potential role of symbolism in tolerance for wolves, while two studies focus on the risk-based antecedents of tolerance (namely, perceived risks/benefits, affect, social trust, and perceived control). Symbolic interaction is concerned with meaning, or how people understand something (i.e. a wolf), what cues they take from that meaning and how those cues influence behavior. The symbolism of wolves and the role it plays in support for and opposition to predator conservation is not a novel idea (Wilson, 1997); however, empirically investigating the extent to which wolves might be primarily thought of as a symbol and how that relates to both group identity and where one lives remains an open question. Previous studies either lacked empirical data to support symbolic claims (Wilson, 1997), or only conceptualized symbolism in terms of beliefs about the importance of maintaining populations for future generations (i.e., so-called “symbolic existence beliefs”) (Bright & Manfredo, 1996). The present study uses construal level theory as a lens for understanding the varied thoughts and images people associate with wolves, and lends insight to approaches for engaging stakeholders with varying perceptions. Pivoting to more quantitative analyses, previous research on psychological models of tolerance for wildlife point to perceptions of risk and benefit as critical drivers of tolerance, while affect, trust and control likely play important antecedent roles. This study will use wolves as the species of interest, but ultimately, this model may be generalized to other predator species and perhaps even more broadly to nuisance species, generally. Each proposed variable has important potential implications for communication efforts (Slagle et al., 2013). Agencies often already have communication and outreach efforts in place, however, better knowledge of actual psychological mechanisms involved in tolerance could assist agencies in modifying existing outreach, and point to entirely different approaches. Changes might be as simple as adding
language about the benefits of carnivores, or as elaborate as engaging stakeholders in decision-making processes, but understanding these psychological mechanisms can guide where one approach might be more helpful to agency objectives than another.

**Gray Wolf Biology and Its Risk/Benefit Relationship**

The wolf, in the most basic sense, means many things to many people—humans lend their own relevant meaning to wolves and their behaviors, be it as examples of a way to live, in myths to warn children, or objects of scientific study, to name but a few (Lopez, 1978). Beginning as objectively as possible, the gray wolf currently occupies seven states in the U.S., with a subspecies, the Mexican gray wolf, occupying recovery areas in Arizona and New Mexico (United States Fish and Wildlife Service, 2012). In appearance, they look like large dogs, with females weighing between 80-85 lbs and males weighing 95-100 lbs, on average (Mech, 1970). Their characteristic howl can carry over distances ranging from six to ten miles, and is used for reunion purposes, to strengthen social bonds, to avoid other packs, and possibly to find mates (Harrington & Asa, 2003). Wolves’ physical and behavioral characteristics likely influence tolerance among people taking their physical features as representative of the beloved domestic dog. Their howl can be both positively and negatively associated with wilderness (e.g., as an indicator of ‘wildness’, or a reason to fear the wild), and their physical appearance and characteristics also play into human myths and stories. For example, in the myth of the werewolf, a beastly transformation scapegoats incomprehensibly evil human behavior (Beresford, 2013), and in the story of Little Red Riding Hood, big eyes, big ears, and a big, toothy grin warn children of the evils lurking in the forest (Lopez, 1978).

The adaptability of wolves to anthropogenic surroundings is one of the drivers in human-wolf conflicts, with livestock depredation taking center stage. If prey species are large and dispersed on the landscape, wolf packs will tend to have higher numbers and larger
territories (Mech & Boitani, 2003). Their diet is extremely variable, influenced by both the seasons and whatever is available and suitable for consumption. Their prey range from beaver and snowshoe hare to moose and bison, and in the heavily populated areas of Eurasia that they occupy, they will take advantage of anthropogenic food sources as well (Peterson & Ciucci, 2003). In short, they are highly adaptable to their surroundings, and, relative to other species, have been very successful at repopulating areas where they were once extirpated (Mech & Boitani, 2003). Where wolves are still a listed species in most of the coterminous U.S., government officials are able to kill offending wolves upon confirming depredation events (Musiani et al., 2004), and livestock owners themselves may kill offending wolves in Utah, Montana, and Idaho (Bradley et al., 2015; Idaho Department of Fish and Game & Nez Perce Tribe, 2014; Utah Department of Natural Resources, 2011). A number of management tools exist for deterring wolves (Shivik, 2006), however, evidence for why wolves depredate livestock and what methods are most effective for curbing depredation seems to be lacking (Breck, 2004). There is some speculation that depredation is limited to individual wolves that are for some unknown reason disposed toward killing livestock, but support for this viewpoint is limited; however other possible reasons for depredation include habitat characteristics, livestock management practices or seasonal prey availability (Wydeven, Treves, Brost, & Wiedenhoeft, 2004). There is also some evidence for “hot spots” of depredation, where several of the above contributing factors could come together to create optimal conditions for livestock depredation in certain areas (Breck, 2004; Treves, Martin, Wydeven, & Wiedenhoeft, 2011).

In addition to livestock mortality, livestock producers are also concerned about behavior changes in their livestock and a related loss of market weight in wolf territories. Generally, livestock may be more vigilant in the presence of predators, which reduces their time spent foraging, and potentially reduces their fecundity as well. The effects of wolf presence on the
market weight of livestock are difficult to tease out, and efforts to do so are still very recent (Breck et al., 2012) However, initial studies indicate that livestock unaccustomed to wolf presence may actually be less vigilant than wild ungulates, though effects on market weight are still unknown (Laporte, Muhly, Pitt, Alexander, & Musiani, 2010).

One of the many suggestions for better management of livestock in these areas is the use of guard dogs, however, wolves have also killed domestic dogs, possibly in efforts to guard their own territory from pack outsiders (U.S. Fish and Wildlife Service et al., 2016). Depredation of livestock is likely something to be managed rather than cured, though improvement in methods for deterrence is still necessary (Breck et al., 2012). In addition to livestock, the possibility of wolf depredation of humans exists with recovered wolf populations, though this is indeed rare in North America, and is typically associated with rabies elsewhere in wolf range (Linnell et al., 2002). However, childhood stories carry warnings of wolves, and may stick with us throughout our lives, influencing our adult perspectives on their conservation (Kellert, 1985).

The risks of recovered wolf populations listed above are somewhat self-evident, but the benefits provided by wolves are generally less visible to the average person. Some individuals consider it a benefit to merely know that wolves are on the landscape once again (this is sometimes called ‘existence value’). For such individuals, wolves may represent wilderness and naturalness in the world, something inherently good in their minds, while the same wilderness and naturalness represents something distasteful to others (Kellert, 1985; Lopez, 1978).

Biological benefits of wolves may include a reduction in overabundant coyote populations (Crooks & Soulé, 1999) and modification of the behavior of prey species (Hernández & Laundré, 2005); these changes are hypothesized to result in their own biological consequences (Berger, Gese, & Berger, 2008; Ripple, Larsen, Renkin, & Smith, 2001). This system of effects are referred to as trophic cascades, where an increase in predator populations leads to a reduction in prey
species and increased vigilance in the presence of predators, which, in turn, can decrease ungulate herbivory and lead to a variety of ‘indirect effects’ on lower trophic levels (e.g., increased recruitment of trees in riparian areas; Pace, Cole, Carpenter, & Kitchell, 1999). This decrease in herbivory can contribute to stronger streambanks, less bank erosion, improved water quality and cooler water temperatures. The resulting effects on the stream are then thought to create better habitat for fish species (Ripple & Beschta, 2012). Ultimately, while such effects have been identified in places where predators have been restored, the research on trophic cascades is largely correlational, and suffers from the critical defect existing in all correlational research: weak causal inference (Mech, 2012). Likewise, the research supporting these findings primarily comes from pristine (or near pristine) habitats, and uncertainty remains regarding likely impacts in more disturbed habitat areas which are more common across the landscape. A more nuanced interpretation of the evidence for trophic cascades is that the effects of predators on their respective ecosystems probably varies over time and space, and ultimately, depends on the framing of the research questions posed by ecologists investigating the existence of trophic cascades (Peterson, Vucetich, Bump, & Smith, 2014). Given these uncertainties and nuances, trophic cascades as a benefit of predator conservation are somewhat controversial and may be difficult to explain to the general public. In sum, the overall benefits of predator conservation are less concrete than the risks, and may contribute to the psychological drivers of tolerance for predators at the policy level.

**Theoretical approaches**

*Symbolism of wolves*

Symbols are "a concrete representation of some other entity that is often more abstract," (Cary, 1993, p. 556). A thing can be described as “symbolic” if it is used to ‘stand for’ something else. More broadly, these abstractions impact the way people interpret situations and choose
to behave within a given context, a basic premise of symbolic interactionism, one of the grand theories of sociology (Stryker, 1980). In symbolic interactionism, meaning is determined through social interaction, and this includes meanings of objects, roles, and positions. Through the naming and attributed meaning of objects, roles, and positions, social expectations emerge as to appropriate behavior in a given context. The same naming and meaning attribution occurs for the self, and creates a sense of self and of personal behavioral expectations. The degree to which any of these take place—the naming and meaning and setting of expectations for interactions—is dependent upon larger social structures in place (i.e. a formalized setting of church services vs. etiquette at a backyard barbecue). While symbolic interactionism may not directly predict how the interpretation of a specific symbol impacts a particular behavior, it suggests an overview of how people learn to operate in the world.

From a psychological perspective, researchers have invoked construal level theory to explain the context in which abstractions or symbols may be more predictive of behavior than more rational, vested interests (Hunt, Kim, Borgida, & Chaiken, 2010). Construal level theory holds that the more distant something is, be it socially distant or distant in time or space, the more abstract, or high-level, a person’s construals will be regarding that something. Alternatively, when something is closer socially, temporally or spatially, construals will tend to be low-level, or more concrete (Liberman, Trope, & Stephan, 2007) When conditioned to think abstractly, people tend to have better self-control, achieve better outcomes in negotiation, and are more creative and intuitive thinkers (Förster, Friedman, & Liberman, 2004; Fujita, Trope, Liberman, & Levin-Sagi, 2006; Wening, Keith, & Abele, 2015). People can think about the wolf issue in high-level terms; for example, valuing the idea that future generations should have intact ecosystems, which might lead to greater support for wolf conservation in the present. For people focused on future generations or benefits, values or central attitudes tend to better
predict choice (Liberman et al., 2007). People thinking about the wolf in low-level terms might be concerned about wolf packs near their home and the potential for depredation, and choose to oppose further wolf conservation. Vested interest may play a bigger role in predicting choice for these people, particularly when the effects of wolf conservation are perceived to be happening sooner rather than later (Hunt et al., 2010).

Lying between ‘big picture’ symbolic interactionism and individually-driven construal-level theories, Wilson (1997) suggests that the intense conflict over wolves is primarily due to their status as symbols with very different meaning to different groups of people. Wilson’s (1997) work suggests that the conflict is not truly over wolves at all, but rather, is about competing visions for the American West. Likewise, some suggest that historical myths and stories influenced the symbolic meaning of wolves in our cultural development, creating largely negative feelings about wolves (Kellert, Black, Rush, & Bath, 1996). Simple examples in western culture include the stories of Little Red Riding Hood or The Three Little Pigs, where wolves are cast as villains (e.g., killing and consuming little girls, grandmothers or livestock), and generally represent “badness” within humans or out in the world (Lopez, 1978). Quantitative research indicates that wolves, represented as a symbol of wilderness, are positively related to individual support for wolf restoration (Bright & Manfredo, 1996). However, recent work is unclear on how these existence beliefs coincide with other types of symbolic beliefs, for example, the idea that wolves are a tool of environmental groups and the federal government to restrict use of federal lands (Slagle et al, unpublished data). Because there is little empirical evidence for the symbols that may exist related to wolves and their conservation, or for the relationship between various symbols and policy support, this analysis will aim to gain some basic understanding of what symbolic beliefs exist among members of the public most engaged with the wolf management issue and the public at large. The relationships between these beliefs, the groups with which
individuals identify, and their interest in the wolf issue will shed light on the potential consequences (intended or otherwise) of communication strategies that tap into the symbolism of wolves.

*Risk theory*

Policy choices and decisions regarding carnivores are laden with risk: risk of extinction, risk of depredation, and from an agency's perspective, the risk of losing public support or incurring opposition. Risk can be either objective and quantitatively defined, or subjectively viewed through the perceptions of the individual. In both cases, risk as a construct is made up of 3 factors: loss, the significance of the loss, and uncertainty surrounding the loss (Yates, 1992). Loss itself assumes movement away from some referent point, for example, experiencing pristine waterways as a child but noticing their degradation as an adult. Objective risk is measurable—typically by assessing the likelihood or probability of a particular outcome, and multiplying that likelihood by the severity of the outcome should it occur. However, research on decision making under risk suggests that subjective risk assessments are important for understanding public acceptance of various types of risks like those posed by recovered carnivores (Slovic, 1987). Subjective risk assessments, or public perceptions of risk, tend to be less sensitive to the probability of a given outcome, and more sensitive to the severity of the potential consequences. The psychometric paradigm generalizes two potential factors for explaining lay subjective risk perceptions: the dread factor, which includes the controllability of a risk and the catastrophic nature of the consequences, and the unknown/novelty factor, which includes the familiarity and observability of the risk (Slovic, 1987). These two factors are characteristics of the risk itself, and the paradigm contends that public risk perceptions will be highest for hazards that contain high levels of dread and novelty. In this case, high risk perceptions related to wolves might be due to the perception that as a risk, wolves are dreaded
or perhaps unfamiliar. Increasing levels of dread and decreasing levels of familiarity with the risk tend to result in higher risk perceptions, with the dread factor typically having the largest influence. The role of dread as measured by affect and perceived control will be explored in more detail below.

Evaluations of risk are only one subset of decisions, and risk can be mitigated by other factors, like benefits, when weighed in the decision process. Perceptions of risk and benefit can be characterized by beliefs about potential positive and negative outcomes associated with some hazard, and there appears to be a consistent, inverse relationship between risk and benefit in the minds of most people. Generally, if risk is high, people perceive the benefits to be low (Finucane, Alhakami, Slovic, & Johnson, 2000). This finding holds for a host of hazards (Alhakami & Slovic, 1994) ranging from nuclear power (de Groot, Steg, & Poortinga, 2013) to genetically modified organisms (Siegrist, 2000) to tiger conservation in Bangladesh (Inskip, et al., 2016). This tendency to perceive a negative relationship between risk and benefit may falsely inflate or deflate one’s perception of the risk or benefit of a hazard. If perceptions of the risks related to predators are high, people may discount potential benefits, and vice versa, thus impacting their support or opposition to predator conservation. It is believed that this inverse relationship between risk and benefits is largely driven by the affective reaction of an individual to a particular hazard (Finucane et al., 2000), see more on this in the following section.

*Emotion/Affect*

Emotions are conceptually diverse, indicative of both the recency of the interest in emotional research and the complex ways emotions are experienced. In their overview of the state of emotion research, Keltner and Lerner (2010) describe four levels of analysis for emotions: traits, moods, emotions, and sensory experiences. Traits are a general tendency towards certain emotional experiences in life (i.e. tendency toward anger). Emotions are
feelings related to a specific object or action (e.g. feeling anxiety about an upcoming test).

Moods are longer lasting than emotions, and not always due to one cause (e.g. waking up in a “good mood”). Finally, sensory experiences are a more physical experience of pleasure or pain (ex: experiencing disgust may make one sick to their stomach), and such experiences are often linked to a positive or negative affective reaction to a stimulus. It is likely that emotions stem in large part from the amygdala, located in a more primitive part our brain (LeDoux, 1996). The amygdala is the first place that sensory input is received in our brains, and is likely where our emotional responses are generated or regulated (though pinpointing emotions as occurring in just one part of the brain is not quite accurate; see LeDoux, 1996). This "automaticity" of affect can occur even for images we are unaware of perceiving, and can even cause an affinity when we have no experience with or reason to prefer a particular stimulus (Zajonc, 1980).

Interestingly, the amygdala also reacts more quickly to animal stimuli than any other type of stimuli, regardless of the positive or negative valence associated with the animal (Mormann et al., 2011). It is possible that this is related to the need of our ancestors to process information regarding predators or prey quickly, although the authors note that the relationship this may or may not have to our current day processing of information regarding animals is uncertain.

Referencing Lerner and Keltner’s levels of analysis above, affect arguably taps into two levels; it is both sensory, in that physical experiences shape it, and emotional, in that it relates to a specific object, idea, or situation. Affect is the simple valenced reaction to some stimuli, whether an immediate reaction to new stimuli or the conscious consideration of one’s affect toward a remembered stimuli, and has a rather important relationship to risk perceptions. Studying risk perceptions, Alhakami and Slovic (1994) found an inverse relationship between risk and benefit, and that this relationship was linked to the affect attached to the stimuli of interest. To elaborate, those holding more positive affect towards the stimuli were likely to rank it as
more beneficial and less risky. This relationship becomes stronger when a time pressure is introduced (Finucane et al., 2000). This time pressure is thought to reduce the amount of rational thought and increase the reliance on quicker, affective reactions. It should be noted that though it appears in people's minds risk and benefit are inversely related, often in reality, risk and benefit are positively related to one another, such that more risk entails greater benefit (Finucane et al., 2000). The inverse relationship between perceptions of risk and benefit is descriptive, as opposed to normative, and the reasons or causes for this are not entirely understood.

In the present study, affect could be playing a role in at least three ways: first, feelings of dread (e.g. negative affect) related directly to wolves or encounters with wolves may influence the positive or negative perceptions of wolf recovery. The second potential role for affect is in its relationship with symbols related to wolves and their recovery. This second relationship suggests that negative or positive affect towards wolves as a symbol is more related to the things wolves represent to people rather than the wolves themselves. So for example, if I hold strong positive affect toward “naturalness” or wilderness, I may transfer this feeling to wolves as a symbol of wilderness (Bright & Manfredo, 1996). Third, affect impacts other cognitive processes in a way that might be thought of as motivated reasoning, such that quick affective reactions directly influence choice, bypassing any deliberative or normatively rational cognitions (Taber & Lodge, 2016). Here, affect acts as a contagion spreading throughout cognitive schema and biasing choices. In addition, these processes are automatic, in that the effect of affect on choices is stronger under time pressure (Lodge & Taber, 2005). These processes result in a biasing of our choices toward our existing feelings for something.

Control
In the psychological literature, the concept of control is multi-dimensional (Ajzen, 2002a), and has been described as relating to locus of control (Rotter, 1966), self efficacy (Bandura, 1977), and perceived behavioral control, commonly associated with the theory of planned behavior (Ajzen, 2002). Locus of internal/external control is thought to be a personality trait, something inherent and rarely changing within the individual, and it distinguishes between those who tend to place the control over a situation within themselves or with some other entity (fate, deity, etc; Rotter, 1966). Perceived self-efficacy refers to one’s sense of how capable they are of performing some task (Bandura, 1977). Finally, perceived behavioral control, stemming from self-efficacy, also refers to how easy or difficult it will be for the individual to perform some behavior (Ajzen, 2002). While Ajzen (2002) goes to great lengths to distinguish between perceived behavioral control and self-efficacy, and on the way discounts locus of control as unimportant to predicting behavior, he ultimately concludes from other meta-analyses that self-efficacy and perceived behavioral control can be acceptably combined into a scale measuring roughly the same thing: whether or not someone perceives that they can perform some behavior. In general, greater perceived control or self-efficacy (and in the case of locus of control, greater internal locus of control) in a situation is associated with lower risk perceptions. Note that one’s perceived abilities to perform some risk-mitigating behavior stands in contrast to the control aspect of risk described above. The uncontrollability of a risk is a characteristic of the risk itself, while one’s perceived behavioral control/self-efficacy are related to the individual or the context. In the present study, control will be measured in two ways: as a characteristic of the risk associated with the species, and as control over the policy aspect of carnivore management. Greater control is hypothesized to be related to lower risk perceptions, and subsequently, greater tolerance of wolves.

Trust
Trust is a necessary mechanism that confers responsibility to some outside agency for the things we ourselves cannot control or manage. It is a risky thing to choose trust—in doing so we pass the responsibility for managing some risk to someone else (Earle & Cvetkovich, 1995). By passing on this responsibility, we reduce the vast complexity of our modern lives and make them more manageable. Trust can be thought of both as calculative, placing confidence in others based on their past behavior and ability to manage risk effectively, and relational, based on future intentions and perceived shared values and goals (Earle & Cvetkovich, 1995; Siegrist, 2000). Calculative trust or confidence is fairly fragile and risk averse, while relational trust is resilient and risk tolerant (Earle, 2010). Relational trust is more likely to act as a heuristic in our decision making, and specific to wildlife management, it simplifies an incredibly complex bureaucratic and ecological problem. We know that when considering wildfire mitigation, individuals trust those agencies they perceive to share values and agreement with on the issue, and subsequently hold more positive views of mitigation practices and may perceive the hazard as less risky (Vaske, Absher, & Bright, 2007). When considering endangered species management by the U.S. Forest Service, individuals with greater trust in the agency were also more accepting of management actions (Cvetkovich & Winter, 2003). Higher trust in an agency to manage wildlife serves to reduce perceptions of risk and raise tolerance for carnivores.

Tolerance

The psychological model of tolerance for carnivores will employ a notion of tolerance proposed by Bruskotter and Fulton (2012), which examines behaviors that can indicate varying degrees of intolerance (actively working against full recovery), tolerance (passively accepting recovery) or stewardship (actively working for full recovery) of wolves. Other research in the wildlife field has used various measures to assess similar concepts of tolerance. The wildlife acceptance capacity (WAC) measure has been used often since its inception 25 years ago, and
refers to the “maximum wildlife population level in an area that is acceptable to people” (Decker & Purdy, 1988, p. 53). The measure explicitly asks respondents whether they think wildlife populations are currently too high or low on a bi-polar scale, and if respondents think populations should increase or decrease in the future. While simple and direct, this measure lacks concrete ties to any psychological theory, save considering it a potential proxy for attitude towards the wildlife population in question.

Other research has used a “preponderance of the evidence” approach, combining multiple variables including WAC, behavioral and behavioral intention measures, and attitudes towards hunting (Naughton-Treves, Grossberg, & Treves, 2003; Treves & Martin, 2011) as indicators of tolerance. The challenge with this approach is that while some variables do potentially connect to theory (attitudes, behavior), the variables used as indicators of tolerance have been inconsistent and often are not grounded in principles of psychological measurement. Likewise, putting attitudes and behavior into one basket is both theoretically indefensible, as our behavior does not always perfectly correlate to our attitudes (Bruskotter, Singh, Fulton, & Slagle, 2015), and practically unproductive, as understanding the mediators to this relationship can aid in changing behaviors. Focusing on behavior or behavioral intentions as indicators of tolerance gives a clear link to not only psychological literature, but to the social sciences generally, a critically important piece to making the interdisciplinary connections future work in this field will demand (Bruskotter, et al., 2015). For this reason, Bruskotter and Fulton’s behavioral conceptualization of tolerance will serve as the dependent variable in tests of psychological models. Control, trust, affect, risk and benefit will be investigated as the potential drivers of tolerance for wolves.

*Putting it all together: Risk, emotion and predator policies*
Bright and Manfredo (1996) suggested a psychological model for understanding support and opposition to natural resource policies, also using gray wolf reintroduction as a case study. Using Fishbein and Ajzen’s (1975) theory of planned behavior as a guide, they surveyed respondents in Colorado, measuring the cognitive components of an attitude toward reintroduction, including knowledge of wolves and potential positive and negative outcomes of wolf recovery, and the affective, emotional component of attitudes. In addition, they measured general attitudes towards wolf reintroduction and towards wolves themselves, symbolic existence beliefs about wolves, and the personal importance of the issue. The cognitive and affective components, general attitudes and symbolic existence beliefs were placed in a path model predicting attitudes toward reintroduction, which in turn predicted behavioral intentions to vote in support or opposition to wolf reintroduction. Overall their path model explained 93% of the variance in support for wolf reintroduction, but this explanation dropped to 76% when respondents considered the issue to be of low importance. While beliefs about outcomes of wolf recovery were significant predictors in their model, positive and negative emotions related to reintroducing wolves were more predictive in their regression models, and only symbolic existence beliefs about wolves were more predictive than emotions in their model of support for wolf reintroduction. Bright and Manfredo discuss a number of ways to influence policy support depending on the interests of the target audience (environmentalists vs. cattle ranchers vs. agencies); however, they ultimately conclude that the tactics suggested, no matter the aim, are unlikely to be effective. In part, this is because it is very hard to change the beliefs (let alone emotions) of those who care passionately about issues (Petty & Krosnick, 2014).

The present study distills this model, and instead of relating to theories of attitudes, beliefs and behavioral intentions, focuses on risk/benefit perceptions, the role of emotion and the implications for risk communication. The risk communication field has developed strategies
for communication based on such variables, and may prove more useful for agencies attempting predator conservation. To that end, the focus herein includes pieces of the Bright and Manfredo model: emotion (measured as affect), knowledge of wolf biology, and beliefs about risk (negative outcomes) and benefits (positive outcomes). Additionally, the hazard objective presented below will enhance the Bright and Manfredo model by adding trust and control, important variables in predicting acceptance of risk, as well as extend the model to a national population. Moreover, symbolic existence beliefs were the largest predictors of support in Bright and Manfredo’s model, and the symbolic objective described below builds on this finding by exploring in more detail the extent to which symbolism is present in the public’s salient thoughts of wolves.

Research Objectives and Hypotheses

Three separate approaches will be used in this study. 1) The first will address the potential symbolism of wolves and determine if empirical evidence exists for a relationship between symbolism and tolerance using existing qualitative data collected from a highly involved public and data from a nationally representative survey of the general public (Symbols objective). 2) The second applies a simplified hazard model to tolerance for wolves among an issue public to understand the role of affect in tolerance (Affect objective). 3) The final approach will be performed in the context of a larger national-scale online survey assessing attitudes towards predator management. Data from this survey will serve to validate a more comprehensive model of predator tolerance using structural equation modeling (Hazard objective).

While the symbols objective is more exploratory in nature, hypotheses for the affect objective can be found in Figure 1.1 below:
Figure 1.1: Proposed affect model of tolerance, with expected relationships noted as positive or negative.

The hazard objective will test a more comprehensive hazard acceptance model of tolerance proposed by Bruskotter and Wilson (2014). Hypotheses for this objective can be found in Fig. 1.2.
Methods

The present research uses a multi-method approach to investigating tolerance for carnivores by qualitatively coding open-ended responses from two large sample surveys, and quantitatively testing psychological models of tolerance from those same two surveys. Both surveys were conducted online, but accessed different parts of the public. The first survey was of a “river sample”, where anyone viewing and clicking the link to the survey could respond (Baker et al., 2010), resulting in a highly interested and motivated sample, hereafter referred to as the issue public sample. That the issue public sample was found to be highly engaged and informed indicates they likely have great breadth and depth to their belief structure for wolves.
(Fishbein & Ajzen, 2010; Heberlein, 2012). If symbolic beliefs exist for wolves and are varied, they may be evident in the open-ended responses of these individuals.

The second set of survey data was collected via an online panel recruited through probability sampling typical of mail surveys (Baker et al., 2010) and similarly generalizable (Chang & Krosnick, 2009), hereafter referred to as the national sample. This sample was accessed through the services of GfK (formerly Knowledge Networks), and consists of 3 stratified samples from their probability-based online panels: one of residents within the Northern Rocky Mountain management area (NRM; including Idaho, Montana and Wyoming), one of the Western Great Lakes management area (WGL; including Minnesota, Wisconsin and Michigan), and a final sample of the remaining continental US. To ensure the generalizability of the proposed model for each region, at least 400 responses from each region were targeted (Schumacker & Lomax, 2004). This number of responses allows for a less than 5% margin of error at the 95% confidence interval for each subsample.

Data Collection

The issue public data was collected using an online questionnaire administered through surveymonkey.com, focusing on predator management in the U.S. It was distributed through a wildlife blog, and was posted for one week, resulting in 813 cases for analysis (no response rate available due to the type of sampling used). The national sample data was collected using an online questionnaire administered through Qualtrics, largely using items included in the online questionnaire used for the issue public sample, but with fewer questions. The online survey will followed a modified Dillman (2007) protocol. All contacts were handled by GfK, but largely consisted of email reminders and if necessary, automatically generated phone calls. The national survey remained open for 11 days in February 2014, and resulted in 1,287 responses and a response rate of 63.7%.
Analysis

The qualitative data analysis for the symbols objective was performed using MAXQDA computer aided qualitative data analysis software that allows for systematic development of codes and relationships among qualitative data. Data analyses for the affect and hazard objectives involving various descriptive statistics, reliability statistics, etc. were performed using SPSS (SPSS for Windows, 2010), and structural equation modeling was performed using both AMOS (Arbuckle, 2006) and R (R Development Core Team, 2016).

Expectations and Implications

The broad impact of this research lies in the potential for a generalized model of tolerance for predators, and the potential application of this model to a range of nuisance species as well. Much research exists in the field of wildlife management, but the literature lacks a clear, overarching model for understanding one of the biggest threats to carnivore conservation: tolerance of carnivores by people (Linnell, Swenson, & Andersen, 2001). Extensive literature exists in understanding people's relationships to risks in their environment, but some evidence suggests that environmental risks may prove unique in how people come to understand them when contrasted with technological risks like genetically modified organisms (Kahlor, 2007). Developing models and standards for measurement could allow research teams to better compare their research across species and contexts, and enable more cohesive engagement with those outside of applied fields. The implications of this model for communication should not be overlooked, as some initial work based on a similar model has proven influential in improving tolerance of carnivores (Slagle et al., 2013; Zajac et al., 2012). Where specific variables are highly related to tolerance, communication efforts can tap into these variables to achieve conservation goals.
A gap exists where models of tolerance for carnivores are primarily investigated among samples limited in spatial scale to either local communities (Carter et al., 2012; Gore et al., 2007; Inskip, Carter, Riley, Roberts, & MacMillan, 2016) or to statewide populations (Bright, 2000; Siemer, Hart, Decker, & Shanahan, 2009; Zajac et al., 2012). I expect that the hazard acceptance model will be less predictive for a national sample than models of acceptance tested among publics at smaller spatial scales for two reasons: from a theoretical perspective, greater context and specificity matters for predicting behavior (Fishbein & Ajzen, 2010), and greater issue importance among respondents tends to result in better prediction within a model (Bright & Manfredo, 1996). Bright and Manfredo’s (1996) model for less interested respondents, though explaining 76% of the variance in policy support, was far less predictive than it was for those that were invested in the issue (93%). Given the substantial attention to other political issues at the moment (the economy, international relations, equal rights, etc.), I expect this issue to be far less salient for most of the American public. Understanding tolerance in local communities is indeed important to conservation of local carnivores; however, large carnivores tend to have large home ranges, and conservation at the population scale will likely overlap with communities on the outskirts of recovery. Ultimately, the aim of this research is to develop a relatively parsimonious model that can inform future management of predators, such that limited resources can be put to their best effect when implementing ESA mandates.

Claims of symbolism driving conflict surrounding wildlife management in the literature are common, but theoretically-driven investigations of those claims are few (Douglas & Veríssimo, 2013). The research that follows suggests a new approach to these claims that assesses the extent to which wolves are indeed considered symbolic among the public, and uses construal level theory to provide a needed lens for the symbolism of other species as well. Additionally, construal level theory is explored primarily in lab settings, where participant’s
perspectives are manipulated experimentally. Here, by flipping the manipulation to a criteria for coding responses, I consider salient construals of an object, and correlate construals with social identities and spatial proximity to the object in question: wolves. This approach takes construal level theory to an applied setting and considers the salient construals of an object, which might be expected to influence day-to-day processing of information. Given the argument that wolves are thought of symbolically (Douglas & Veríssimo, 2013; Wilson, 1997), we might expect more abstract construals than concrete construals in salient thoughts about wolves. Abstract construal manipulations typically result in a focus on values and overarching goals in choice experiments (Liberman & Trope, 2008), and extrapolating to the present study, salient abstract construals might result in a focus on desirable conservation outcomes, rather than feasible ones, as well as a willingness to take greater risks (Sagristano, Trope, & Liberman, 2002). By assessing salient construals, this work investigates the relationships between a very basic mental process and contextual variables in an applied setting.

In sum, this study builds on previous work in two ways: first, it takes a national level approach to a species with a wide potential geographical distribution, where typically only state-level approaches have been made. Second, it is guided by existing psychological theory and measures, and therefore standardizes the measurement of these variables for potential future work and allows this work to potentially inform more basic psychological understandings of decision making and risk. The resulting research could help guide agencies in choosing where and how to place their effort in modifying communication efforts, and where these efforts may have little effect implying that other tactics may be necessary.
Abstract

Explanations of why charismatic, symbolic wildlife are difficult to manage often end with the claim that the difficulty lies in the many meanings people attribute to wildlife. The present study explored this challenge using wolves as a model species. By assessing the meaning of wolves through the lens of construal level theory, which posits that everything we encounter as humans can be considered on a continuum of abstract to concrete, we linked symbolic claims regarding the meaning of wolves to people with psychological theory. Responses to questions regarding thoughts and imagery related to wolves in two large sample surveys, one of a convenience sample and one of a nationally representative sample, were qualitatively coded for their abstract (i.e. symbolic and values-laden) or concrete (i.e. corporeal and action-focused) content. We then quantitatively investigated the relationship between the presence or absence of abstract and concrete content with key variables of interest: sample type, affective feeling toward wolves, region of residence, importance of the wolf issue, quantitative measures of symbolic existence and oppositional beliefs, and group identities. We found that people generally thought of wolves abstractly, which related to positive feelings toward wolves and symbolic existence beliefs, as well as living in the Western Great Lakes region. A minority thought of wolves concretely, which related to living in the Northern Rocky Mountains region, symbolic oppositional beliefs, and strongly identifying with four identities: gun rights advocate,
property rights advocate, hunter, or farmer/rancher. Our results suggest that wolf management in the Western Great Lakes will likely require a different approach than has been taken in the Northern Rocky Mountains, with residents there focusing more on big picture, abstract ideas surrounding wolves. Agencies charged with wolf conservation in the Great Lakes would do well to incorporate values-based objectives within their plans in an attempt to connect concrete management actions with the likely more values-focused individuals construing wolves abstractly. Agencies in the Northern Rocky Mountains or engaging with any groups construing wolves concretely may need to focus more on specifics of how wolves are managed on the ground, and ensuring management actions address specific concerns within the local context.

One such process, structured decision making, could transparently weave together these disparate views of wolves by explicitly linking together both the abstract values and the concrete concerns of stakeholders to better facilitate the necessary difficult tradeoffs in their management.

**Keywords:** wolves, construal level theory, symbolism, carnivore, abstract, concrete, conservation.

> “[T]he debate over wolves has nothing to do with wildlife ecology or the wolves themselves; it’s purely a debate on human values, wants, needs, desires, etc. In general, those values, wants, needs and desires are poorly informed, which is leading to questionable decisions and positions.”
> 
> -Respondent 1351759691

**Introduction**

Conflict surrounding carnivore conservation, and wolves in particular, is often attributed to the symbolism of the animals themselves (Douglas & Veríssimo, 2013; Lopez, 1978). Do wolves represent the fear and uncertainty we feel when entering wild places—the “big bad wolf”— lurking in the forest awaiting the unwary? Are they the tool of an over-reaching government and extremist environmentalists? Or do they represent the ideals of “wilderness”—
a long-lost Eden that needs recovery and protection? The meanings individuals ascribe to these animals may influence cognitive processes and, in turn, behaviors that impact conservation.

The term “symbolism” seems to be a catchall used to explain that wolves mean different things to different people, and these conflicting meanings can drive conflict surrounding their management and conservation (Phillips, 2015). The idea that symbolism drives the conflict regarding wolf conservation is not novel in any way, but it is typically asserted, rather than investigated empirically (Douglas & Veríssimo, 2013). Among those engaged with wolf management, discussions of the symbolism of wolves relate to what they represent to indigenous people, biologists, and modern society (Lopez, 1978), their use as political pawns, or “government dogs” (Wilson, 1997), and their role in rewilding, taming and corrupting wilderness (Kellert et al., 1996). Quantitatively, symbolic existence values of wolves (i.e. the idea that it is important for wolves to exist somewhere on the landscape and for future generations) are included in psychological models predicting public support for wolf conservation (Bright & Manfredo, 1996). More recently, symbolism has been invoked at academic meetings and in peer reviewed literature to explain everything from urban and rural differences over wolf management in Norway (Figari & Skogen, 2011), to the lack of preparedness for increasing wolf populations in Germany (Von Ruschkowski, 2014), and the greatly negative views attached to wolves when compared with bears in Finland (Mykra, 2014).

While wolves are wrapped in controversy and attributed nebulous meanings, few studies attempt to capture exactly what wolves mean to people, and whether or not that meaning is positive, negative, or even mixed. Similarly, there tends to be little attempt at generalizing these observations to any larger predictive theory. The present study aims to empirically examine the claims of symbolism in two ways: first, by using construal level theory to explore the degree to which the thoughts and images evoked by wolves are symbolic and
abstract, as opposed to corporeal and concrete. And second, by investigating at an aggregate level the relationship between these thoughts and region of residence, issue importance, group membership, and existing quantitative measures of symbolic beliefs related to wolves. The findings here have implications for managers wishing to effectively communicate with various stakeholder groups, and could enable more effective tailoring of outreach in places where wolf populations are expanding. Additionally, these results provide a new lens for understanding the conflicted nature of carnivore conservation.

Literature review

Symbolism is described in symbolic interactionism, one of the three primary theoretical foundations in sociology, and the only one focusing on individual interactions. Symbolic interactionism posits a host of intricate relationships (Stryker, 1980), but the most relevant for the present study is that individuals learn the meaning of objects and roles through social interactions, and these meanings establish expectations for behavior. Put simply, symbolism can be thought of as the many meanings associated with some object (Cary, 1993). For example, imagine a room full of chairs with small writing platforms attached to them—a desk. Through socialization as children, we come to see this chair as representing school, a classroom, learning, and probably a host of other meanings. Sitting in the chair, we might play the role of student, listener, attendee, and maybe others. In the end, however, the chair is still simply a chair, or some variation thereof. However, it is worth noting that the chair can be thought of in more abstract terms (as a symbol of school and learning) or more concrete terms (the chair you occupied in the eighth grade with the rickety legs) by the person considering the object.

Linking symbolic interaction to psychological theories has typically occurred through research on symbolic politics (Sears & Funk, 1991), and focuses on issues of racism and political preference (Sears, Hensler, & Speer, 1979; Sears, Lau, Tyler, & Allen Jr, 1980). This line of
research presumes that individuals relate affectively (i.e. via emotive meaning) to symbols early in life and hold onto this affect throughout their lives. The predisposition toward a symbol then influences attitudes related to that symbol, possibly through the activation of related abstract constructs (Sears & Funk, 1991). Some research in political psychology suggests that symbolic beliefs about politics and racial or ethnic groups, as opposed to rational self-interest, drive political opinions related to busing (sending children to more distant schools to desegregate school districts) and other social safety net issues (Sears et al., 1979, 1980). According to Sears and his colleagues, rational self-interest and personal experience are perceived as discrete instances that are unreflective of bigger, more abstract ideals. We do not tend to perceive our everyday experiences as part of a larger, societal picture. This disconnect attenuates the relationship between the personal experience and the political symbol (however, for a critique of this view, see Crano, 1997a, 1997b; for response, see Sears, 1997). While social issues are painted in broad strokes of symbolic or abstract language, our concrete, everyday experiences are more difficult to generalize to a bigger picture, leaving personal experience as a poor predictor of political behavior.

More recent research places symbolic politics in the context of construal level theory (Eyal, Sagristano, Trope, Liberman, & Chaiken, 2009; Hunt et al., 2010). Construal level theory (CLT) predicts that all objects, situations and behaviors can be construed or thought of along a continuum from abstract to concrete, and that the level of abstraction or concreteness activates cognitions at a similar level (Liberman & Trope, 2008). Higher level, abstract construals are, “general, superordinate, and decontextualized,” while lower level, concrete construals are marked by context and specificity (Liberman & Trope, 1998). For example, construing Thanksgiving more abstractly, or at a higher level of construal, might bring up general thoughts about quality time spent with loved ones, whereas concrete, lower-level construals of
Thanksgiving might bring up this year’s travel plans, or a specific event from a prior holiday gathering. Construing something at a higher level of abstraction enables people to travel the “psychological distance” between their present state of being and some other state, allowing one to plan for future events or consider alternative perspectives. Psychological distance can be represented temporally (now or in the future), spatially (home or abroad), socially (my family and friends or a stranger), or in terms of hypotheticality (the likelihood that an event will take place, with events that are probable as opposed to only possible being psychologically near) (Liberman et al., 2007). The greater distance one perceives, the more abstractly one construes the object, situation, or behavior. Hence, in our Thanksgiving example, asking someone in February about Thanksgiving may bring up more high-level, abstract thoughts than asking them about it in November. Symbolism would seem to correspond to these high-level abstractions, the level at which values have been shown to have a greater influence on thoughts and behavior (Eyal et al., 2009). Alternatively, considering an object or situation in low-level, concrete terms would lead to considering behavior and cognitions within their specific context where the limits of personal control or perceptions of the efficacy of certain behaviors might restrict the role of values.

Wolves as symbols. Holding various symbolic beliefs about wolves may identify one as belonging to a particular group or social movement (Wilson, 1997). When describing the role of wolves as a symbol in the battles over land management in the American West, Wilson (1997) posited three hypotheses. First, that wolves and their management are surrogates for concerns about differential access to social power, with those holding traditional “old-West” values having less perceived power than “new-West” groups whose concerns were more environmentally-focused and were viewed as having more power regarding federal policy. Second, that wolves are a symbol of divergent ideas about private property rights and public
lands management. This divergence stems from long-running conflicts about the use versus preservation of natural resources for the greater good, and the impacts of land management decisions on adjacent private lands. And finally, that wolves are a symbol of divergent beliefs about man’s relationship to the natural world. Overall, Wilson’s argument is that the fight over how wolves should be managed in the West is a skirmish in the long-running debate over how western lands should be used and managed, as well as who should have control. On one side are those who believe that lands should be protected and restored consistent with the “wilderness” ideal; on the other side are those who believe lands should be “used wisely” for the benefit of individuals and society. The underlying discourse would seem to be a very basic disagreement over the construal of wolves themselves; do they represent an abstract, wilderness ideal or do they represent a concrete threat to Westerner’s ability to make use of the land?

Contemporary with Wilson (1997), Bright and Manfredo (1996) looked to predict voting intentions regarding wolf reintroduction using several variables, with ‘symbolic existence beliefs’ among them (i.e. it is important that wolves exist somewhere on the landscape for future generations). Symbolic existence beliefs were the strongest predictor of attitudes toward reintroducing wolves in the study. Specifically, stronger agreement with statements about the importance of wolves merely existing in the wild correlated to stronger political support for their conservation. Positive emotional response to wolf reintroduction was the second biggest predictor of positive attitudes toward reintroduction, with more influence than knowledge about wolves and perceptions of outcomes of wolf recovery.

Construal level theory provides a psychological lens for considering wolves as abstract symbols (e.g., embodying ideals of wilderness, righting an ecological wrong, or government overreach and an attack on traditional western lifestyles), or as a concrete representation of an
animal that will act to fulfill its biological needs (e.g. wolves killing livestock or their impacts on prey populations). Likewise, CLT provides predictive guidance as to how these construals impact the perceptions of those holding them, and can provide insight to the conflict surrounding wolf conservation. In prior research, CLT has primarily been tested using experimental methods (Liberman & Trope, 2008); however, here we use a mixed methods, cross-sectional approach. We draw from manipulation practices in the experimental setting to “backtrack” our understanding of responses to open-ended survey prompts included in two surveys about wolves’ conservation and management. Methodologically, some experimenters investigating construal level theory start by manipulating a particular mindset or construal within the participant through thought exercises. One such exercise involves asking participants to list “how” or “why” statements downward or upward, respectively, on a paper. So a participant in one condition would start at the top of a page and move downward to list statements regarding how they might better their health, whereas a participant in another condition would start at the bottom of the page and move upward to list statements related to why they might better their health (Liberman & Trope, 1998). These manipulations are meant to put the participant in a concrete or abstract mindset, respectively. Another CLT manipulation uses examples to place participants in a more abstract or concrete frame of mind. To do this, researchers have participants look over a list of words and then either provide examples of the words (a concrete manipulation) or provide a response as to what the word might be an example of (an abstract manipulation; Fujita, Trope, Liberman, & Levin-Sagi, 2006). So, if we consider the word “king”, participants in the first manipulation may provide specific examples of king such as King Henry the VIII or the king of Thailand; these are actual people who are concrete examples of the word “king.” Alternatively, those asked to consider things for which king is but one example might respond with “ruler” or “monarch,” representing higher-level, more abstract ideas. With either
approach, the experimental design includes a blind evaluation of the extent to which the manipulation succeeded based on whether participant responses were coded by experimenters as more concrete or abstract (Fujita et al., 2006; Liberman & Trope, 1998).

Drawing from these manipulations, we use the idea of “how” vs. “why” statements and the question of example to consider the abstractness and concreteness of responses to an open-ended question about salient thoughts and ideas related to wolves. Leveraging these open-ended responses allows us to understand the salience of abstractness or concreteness of wolves in people’s minds, while the large samples from which our responses are drawn allows for greater generalization among both the attentive public and the public at large. In this way, this work aims to bridge the distance between Wilson’s (1997) qualitative analysis of conflict surrounding wolves and Bright and Manfredo’s (1996) quantification of support for wolf recovery (Tarrow, 2004). Using CLT as a lens, we aim to answer the following questions:

1. Does the abstract, symbolic nature of wolves become evident in salient thoughts regarding wolves? How does construal of wolves relate to positive and negative feelings about wolves? How do construals quantitatively relate to existing measures of symbolism?

2. What is the relationship between construals of wolves and issue importance, region of residence, and group identification? Do certain groups tend toward a language of concreteness or abstractness?

**Methods**

In order to consider differences in the mental representation of wolves among a diverse audience, we used datasets from two complimentary samples. Each sample provides unique insights into different aspects of the present study. The first is a nationally representative probability sample, collected through an online panel maintained by the GfK group, a private
research firm (formerly Knowledge Networks; www.knowledgenetworks.com/ganp). The second will be referred to as the “issue public” dataset, and was a convenience sample of respondents that were highly involved in and knowledgeable about the wolf issue (see Slagle et al., 2012). Data collection procedures for both samples were approved by The Ohio State University’s Office of Responsible Research Practices (GfK sample protocol number 2013E0553; issue public sample: protocol number 2011E0124).

Sampling

The GfK group uses address-based sampling identical to traditional mail surveys to recruit individuals to their online subject panel. Baseline demographic information is collected for each panelist, and is then used to create weights approximating national census data, which are applied prior to sampling. Online panels constructed in this way result in nearly identical findings as robust telephone surveys, but lack the social desirability bias associated with telephone surveys (Berrens, Bohara, Jenkins-Smith, Silva, & Weimer, 2003; Chang & Krosnick, 2009). Samples were drawn from three regions, the Northern Rocky Mountains (NRM; largely consisting of Wyoming, Montana, Idaho, and smaller portions of Utah, Washington and Oregon), the Western Great Lakes (WGL; largely consisting of Minnesota, Wisconsin, Michigan, and smaller portions of N. Dakota, S. Dakota, Iowa, Illinois, Indiana and Ohio), and the rest of the U.S. (RUS). These sampling locations aligned with three wolf management regions called “distinct population segments,” separate populations that are significant to the overall conservation of a species (Freyfogle & Goble, 2009). GfK contacted 2,020 potential respondents over eleven days in February 2014, resulting in 1,287 total responses (63.7% response rate; NRM n = 406; WGL n = 451; and RUS n = 430; for more detail see (Slagle, Bruskotter, Singh, & Schmidt, In press).
The issue public sample was gathered via a convenience sample, or in internet survey parlance, a river sample (Couper, 2001). A link to the survey was posted on a wildlife blog for one week, and any interested individuals that saw the link were able to participate. The link may have been shared with others or reposted to other sites over the course of the week (see Slagle et al., 2012). Stream samples tend to over-represent individuals highly interested in the topic of the survey (Chang & Krosnick, 2009); because these groups tend to be highly involved and potentially influential in the wolf issue, this sample was particularly useful for understanding the present research questions. As this was a convenience sample of individuals online, only self-reported state-level data was collected. To create similar regions as the national sample, responses were binned according to their reported state of residence. Wyoming, Montana, Idaho, and Washington were binned to become the proxy NRM; Minnesota, Wisconsin, Michigan, South Dakota, North Dakota, and Iowa were binned to become the proxy WGL; and the remaining respondents were then binned to create the RUS region. Individuals who did not respond or selected “Other” to their state of residence were dropped from regional analyses.

Measurement

Salient thoughts about wolves. We used a common measure of affect to investigate salient thoughts regarding wolves. Affect is the basic positive or negative feeling we have toward something (Peters, 2006), and is based on Damasio’s somatic marker hypothesis (Damasio, 1994). Briefly, the hypothesis suggests that as we go through life, we have minor and major experiences during which we consciously or unconsciously note our physical feeling in the moment, and mentally mark these experiences with a positive or negative connotation. When making decisions, we can consciously or unconsciously access these markers to more efficiently make choices. While Damasio does not formalize a relationship between affect and symbolism, his hypothesis would seem to line up well with how we learn the meanings of objects (Cary,
Affect is typically measured by asking the respondent to describe in a few words the first thought or image that comes to mind when considering something. They then select how positively or negatively they feel about that thought or image. This set of items is typically asked 1-2 more times (Peters & Slovic, 1996). This question set was asked only once to the issue public sample, and modified slightly but asked twice in the national sample. Because we were interested in salient thoughts, we limited coding and analysis in the national dataset to the first response. Coding procedures are described in more detail below.

To allow for a nuanced assessment among our issue public sample, we asked respondents to assess their positive/negative feelings on an 11-point scale with a midpoint at 0. We subsequently simplified this for the national sample to a shorter, 5-point scale. To compare the two, we binned the issue public scale as follows: -5 to -2 were coded as -1 (negative affect), -1 to 1 were coded as 0 (neutral), and 2 to 5 were coded as 1 (positive). The national sample was recoded as follows: -2 and -1 became -1 (negative), 0 remained 0 (neutral), and 1 and 2 became 1 (positive). This allows for a comparison of how respondents felt generally about wolves.

**Issue importance.** We assessed issue importance in both samples by asking respondents the following: “In general, how important is the issue of wolf conservation management to you personally?” Responses were recorded on a 4-point scale of 0 (Not at all important) to 3 (Very important).

**Group identification.** Social identities relevant to the wolf issue were assessed in both samples with similar methods. Respondents were asked to indicate the degree to which they identified with each of the following eight identities: environmentalist, wildlife advocate, animal rights advocate, conservationist, hunter, gun rights advocate, property rights advocate, and as a farmer or rancher. Respondents could identify with as many or as few of the listed identities as they wished, with those in the issue public sample rating identity on a scale of 0 (do not identify
with group) to 6 (strongly identify with group), and those in the national sample rating on a scale of 1 (not at all) to 5 (very strongly). Those responding above the midpoint for each scale were coded as strong identifiers (responding 4-6 in the issue public and 4-5 in the national; coded as 1) and those at or below the midpoint as weak identifiers (coded as 0).

**Symbolic beliefs.** We replicated the set of symbolic beliefs originally suggested by Bright and Manfredo (1996). The set of statements aimed at assessing existence beliefs included: “It would be important to me to know that there are healthy populations of wolves in the U.S.” “It is important that the U.S. always have an abundant wolf population,” “It is important to maintain wolf populations in the U.S. so future generations can enjoy them,” and “Whether or not I would get to see a wolf, it is important to me that they exist in the U.S.” In addition, we assessed a set of oppositional symbolic beliefs developed based on Wilson (1997). Oppositional beliefs were largely meant to determine if wolves were viewed as representing environmentalist and federal power over public lands management. These included the following statements: “Wolves are a ploy by environmental groups to restrict use of federal public lands,” “In the places where wolves have been reintroduced, wolves have more rights than people,” “The federal government is using wolves to restrict activities on federal public lands,” and “Wolves are not so bad, it’s the people that support them I cannot stand.” Due to limits on survey length with the national sample, we were unable to assess symbolic beliefs at the national scale.

**Qualitative analyses**

To assess salience and manage the large number of respondents in these datasets, we used the MAXDictio word frequency function in MAXQDA to run a frequency count for all words in the responses to the affect question (*MAXQDA, software for qualitative data analysis*, 1989). Presumably, these are the most salient words related to wolves among both groups. We then selected the top 40 words from the list, excluding a number of short words (hereafter, stop
words) that were not useful for this analysis. Stop words included words like “can”, “for”, and “have” among others, for a total of 27 stop words (See Appendix C: Stop words). After examining the full word list for potential misspellings, we created a dictionary within MAXQDA unique to this dataset for the top 40 words and their misspellings or variations (See Appendix D: Top 40 words, overall rank and variations). In addition to the top 40 words, we added the word, “should” to the dictionary, expecting prescriptive phrases regarding how wolves are managed to be relevant to understanding the controversial symbolism of wolves. We also examined the full list of words for any that might have been included in the top 40 but due to frequent misspellings or variations were excluded, and found “protect” and its variations to meet this criteria. Adding “protect” to the top 40 brought the total list to 42 words most salient to respondents when considering wolves.

Given that collectively there were 2,131 respondents included in this analysis, systematic, accurate qualitative coding of all affective responses proved to be unrealistic. Initial efforts at such coding for just one of the samples resulted in low intercoder reliability, despite multiple efforts at simplification of the coding scheme and discussions of coder differences. To gain some depth of understanding of this data in a reliable, systematic way, we considered wolves as a type of risk (Bruskotter & Wilson, 2014), and used a mental models approach paired with potential effect size. Mental models are used to understand both expert and lay person mental representations of risk and provide insight into the variables each group views as associated with a particular risk, in order to develop outreach materials that can contribute to bringing the public’s risk perceptions into line with expert assessments (Morgan, 2002). Mental models research is generally conducted through interviews with 20 to 30 individuals within the population of interest as prior research suggests this is the point where saturation of new ideas is reached (Morgan, 2002). According to Cohen, the observations necessary to detect a large
effect size in a population range from 13-66, depending upon study-specific factors (Cohen, 1988). Following these lines of research, if a top 40 word appeared 50 times or less in the frequency count, we coded all instances of surrounding text for abstract or concrete construal. If a top 40 word appeared more than 50 times, we randomly selected 50 of the respondents mentioning the word, and coded the surrounding text for abstractness or concreteness for only those randomly-selected 50 entries.

The lexical coder within MAXQDA was also used to autocode the affective responses for words in the dictionary created previously; each instance of each word was coded under that word category. Finally, following the sampling scheme described above, the first author coded text within each response to the first open-ended affect question for abstract or concrete construal. Two rules were used to determine whether a response was abstract, concrete, or both: the example rule and the management rule. First, if the response better fit the question, “Wolves are an example of X,” it was coded as an abstract construal of wolves. If it better fit the statement, “X is an example of wolves,” it was coded as a concrete construal of wolves. Second, if the example rule did not seem to fit the response, the rule of management was applied. If a response referred to the “why” of wolf management, it was coded as an abstract construal of wolves. If it better fit the “how” of wolf management, it was coded as a concrete construal of wolves. This rule helped to distinguish between objectives and actions of wolf management, which directly relate to abstract and concrete construals, respectively (Liberman & Trope, 1998; Vallacher & Wegner, 1987). A subsample of 100 responses were coded by the second and third authors, and differences were discussed until an appropriate level of intercoder reliability could be reached ($k = .83$; almost perfect agreement; Landis & Koch, 1977). Systematic differences in agreement were assessed by the first author and were recoded accordingly.

Quantitative analyses
The word codes and abstract and concrete codes were transferred into SPSS for quantitative analyses (IBM Corp, 2013). The word codes indicated how many times each person mentioned each word in the dictionary within their response to the affect question. The abstract and concrete codes were separated as presence/absence for each, since some responses were found to have both concrete and abstract elements.

To answer Q1, we report the relative proportions of abstract and concrete language within the responses coded. We crosstabulated the abstract and concrete construals with the affective feeling bins described above. And, in the issue public dataset only (as relevant items were not included in the national survey), we correlated the presence or absence of abstract and concrete construals with mean scores on each symbolic belief scale (existence, oppositional).

To answer Q2 regarding abstract thoughts of wolves by importance, region, and group identification, we first correlated the presence or absence of abstract and concrete construals with importance ratings. We used crosstabulation to investigate potential differences among the samples and regions in their abstract or concrete construals. Lastly, we correlated abstract and concrete construals with strong or weak identification with 8 different group identities.

Results

The national dataset contained 1,153 valid responses (at least 1 word typed into the response box) to the affect question out of 1,320 responses (overall survey response rate was 64%); the issue public dataset contained 691 valid responses out of 811 (stream sample—no overall response rate available). Of the total 1,844 valid responses, 1,068 were coded (58%) under the scheme described above to maintain consistent coding but capture a range of salient thoughts. Salient thoughts about wolves appeared to be primarily abstract, as most responses were coded as at least partially abstract (75%), while far fewer were coded as concrete (31%).
Affect showed a strong relationship to abstract and concrete construal, with a significant number of respondents reporting positive affect towards wolves also having abstract construals ($X^2(2, N=1064)=158.99, p < .001, \text{Cramer's } V = .39; \text{Table 2.1}; \text{Cohen, 1988}$), and a significant number of respondents reporting negative affect towards wolves also having concrete construals ($X^2(2, N=1064)=157.07, p < .001, \text{Cramer's } V = .38; \text{Table 2.1}$). Within the issue public dataset, abstract construals correlated strongly and positively with symbolic existence beliefs, while concrete construals correlated strongly and positively with symbolic opposition beliefs (Table 2.2).
Table 2.1. Percent of responses coded as abstract or concrete by sample, affect, and region.

<table>
<thead>
<tr>
<th>Level of Analysis</th>
<th>n</th>
<th>Abstract</th>
<th>Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>1068</td>
<td>75%</td>
<td>31%</td>
</tr>
<tr>
<td>Sample – National</td>
<td>621</td>
<td>79%</td>
<td>25%</td>
</tr>
<tr>
<td>Sample – Issue public</td>
<td>447</td>
<td>69%</td>
<td>39%</td>
</tr>
<tr>
<td>Affect – Positive</td>
<td>605</td>
<td>87%</td>
<td>18%</td>
</tr>
<tr>
<td>Affect – Neutral</td>
<td>167</td>
<td>78%</td>
<td>26%</td>
</tr>
<tr>
<td>Affect – Negative</td>
<td>292</td>
<td>48%</td>
<td>59%</td>
</tr>
<tr>
<td>Region – Northern Rocky Mountains</td>
<td>357</td>
<td>69%</td>
<td>68%</td>
</tr>
<tr>
<td>Region – Western Great Lakes</td>
<td>251</td>
<td>80%</td>
<td>25%</td>
</tr>
<tr>
<td>Region – Rest of the U.S.</td>
<td>406</td>
<td>78%</td>
<td>28%</td>
</tr>
</tbody>
</table>

Note: Some responses contained both abstract and concrete elements, so abstract and concrete codes are not mutually exclusive, and row totals will not necessarily equal 100%.

Table 2.2. Means and standard deviations for importance, symbolic beliefs and group identities, and their correlations with abstract and concrete construals.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>Abstract r</th>
<th>Concrete r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance**</td>
<td>Importance of issue to respondent</td>
<td>1064</td>
<td>2.04</td>
<td>1.04</td>
<td>0.01</td>
<td>0.04</td>
</tr>
<tr>
<td>Symbolic beliefs***</td>
<td>Existence</td>
<td>428</td>
<td>0.79</td>
<td>2.38</td>
<td>0.52*</td>
<td>-0.55*</td>
</tr>
<tr>
<td></td>
<td>Opposition</td>
<td>428</td>
<td>-0.52</td>
<td>2.10</td>
<td>-0.44*</td>
<td>0.49*</td>
</tr>
<tr>
<td>Group Identities****</td>
<td>Environmentalist</td>
<td>1046</td>
<td>0.43</td>
<td>0.50</td>
<td>0.05</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>Conservationist</td>
<td>1045</td>
<td>0.53</td>
<td>0.50</td>
<td>-0.04</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Animal Rights Advocate</td>
<td>1046</td>
<td>0.28</td>
<td>0.45</td>
<td>0.16*</td>
<td>-0.14*</td>
</tr>
<tr>
<td></td>
<td>Wildlife Advocate</td>
<td>1045</td>
<td>0.47</td>
<td>0.50</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Hunter</td>
<td>1047</td>
<td>0.37</td>
<td>0.48</td>
<td>-0.28*</td>
<td>0.30*</td>
</tr>
<tr>
<td></td>
<td>Farmer/Rancher</td>
<td>1045</td>
<td>0.30</td>
<td>0.46</td>
<td>-0.21*</td>
<td>0.24*</td>
</tr>
<tr>
<td></td>
<td>Gun Rights Advocate</td>
<td>1046</td>
<td>0.45</td>
<td>0.50</td>
<td>-0.24*</td>
<td>0.28*</td>
</tr>
<tr>
<td></td>
<td>Property Rights Advocate</td>
<td>1047</td>
<td>0.422</td>
<td>0.49</td>
<td>-0.23*</td>
<td>0.27*</td>
</tr>
</tbody>
</table>

*Significant at p < .01
**Scale from 0 (Not at all important) to 3 (Very Important).
***Scale from -3 (Strongly disagree) to 3 (Strongly agree).
****Dichotomized 0=weak identifier, 1=strong identifier

There was no correlation between abstract or concrete construals of wolves and the level of importance a respondent attributed to the wolf issue. Slightly more responses than
would be expected at random in the national sample were coded as abstract ($X^2 (1, N=1068)=15.96, p < .001, \text{Cramer’s } V = .12; \text{Table 2.1}$), while more than expected responses in the issue public sample were coded as concrete, though the relationship for both was small ($X^2 (1, N=1068)=23.20, p < .001, \text{Cramer’s } V = .15; \text{Table 2.1}$). We also found a small relationship with region overall, where those in the NRM were more likely to hold concrete construals of wolves than expected by chance, while those in the WGL and RUS were less likely to report concrete construals, but were more likely to report abstract construals of wolves ($X^2 (2, N=1014)=12.10, p = .002, \text{Cramer’s } V = .11; \text{Table 2.1}$).

Finally, we considered the relationship between strong group identity, and the construal of wolves as abstract or concrete. Bivariate correlations were significant for 5 of the 8 identities (animal rights advocate, hunter, gun rights advocate, property rights advocate, and farmer/rancher; Table 2.2). Strongly identifying as an animal rights advocate was positively correlated with abstract construals of wolves and negatively correlated with concrete construals. The remaining identities with significant correlations (hunter, farmer/rancher, gun rights advocate, property rights advocate) were negatively associated with abstract construals and positively associated with concrete construals.

**Discussion**

The purpose of this study was to use the lens of construal level theory to empirically investigate claims that social conflict over wolves is driven by symbolism. We aimed to further probe the idea of wolves as abstract symbols by looking at the relationship between seeing wolves as symbols and one’s region of residence, importance placed on the wolf issue, group membership, and other symbolic beliefs. The idea that the issue of how to conserve and manage wolves is more about *what they represent* than *how they behave* on the landscape was broadly supported by the largely abstract construal of wolves in our two study samples.
Additionally, abstract construals were associated with positive affect; put differently, wolves as a symbol were generally positive. That wolves generally have a positive connotation is unsurprising (Williams, Ericsson, & Heberlein, 2002), and that this is associated with symbolism has been suggested elsewhere (M. A. Nie, 2001; Primm & Clark, 1996), but the research presented here is the first attempt at quantifying the link at a large scale. When wolves are mentioned as a symbol elsewhere, both opposition to and support of conservation are implicated as symbolic in a relatively equal way (M. A. Nie, 2001; Primm & Clark, 1996), or opposition is primarily labeled symbolic (Wilson, 1997). Here, it might be argued that support is more symbolic and abstract than opposition, however, more detailed analyses reveal nuances, and the relationship between concrete construals of wolves and symbolic opposition to their recovery suggests opposition rooted in more than symbols. Similarly, those reporting negative affect toward wolves were only slightly more likely to think of wolves concretely (59%) than abstractly (48%). Adding to the nuance are more concrete construals in the Northern Rocky Mountains but not in the Western Great Lakes, both areas where wolves are spatially proximate and concrete construals might be expected. Also construing wolves concretely were hunters, gun rights advocates, property rights advocates, and farmers and ranchers. Experimental work in construal level theory suggests some typical ways in which abstract or concrete construals impact individual choice, and we discuss these predictions in detail below. These predictions tell us how the salient construals of wolves might influence the way various publics engage with the issue of wolf conservation and management. It should be noted that any predictions from construal level theory have been made in the context of construal manipulation, not salient construals, so while abstract and concrete construals are fundamental psychological processes (Fujita, Trope, & Liberman, 2016), differences may arise between lab and applied settings. Finally, one tool for moving beyond a theoretical discussion of these points and facilitating the
linkage of high level, abstract values and low level, concrete concerns might be found in structured decision making (or similar processes that explicitly address how proposed management or policy actions impact stakeholder values).

People mentally use construals to travel the distance from the near to the far, spatially, temporally, socially, and hypothetically where low-level, concrete construals tend to correlate with things that are near, while high-level, abstract construals tend to correlate with things that are far. Individuals living in close proximity to wolves should theoretically construe wolves concretely (e.g., Decreased elk populations) while those living at a distance to wolves should construe them abstractly (e.g., majestic creatures). Residents of the Northern Rocky Mountains and the rest of the U.S. follow this pattern, respectively. However, residents of the Western Great Lakes did not fit with this prediction well, as wolves were never extirpated from the entire Western Great Lakes, and their presence on the landscape there should have provided residents with a more concrete view. It is possible some other aspect of psychological distance (temporal, social, or hypothetical) is more salient and related to the aggregated abstract construal of wolves in the WGL. While this study did not explicitly assess relative psychological distance across each domain, a reasonable expectations might be that the hypotheticality dimension is driving this relationship. The hypothetical aspect of psychological distance taps the likelihood of an event, with events being probable being construed more concretely. Individuals in the Western Great Lakes are generally less likely to either encounter a wolf or negative news stories about wolves relative to those in the Northern Rocky Mountains (Houston, Bruskotter, & Fan, 2010), perhaps increasing the psychological distance of wolves in this domain despite their relative spatial proximity.

What is clear is that wolves nearby are not always thought of in concrete terms, and this may be true of other species as well. Put differently, those physically nearest the species may
still not necessarily see it in a concrete, contextually specific way, as interactions with this species are still extremely rare, and this could have implications for species management in areas with these characteristics (low species numbers and a spatially proximate public that does not think of the species in a concrete way). This finding places emphasis on the suggestion that wildlife management actions be linked to overarching goals and objectives but making that link explicit to a symbolically-minded public could garner additional public support (Riley et al., 2003).

Specific to wolves, residents of the WGL appear to be unique from those in the NRM, and individuals responsible for managing wolves in the WGL would do well to recognize that the NRM is not necessarily an appropriate analog for wolf management. While geographic differences in land ownership patterns between the two regions are likely evident to managers, with largely public lands in the NRM and a patchwork of private and public lands in the WGL, the psychological differences in the residents may be less obvious or intuitive. Along with more privately-held land, the WGL contains more residents that see wolves in a positive, value-focused light, and explicitly linking management actions on the ground to the values they serve might garner greater acceptance of local actions. Specifically, existing public controversy with hunting wolves in Michigan might benefit from linking the why questions (ex: Why are we managing wolves?) to the how of their management (ex: How does hunting serve the reasons we state for managing wolves?) (Lute, Bump, & Gore, 2014). Calls for thoughtful stakeholder engagement in this vein abound in the literature on wolf conservation (Gore, Nelson, Vucetich, Smith, & Clark, 2011; Nie, 2002; Treves, 2008; Williams, Ericsson, & Heberlein, 2002), and our finding here emphasizes that of previous authors.

Individuals strongly identifying with more traditional “old West” identities (hunter, farmer/rancher, gun and property rights advocates), regardless of their proximity to wolves,
were more likely to think of wolves concretely and less likely to think of them abstractly. Reviews of construal level theory are largely silent on the impacts of the social dimension of psychological distance (Fujita et al., 2016; Liberman & Trope, 2008), but one relevant recent study does shed light on the way social distance impacts learning (Kalkstein, Kleiman, Wakslak, Liberman, & Trope, 2016), by illuminating group influences on the way people think of wolves. Individuals in concrete construal conditions prefer to learn from others that are near to them socially and temporally, particularly when considering emulating self-defined positive behaviors, while people in abstract conditions were more varied in their choices for learning. Perhaps this explains the stronger correlations between identity and concrete construals among old West identities—their concrete construals of wolves may be linked and reinforced by the way they learn and think about wolves from their psychologically near peer groups. New West identities (wildlife advocate, animal rights advocate, environmentalist, and conservationist) had lower correlations with concrete or abstract construal, with just one small significant correlation between animal rights advocates and abstract construal. Entities seeking to engage old West groups will likely need to leverage more personal connections with these groups, and frequently enough that the perception of temporal distance does not become more salient and any message is lost. Alternatively, entities wishing to engage new West groups might bear in mind that people identifying with these groups and thinking of wolves more abstractly may not toe any party line; their consideration of wolves is likely linked to some other variable than group identity.

Individuals construing wolves concretely and slightly more negatively might be more likely to take near term action related to wolves than those thinking of wolves positively and abstractly (Eyal et al., 2009). The minority of symbolically-opposed but concrete thinkers in our sample might be given greater weight and consideration by anyone concerned about wolf
mortality, in that this minority also tends to align with groups best positioned to directly impact wolf populations. While not everyone identifying strongly as a hunter, farmer, rancher or gun rights advocate will be physically close enough to impact wolf populations, we posit that as they are more likely to be on the landscape, they are also more likely to be in a position than weak identifiers to directly impact wolves. So although wolves are generally seen in a symbolic, abstract light, the hunters, farmers and ranchers, gun rights advocates, and residents of the Northern Rocky Mountains are best positioned spatially to act on their concrete perceptions of wolves. Indeed, recent evidence from Wisconsin suggests poaching of wolves impacts wolf populations more than officially reported, to the extent that public hunting may need to be limited to account for the extra mortality (Treves, Langenberg, Lopez-Bao, & Rabenhorst, In press). The relationship between symbolic opposition beliefs and concrete construals indicates that naming opposition as “symbolic” does not necessarily mean the species or problem itself is entirely symbolic. Concrete construals of wolves may serve to tell us that issues of how wolves behave on the landscape are real and concrete to those in a position to impact populations, and require consideration alongside more common, abstract symbolic values. In fact, behavior is more likely to be predicted or impacted by concrete construals than by abstract construals, or put more generally, contextual variables predict behavior better than values (Eyal et al., 2009).

An individual is less likely to act on their symbolic opposition to wolves as a symbol of government interference, but much more likely to act on their concrete opposition to wolves as a physical threat on the landscape.

Overall, respondents were positive about their associations with wolves, and this related to a tendency toward abstract construals; conversely, negative affect for wolves was associated with concrete construals. The strong relationship between affect and construal is not surprising, given this was a direct assessment of the response itself; however, construal level
theory is largely silent on the direction of affect and its relationship with construals. There is a tendency for those in psychologically distant (and therefore, abstract) conditions to generate more pro statements regarding an action, while those in near (and concrete) conditions to generate relatively equal pro and con statements (Eyal, Liberman, Trope, & Walther, 2004). In relation to our results here, abstract construals were more likely among those with positive affect for wolves, while concrete construals were more likely among those reporting negative affect for wolves. Within the positive affect literature, those in a positive frame of mind tend to be more flexible and creative in their thinking, *provided the task is somewhat interesting to the individual* (Isen, 2008). Similarly, they also tend to be more broad and flexible in their categorization of things, innovating unconventional categories for everyday objects. So while importance of the wolf issue to the individual (and thus, level of interest) has no relationship here with concrete or abstract construal, it could conceivably enhance the relationship between positive affect and more flexible, abstract thinking about wolves. A person holding positive affect toward wolves might also be prone to thinking more abstractly about them, and with an interest in wolf management, they may be particularly thoughtful about flexible management alternatives.

Conclusions regarding positive affect do not necessarily mean that respondents with negative affect will always be less flexible about solutions. The relationship between negative affect and concrete construals suggests that for these individuals, emphasis might be placed on concrete evidence of the efficacy of various solutions. Research on the impacts of negative moods on decision making is nuanced, however, interest might play a similar role as it does for positive affect. In experimental settings, sadness drives effortful consideration of details (Bodenhausen, Gabriel, & Lineberger, 2000; Small & Lerner, 2008), while fear inspires certainty and a reliance on heuristic cues (Lerner & Tiedens, 2006; Small & Lerner, 2008). However,
experimentally reducing one’s ability to consider details by increasing cognitive load causes sad and angry individuals to behave similarly and rely on heuristic cues. Broadly, we could think of this increase in cognitive load as equating to low interest in a real world setting—we are all inundated with information and interest can help us narrow the view and focus our attention. A lack of interest among those with negative affect towards wolves, perhaps regardless if they are sad or angry, could result in short term, action-oriented thinking, which often fails to consider bigger picture objectives. But an interested and focused individual with negative affect might be motivated to carefully consider the concrete details of an alternative—a necessary step in any management planning. Fortunately, processes like structured decision making incorporate the important task of evaluation of solutions and actions, to ensure that the means are indeed still serving the ends. Carrying the previous suggestion for decision aiding processes forward, in the WGL and the rest of the U.S., interested parties with positive affect may be more open and flexible about what solutions might best serve the existence values placed on wolves. Meanwhile, stakeholders with negative affect might give careful scrutiny to these broad plans, looking for the most effective alternatives. Both perspectives are important aspects to the decision making process, and a skilled facilitator can help weave them together into a management plan (Gregory et al., 2012).

Related to this, our finding that symbolic existence beliefs correlated with abstract construals of wolves brings two challenges to light. First, to reiterate, contextual factors predict individual actions better than abstract values. This said, those construing wolves abstractly and holding symbolic existence beliefs or values may behave quite differently when faced with more concrete, near opportunities to act on those values. Voting for a tax to compensate landowners for losses due to wolves could be a way to act on one’s values from a distance; however, when considering the impact on the household budget, the same person placing existence value on
wolves might choose to oppose such a tax. Second, and possibly problematic for the “how” of wolf conservation, is indeed the tendency of most people to think abstractly about wolves. Tending to correlate with abstract construal is greater psychological distance, which would appear to interfere with the ability to perform detailed analytical tasks well (Förster et al., 2004), regardless of mood or “liking” of the task. Lower analytical performance would seem to stand as an overall roadblock to addressing the detailed complexities of wildlife conservation; however, greater psychological distance along with positive affect could also serve to spur creative insights to problem solving (Förster et al., 2004; Isen, 2008). The assertion that the symbolic nature of wolves is at the root of the challenge of conserving them appears to be well-founded in regards to on-the-ground conservation, but perhaps all of this abstract thought is not entirely negative. If not for the ability to consider abstract distant future generations or places, we may never conserve any species at all, endangered, game, or otherwise.

**Conclusion**

Wolves as a symbol has often been the end of the conversation—the scapegoat for poor management and resistance to conservation. However, our results identify the tendency for such abstract construals to be largely positive, while concrete construals tend to be somewhat more negative and held by the minority of individuals. Construal level theory lends a new perspective and a continued discussion of what it means for wolves to be symbols (or not, for some), and how existing management efforts might be informed by these findings. Construing wolves symbolically and abstractly or corporeally and concretely need not be a hindrance to good wildlife management; indeed, each perspective can be leveraged within a transparent and inclusive process. Structured decision making is one such process that gives participants an opportunity to explicitly state the problem and critical objectives related to the problem, carefully consider alternatives and how each objective performs on alternatives, and
transparently make tradeoffs among alternatives. The potential broad, flexible thinking of those in a positive frame of mind can help identify both objectives and a wide range of potential alternatives, while detailed-oriented thinking of more negative viewpoints might be helpful to critically evaluating alternatives and making difficult tradeoffs. In addition, both the concrete concerns of some stakeholders, and the abstract values of others can be equally represented as decision-relevant objectives in such a process. Seeing concrete and abstract perspectives as opportunities instead of limitations may help managers approach stakeholder involvement in a more open way, and help implement the suggestion made across the wildlife management literature—to engage stakeholders and make them a part of the process.
Chapter 3: The Role of Affect in Public Support and Opposition to Wolf Management

Abstract

Individuals process information through two systems: the experiential system, containing affect and emotion, and the analytic system, containing logic and normative rules. Both are involved in decision making, and expected to help explain choices to support or oppose wildlife-related policies. In the present study, an Internet survey of motivated, informed individuals is used to investigate the role of both systems in wolf recovery policy choices. Integral affect measures serve as the experiential component in our model, while objective knowledge and beliefs about outcomes of wolf recovery serve as the analytic component. Results indicate that affect has a greater effect than knowledge on beliefs, and is more important for explaining intentions to oppose than to support wolf recovery. Knowledge of differences in information processing between those that support versus oppose wolf recovery allows managers to design outreach that motivates greater analytic processing, potentially mitigating the (often negative) effects of experiential processing.

Key words: affect, attitudes, beliefs, wolves, behavioral intentions, decision making, information processing
Introduction

In wildlife management, the idea that citizen-stakeholders will base their actions and decisions upon thoughtful deliberation of factual information is considered the ideal type of participatory decision making (Bies, 2011). Often the desired “rational” decisions are constrained to mean those that are purely objective and based on the best available science (i.e., biological or ecological evidence). Indeed, the Endangered Species Act requires the U.S. Fish and Wildlife Service to use such data when making decisions about the listing status of a species (Enzler and Bruskotter, 2009). This notion—that people’s decisions about wildlife should be based on thoughtful deliberation of facts—in turn assumes that people are capable of “turning off” their emotions; essentially, that people are capable of divorcing the rational from emotional. While such objectivity in information processing and decision making is indeed appealing from the standpoint of natural resource management agencies, the idea that one can divorce emotion and other biases from decisions is not consistent with the prevailing scientific evidence. Therefore, the desire for objective, scientifically-informed, knowledge-based decision making may not be possible. In this study we sought to determine how people’s affective reaction to a species (i.e., wolves) affects their decisions to engage in behaviors relevant for the conservation of that species.

Theoretical Approach

The research presented here aims to explore the analytic and affective factors motivating citizen support for wildlife management, specifically recovery of gray wolf populations in the United States. Cognitive psychologists divide human thought processes into two intertwined systems, the analytic system and the experiential system (Epstein, 1994). The analytic system encompasses logical or traditionally “rational” thought processes, while the
experiential system is based on affect and emotion. Affect is defined as “the specific quality of
goodness or badness (1) experienced as a feeling state (with or without consciousness) and (2)
demarcating a positive or negative quality of a stimulus”(Slovic, Finucane, Peters, & MacGregor,
2002, p. 397). Thought of in this way, affect is “integral” to the object in question (Peters, 2006),
as opposed to “incidental,” which can generally be thought of as mood affect; that is, one’s
general mood unrelated to any particular object. Hereafter, the term “affect” is meant to refer
to this integral affect, as opposed to incidental affect. Cognitive models of decision making,
which guide most of the research in judgment and decision making, have only recently begun to
include the experiential system as a necessary and even perhaps “rational” component of
human decision making.

Some of the work that influenced the inclusion of the experiential system in current
dual process models of decision making stemmed from research on individuals who, because of
brain lesions, were unable to make associations between affect, emotion and future outcomes
and thus were ideal for determining how analytic and experiential systems worked
independently (Damasio, 1994). These studies indicate that individuals without the ability to feel
are incapable of making what would be considered rational decisions, despite their memory and
logical thinking capacity remaining intact (Damasio, Tranel, & Damasio, 1990; Bechara, Tranel,
Damasio, & Damasio , 1996). Indeed, as decision makers, current dual process models
emphasize the need to assess future outcomes using the experiential system in order to be
“rational.” By acting as a “common currency,” affect allows decision makers to efficiently
compare options that might otherwise appear overwhelmingly disparate. In this way, the
experiential system narrows down the list of options to then be considered further through a
more cognitively difficult analytic or deliberative approach (Peters, 2006).
The affective component of decision making is believed to occur before other cognitive functions, placing it first in line in our evaluations of situations or objects. Zajonc (1980) argued for the primacy of affect, anecdotally citing one’s ability to immediately like or dislike a new acquaintance, or the rabbit’s ability to know that it should run when confronted with a snake. Kunst-Wilson and Zajonc (1980) experimentally demonstrated that affect can precede cognition during preference construction. After calibrating exposure times in previous studies to reduce polygon recognition by subjects to no better than chance, they exposed subjects to 1-millisecond flashes of polygons obscured by red film. They then asked subjects to recall which polygons they saw, and to indicate which ones they prefer. While subjects’ recall ability was no better than chance (50/50), they preferred those polygons that were previously flashed. From an evolutionary perspective, the primacy of affect is consistent with the human need to respond quickly in life or death situations, while the desire and ability to make deliberative, scientifically-informed decisions is a relatively recent development. The experiential system evolved as a survival tool, divided between appetitive motivations and aversive motivations. Appetitive motivations are associated with positive emotions, drawing one toward an object and encouraging one to action, while aversive motivations are associated with negative emotions, drawing one away from an object and encouraging one toward avoidance (Dickinson, 1979; LeDoux, 1996). Neurologist Antonio Damasio (1994) suggests that through our interaction with the world, we learn and mentally develop “somatic markers” for objects, in which we carry knowledge of the negative or positive state our body takes on when considering an object. It is these unconscious markers that allow us to quickly take action, or avoid a situation or object based on past exposure and experience.

Similarly, others have argued that affect serves as a heuristic, or decision making short-cut (Slovic, Finucane, Peters, & MacGregor, 2002). Essentially, it becomes a spotlight for
information, in which the affect felt toward a particular issue or object guides individuals towards information that aligns with what they already perceive (Peters, 2006). For example, individuals tend to perceive risks and benefits as having an inverse relationship, such that high-risk situations are perceived to be low in benefit, and vice versa (Slovic, Finucane, Peters, & MacGregor, 2002), although, hen examined objectively, those things that carry benefit usually carry risk, such that often, the higher the benefit, the higher the risk involved. One particular study examined this inverse relationship, and found that perceptions of risk and benefit were linked to affect, such that more negative affect was related to higher perceptions of risk and lower perceptions of benefits (Alhakami & Slovic, 1994). Such risk-benefit assessments occur despite this inverse relationship rarely occurring in practice.

Consistent with the idea that affect promotes cognitive consistency in information processing, Lodge and Taber (2005) posited that the positive or negative affect activated by an object highlights those ideas, words or objects that are likewise positive or negative. Under these conditions, when a person encounters a negatively valenced item, it is more difficult for him or her to process information about positively valenced items, and vice versa. Moreover, greater knowledge about an object enhances this effect—that is, knowledge facilitates appraisal (reaction times) when the concepts examined are affectively congruent, while inhibiting appraisal when concepts are incongruent. One explanation for this effect is that knowledgeable observers have encountered more information and gained more experience about the object, crystallizing their affective reaction toward the object. Likewise, within an individual, objects with stronger positive or negative associations are more likely to produce this effect than objects with ambivalent associations (Lodge & Taber, 2005).
In sum, psychological research on information processing and decision making suggests that the experiential and analytic systems are not easily divorced—decisions require the use of both the experiential and analytic systems. The experiential system, consisting of affect and conscious emotional responses, is the often-overlooked system despite the clear importance of this system to neurological function and the prevalent use of this system in human reasoning. Ideally, the experiential system should provide the initial assessment of a stimulus, and the analytic system should then either contradict or reinforce the initial experientially driven reaction or response (Damasio, 1994; LeDoux, 1996; Peters & Slovic, 2000). Given the initial importance of the experiential system, it becomes clear that evaluations resulting from this initial assessment play an important role in which, how, and to what extent additional information is evaluated, and ultimately what final decision is made.

In this study we sought to evaluate how people’s affective reaction to a species (i.e., wolves) affects their decisions to engage in behaviors relevant for the conservation of that species. Additionally, we wanted to determine the role of the experiential system (represented by affect) relative to more analytic thought processes (i.e., beliefs about the various outcomes associated with wolves). Ultimately, such information is useful for understanding how people make decisions regarding the conservation of wildlife.

**Study Context**

Given the heightened controversy and exaggerated rhetoric regarding wolves’ conservation and management in the U.S., we reasoned that they provided an ideal test case for understanding the role of affect in people’s policy-relevant decisions regarding charismatic species. Once systematically eliminated throughout the lower 48 U.S. states (Mech & Boitani, 2003; Lopez, 1978), wolves have been making a comeback in the Great Lakes and northern...
Rocky Mountain regions following their protection under the Endangered Species Act of 1973 and active reintroductions in the northern Rockies (Bangs & Fritts, 1996). Yet, despite small populations and limited distributions relative to their historic numbers and range within the U.S. (see Bergstrom, Vignieri, Shefield, Sechrest, & Carlson, 2009; Carroll, Phillips, Lopez-Gonzalez, & Schumaker, 2006), the issue of wolf management generates a tremendous amount of press (Houston et al., 2010) and political action, both in the form of citizen ballot initiatives (Nie, 2004), as well as legislative actions (Bergstrom et al., 2009, Bruskotter et al., 2010). The rhetoric regarding wolves in the West has become so heated that the Director of Natural Resources for the state of Utah recently compared the reintroduction of wolves to resurrecting the Tyrannosaurus Rex (Gehrke, 2011). Things came to a head in April of 2011, when congressmen from Idaho and Montana were successful in attaching a rider to the federal continuing budget resolution that ordered the U.S. Fish and Wildlife Service to reissue a 2009 Rule removing wolves from endangered species act protections in parts of 5 western states. The present study took place during mid-March 2011, just prior to the passage of the continuing budget resolution.

Study Objectives and Hypotheses

The present study had two objectives: (1) to better understand the role of affect in people’s policy choices related to wolf recovery, and (2) to understand the influence of affect on people’s policy preferences relative to other, more analytic thought processes (i.e., objective knowledge about wolves and beliefs about outcomes associated with wolf recovery). With the theoretical understanding that affect has primacy over other cognitive processes (Zajonc 1980, 1998, 2000), we hypothesized the following:

H1-2: Affect will be positively associated with intentions to support (1) and negatively associated with intentions to oppose (2) wolf recovery.
H₃-₄: Affect will be positively associated with beliefs about the positive outcomes associated with wolves (3) and negatively associated with the negative outcomes associated with wolves (4).

H₅: Affect will be positively associated with objective knowledge about wolves.

H₆-₇: Knowledge will be positively associated with beliefs about the positive outcomes associated with wolves (6), and negatively associated with the negative outcomes associated with wolves (7).

Study hypotheses are summarized in Figure 3.1, where paths (arrows) represent the proposed relationships between the variables assessed in this study. In general, this model views affect as both directly and indirectly (via its relationship with beliefs about the outcomes associated with wolves) impacting people’s behavioral intentions regarding wolf management policy.

Methods

Internet survey

The sample for this study was collected through a popular wildlife blog (The Wildlife News, www.thewildlifenews.com) that frequently posts news and other information about wolves in the western U.S. Our intent was to contact highly motivated and engaged respondents who were likely to be knowledgeable and interested in wildlife issues. We sought responses from these individuals for two reasons: (a) the implicit assumption in wildlife management that people make better decisions with more data (or knowledge), and (b) because we were interested in people who actually take political actions (i.e., engage in behaviors that promote various policy outcomes). After obtaining permission from the site moderators, we posted a link to an online version of the survey, along with a post that described the intent of the survey.
After the initial posting, it is possible that the link was shared and/or reposted to other sites or distributed via email. Data were collected for one week in mid-March of 2011. During this period, a settlement was reached between the U.S. Fish and Wildlife Service and a collection of environmental groups to delist the Northern Rocky Mountain Distinct Population Segment (NRM) of gray wolves in Idaho and Montana, leaving only those NRM wolves in Wyoming protected under the Endangered Species Act, which produced substantial discussion on the blog (the settlement was later invalidated by a federal court in Montana).

Measurement of Variables

Affect. Affect was operationalized by a standard elicitation measure developed by Slovic et al. (1991), wherein respondents are asked to list the first thought or image that comes to mind when they think about some object of interest. A lifetime of interacting with the world on a daily basis provides people with images of the world, which according to Damasio (1994) can be broadly interpreted as sights, sounds, smells, visual representations of events, or words associated with objects or events. Attached to these images are positive or negative “somatic markers,” which can influence judgment and decision making (akin to trait-affect or integral affect). Here, respondents were asked for the first thought or image that comes to mind when they think about wolves. They were then asked to indicate how strong their negative or positive feelings are about wolves on a ten point scale ranging from "Very negative" (-5) to "Very positive" (5), with zero serving as "Neutral."

Knowledge. Knowledge was measured as a composite of the six items listed in Table 1, adapted from Bright and Manfredo (1996). These items were designed to test an individual’s knowledge of basic wolf biology and behavior. Response options included: "False" (-2), "Probably False" (-1), "I don't know" (0), "Probably True" (1), and "True" (2). Individuals who
answered “I don’t know” received no points for that item and no additional points on their final score, while someone answering “False” to a true statement would lose two points on their final score. Items that were actually false were reverse-scored, such that when the items were summed, a higher overall score indicated a higher level of knowledge across items. This final overall score was used as the composite score for knowledge.

Beliefs about wolf recovery. Statements indicating possible outcomes of wolf recovery were listed and respondents could disagree or agree with the statements on a seven point scale ranging from "Strongly disagree" (-3), to "Neutral" (0), and "Strongly agree" (3). Belief statements are listed in Table 1. These were divided among what can be thought of as positive outcomes (benefits) or negative outcomes (risks) associated with wolf recovery. These items were adapted from Bright and Manfredo (1996) and Bruskotter et al. (2009).

Dependent variables. We measured individual’s behavioral intentions with respect to wolf recovery using a series of eight items designed to assess politically-relevant behaviors (e.g., write your congressperson, sign a petition) and one behavior directly impacting wolves (“Shoot a wolf if you saw one”). Following the recommendation of Ajzen and Fishbein (1980), individuals were asked how likely they were to engage in each of these behaviors along a scale of "Very unlikely" (-2) to "Very likely" (2), with "Not sure" as a midpoint (0). We classified behavioral intentions into two groups: those that were supportive of wolf recovery (4 items) and those that opposed wolf recovery (5 items).

Analysis

Structural equation models (SEM) using maximum likelihood estimation were built and analyzed using IBM SPSS AMOS v.19.0. Two separate models were fit, one predicting support for wolf recovery and one predicting opposition to wolf recovery (both assessed by measuring
behavioral intentions). The same relationships were hypothesized for both support and opposition (summarized in Figure 3.1). Any cases with missing data were dropped from analysis. Model fit was assessed using multiple criteria (Hu & Bentler, 1999), specifically the Comparative Fit Index (CFI) and Root Mean Squared Error of Approximation (RMSEA). Following Diamantopoulos and Siguaw (2000, p.85), RMSEA values of .05 or less were considered indicative of a “good fit,” while values between .05 and .08 were seen as indicative of a “reasonable fit.” Additionally, we sought CFI values of .95 or greater (Hu & Bentler, 1999).

Results

Response

A total of 814 individuals started the survey, and of those, 678 completed the questionnaire for an overall completion rate of 83.3%. It should be noted that response rates are not possible to determine because we had no means of tracking how many people actually encountered the link to the survey. Respondents reported residence in 43 of 50 U.S. states, though most came from western states, which reflects the readership of this blog (based in Idaho). States with the greatest representation among respondents were Washington (n = 89), Idaho (n = 69), Montana (n = 64), Utah (n = 55), California (n = 47), and Colorado (n = 39); these six states accounted for the majority (55%) of respondents who answered the residence question (n = 653). The average age of our sample was 42 years old, and males were somewhat overrepresented in our sample (69%). About one-third of respondents held a bachelor’s degree (36%), and approximately one-quarter held some type of post-graduate degree (24%). Sixty-four percent of respondents indicated that they had hunted at some point in the past, and 36% indicated they had previously hunted wolves, bears or mountain lions.
Reliability of Study Measures

We assessed the scale reliability of multi-item measures using Cronbach’s alpha. Reliability was high (> .85) for all measures (Table 3.1).

Structural Equation Models

The model predicting supportive behavioral intentions (Figure 3.2) had acceptable fit (CFI = .971; RMSEA = .064) and explained a total of 88% of the variance in people’s intentions to support wolf recovery. Similarly, the model predicting oppositional behavioral intentions (Figure 3.3) also had an acceptable fit (CFI = .973; RMSEA = .056) and explained 90% of the variance in people’s intentions to oppose wolf recovery.

As predicted in hypotheses one and two, there was a direct positive association between affect and supportive behavioral intentions (β = .16) and a negative association between affect and oppositional behavioral intentions (β = -.35). Affect also indirectly affected supportive behavioral intentions (β = .70) and oppositional behavioral intentions (β = -.54). These results indicate that a positive affective response to wolves increases one’s likelihood of participating in supportive behaviors, while negative affect has the opposite effect.

As predicted in hypotheses three and four, affect had a strong positive association with beliefs about positive outcomes (β = .86) and a strong negative association with beliefs about negative outcomes (β = -.77). Consistent with hypothesis five, there was also a positive relationship between affect and knowledge; however, the strength of the relationship (β = .57) was somewhat surprising, and indicates people with negative affective reactions have more misconceptions regarding wolf biology and behavior than those with positive reactions.
Further, knowledge within our sample was high—49% got six out of six questions correct—which we expected from a highly motivated group of respondents. However, in regards to hypotheses six and seven, knowledge had only a negligible positive effect on agreement with positive outcomes ($\beta = .04$), and a slightly larger, negative effect on negative outcomes ($\beta = - .13$). These results suggest that knowledge about wolf behavior and biology does not have a strong influence on what people believe about wolf recovery; however, this may be due, in part, to low variability in the knowledge measure. As reported previously (Bright & Manfredo, 1996), affect appears to have a greater effect on beliefs about the outcomes of wolf recovery than objective knowledge of wolf behavior and biology.

**Discussion**

Affect is clearly playing an important role in the controversy surrounding wolves. Individuals willing to participate in political behavior are most likely to be those driving the policies regarding wolf management, and here, these individuals appear to be heavily influenced by their negative or positive reaction to wolves. In particular, those intentions reflecting intolerance toward wolves are driven by negative affect slightly more so than those intentions reflecting stewardship are driven by positive affect. In addition, beliefs about positive and negative outcomes were a greater direct driver for intentions to support than oppose wolf recovery. This may mean that appeals to logic on either side will inevitably fall victim to motivated reasoning (Lodge & Taber, 2005), but that this will be an even greater issue for those opposed to wolf recovery efforts, who may be even more motivated to defend their existing beliefs.

In this manuscript we employed Slovic et al.’s (2002) definition of affect as “the specific quality of goodness or badness (1) experienced as a feeling state (with or without
consciousness) and (2) demarcating a positive or negative quality of a stimulus.” This definition
appears to overlap substantially with the standard definition of an attitude employed in
numerous psychological and human dimensions studies—that is, “a summary evaluation of a
psychological object captured in such attribute dimensions as good-bad, harmful-beneficial,
pleasant-unpleasant, and likable-dislikable” (Ajzen, 2001). Indeed, Ajzen (2001, p.29) noted that
while the term “affect” is often used to refer to “general moods” and “specific emotions,” it has
also been used as a synonym for attitude. We attempted (post-hoc) to evaluate differences
between affect and attitudes as commonly measured by comparing our affect measure with the
standard measure of attitudes (i.e., semantic differential scales; see Osgood, Suci, and
Tannenbaum, 1957). Respondents were asked to evaluate wolves using four, bi-polar items (i.e.,
harmful/beneficial, pleasant/unpleasant, good/bad, worthless/valuable) commonly employed to
assess attitudes (see Eagly and Chaiken, 1993; Fishbein and Ajzen, 1975). We found a strong
correlation (R = .92) between our affect measure and the combined measure of attitudes and
between the affect measure and each item (Rs ranged from .82 to .93). Thus, it appears that our
measure of affect overlaps substantially with common attitudinal measures, leading us to
question whether these variables—as operationalized—represent distinct, independent
concepts. We believe it is critical to point out this operational overlap so as to avoid confusion in
the literature, and suggest that a systematic evaluation of attitudinal and affect/emotion
measures would be a useful contribution to the literature.

An important assumption in our model is the so-called “primacy” of affect, or the notion
that affective/emotional responses precede cognition. A number of studies have demonstrated
the primacy of affect via various types of experiments (see, for example: Kunst-Wilson and
Zajonc, 1980; Lodge and Taber, 2005). These studies show that people evaluate stimuli more
positively after mere exposure—even when exposure times are so short that individuals are not
consciously aware of the exposure (see Kunst-Wilson and Zajonc, 1980; Zajonc 2000). Zajonc (1980, 2000) interprets these studies as indicating that affect and cognition may be separate, albeit interrelated, processes. Other research shows that subjects exhibit faster reaction times to affectively-congruent political concepts, as opposed to incongruent concepts (Lodge and Taber, 2005). These researchers interpreted their findings to indicate that affect is automatically activated on mere exposure to socio-political issues (Lodge and Taber, 2005). They go on to suggest that repeated associations between political beliefs, actions, feelings and intentions will result in an interconnected network that gets “automatized” in everyday thinking. Because affective responding is automatic, it is expected to “have an immediate ‘primacy effect’ on subsequent processing, such that one’s prior attitudes will powerfully constrain the interpretation, depth of processing, and evaluation of new information” (Lodge and Taber, 2005, p. 476-8). Generally following these lines of thinking, we expected respondent’s affect for wolves to be strongly related to their beliefs and knowledge about wolves, and ultimately, their intentions to support or oppose wolf recovery. While correlational in nature, our data support this line of reasoning, but they suggest that the effects of affect on people’s behavioral intentions are mediated by other cognitions—in this case, their beliefs about the outcomes associated with wolf recovery. Whether the experiential system is separable from the analytic system as Zajonc (1980, 2000) suggests is debatable. From our perspective, what is clear is that people’s generalized affect towards wolves is impacting what they believe about wolves—including both what they believe about the likely impacts of recovered wolves, as well as objective facts related to wolf biology and behavior. From the perspective of behavior, the strong associations between affective and cognitive factors suggest that both have a substantial impact on how people decide to act with respect to wolf conservation.
The effect of affect on people’s beliefs about the positive and negative outcomes associated with wolf recovery was expected, but still a reason for concern from a management standpoint. The positive and negative outcomes associated with wolf recovery have an objectively determinable probability, and so one’s agreement with these outcomes should not (from a “rational” standpoint) be correlated with one’s feelings about wolves; that is, the probability of any of these outcomes is not affected by affect. Yet, in this highly motivated and informed group, agreement with positive and negative outcomes was highly correlated with respondents’ affective response to wolves. This finding suggests the affect heuristic has a powerful influence on what people believe about wolves, be it objective information about biology or the potential outcomes of recovery. From a management perspective, our findings suggest that outreach aimed at changing these perceptions via education may be selectively filtered based on motivated reasoning (Taber & Lodge, 2016), and so are unlikely to result in significant changes in beliefs about wolves among this highly engaged group.

While the variance explained in these models is relatively high, future research should include other social psychological factors (e.g., subjective norms, perceived behavioral control) that have also been shown to substantially impact behavior (Ajzen & Fishbein, 1975; Ajzen, 1991). These may also have an impact on the information that individuals are exposed to and to which they attend. Likewise, we readily acknowledge that our sample is not representative of the general population; rather, our sample was designed to examine these relationships in a motivated and knowledgeable sample—people whom we expected were likely to actually engage in the political behaviors relevant to the management and conservation of wolves. While these people are likely to have a greater impact on wolf management (via engaging in politically-relevant behaviors), they are also unlikely to be persuaded by outreach materials typically developed by management agencies. Understanding the differential role of affect in policy
support or opposition among those individuals that are not necessarily engaged in the process would enable managers to tailor information to less engaged audiences. Finally, this research is correlational in nature, and while the primacy of affect has been shown in other studies, the relationships shown here are based on our assumption that affect precedes cognition. Future research should attempt to manipulate affective states in an effort to test the primacy of affect as it relates to knowledge, beliefs and behavioral intentions in these applied contexts.
<table>
<thead>
<tr>
<th>Index and Items</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Affect</strong>¹</td>
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<tr>
<td>How strong are your positive or negative feelings about wolves?</td>
<td>0.99</td>
<td>4.41</td>
<td>-0.40</td>
<td></td>
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<tr>
<td><strong>Knowledge</strong>²</td>
<td></td>
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<td>0.67</td>
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<tr>
<td>In areas where wolves live close to humans, wolf attacks on humans are common. (F)</td>
<td>-1.93</td>
<td>0.94</td>
<td>2.26</td>
<td></td>
</tr>
<tr>
<td>Wolves generally avoid contact with humans. (T)</td>
<td>1.34</td>
<td>1.16</td>
<td>2.26</td>
<td></td>
</tr>
<tr>
<td>In areas where wolves exist near livestock, their primary food is sheep and cattle. (F)</td>
<td>-0.83</td>
<td>1.38</td>
<td>0.09</td>
<td></td>
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<tr>
<td>Wolves are found outside of North America. (T)</td>
<td>1.58</td>
<td>0.94</td>
<td>-2.37</td>
<td></td>
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<tr>
<td>Wolves will not eat animals that are already dead. (F)</td>
<td>-1.30</td>
<td>1.13</td>
<td>1.61</td>
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<tr>
<td>On average, adult wolves weight from 70 to 110 lbs. (T)</td>
<td>1.32</td>
<td>1.07</td>
<td>-1.76</td>
<td></td>
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<tr>
<td><strong>Beliefs about Negative Outcomes</strong>³</td>
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<tr>
<td>Allowing wolf populations to expand into other areas (outside of those areas they currently occupy) would...</td>
<td>0.57</td>
<td>1.61</td>
<td>-0.06</td>
<td>0.87</td>
</tr>
<tr>
<td>result in large numbers of wolf attacks on livestock</td>
<td>0.15</td>
<td>2.38</td>
<td>-0.09</td>
<td></td>
</tr>
<tr>
<td>result in ranchers losing money</td>
<td>0.70</td>
<td>2.20</td>
<td>-0.48</td>
<td></td>
</tr>
<tr>
<td>result in wolf attacks on humans</td>
<td>-1.10</td>
<td>2.14</td>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td>result in wolves wandering into residential areas</td>
<td>0.42</td>
<td>2.09</td>
<td>-0.37</td>
<td></td>
</tr>
<tr>
<td>lead to fewer deer, elk and moose available to hunters</td>
<td>0.15</td>
<td>2.15</td>
<td>-0.16</td>
<td></td>
</tr>
<tr>
<td>result in ranchers killing wolves (dropped from analysis)</td>
<td>2.21</td>
<td>1.21</td>
<td>-2.38</td>
<td></td>
</tr>
</tbody>
</table>

contd.
Table 3.1, contd.

**Beliefs about Positive Outcomes**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowing wolf populations to expand into other areas (outside of those areas they currently occupy) would...</td>
<td>0.23</td>
<td>2.07</td>
<td>-0.14</td>
<td></td>
</tr>
<tr>
<td>result in greater control of rodent populations</td>
<td>0.15</td>
<td>2.23</td>
<td>-0.74</td>
<td></td>
</tr>
<tr>
<td>keep deer and elk populations in balance</td>
<td>0.08</td>
<td>2.66</td>
<td>-0.11</td>
<td></td>
</tr>
<tr>
<td>increase tourism in areas where wolves have moved into</td>
<td>0.26</td>
<td>2.38</td>
<td>-0.24</td>
<td></td>
</tr>
<tr>
<td>preserve the wolf as a wildlife species</td>
<td>0.83</td>
<td>2.33</td>
<td>-0.62</td>
<td></td>
</tr>
<tr>
<td>return the natural environment back the way it was</td>
<td>-0.19</td>
<td>2.48</td>
<td>0.07</td>
<td></td>
</tr>
</tbody>
</table>

**Supportive Behavioral Intentions**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write your congressperson in support of further wolf recovery efforts</td>
<td>-0.29</td>
<td>1.61</td>
<td>0.17</td>
<td>.95</td>
</tr>
<tr>
<td>Sign a petition in support of further wolf reintroductions</td>
<td>-0.19</td>
<td>1.81</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>Contribute to an organization that supports further wolf recovery efforts</td>
<td>-0.25</td>
<td>1.73</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>Write a letter to the editor of your local newspaper in support of wolf recovery</td>
<td>-0.46</td>
<td>1.62</td>
<td>0.41</td>
<td></td>
</tr>
</tbody>
</table>

**Oppositional Behavioral Intentions**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write a letter to your Congressperson to oppose further wolf recovery efforts</td>
<td>-0.38</td>
<td>1.76</td>
<td>0.36</td>
<td>.94</td>
</tr>
<tr>
<td>Contribute to an organization that opposes further wolf recovery efforts</td>
<td>-0.41</td>
<td>1.76</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>Sign a petition to stop further wolf recovery efforts</td>
<td>-0.19</td>
<td>1.87</td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td>Shoot a wolf if you saw one</td>
<td>-0.98</td>
<td>1.43</td>
<td>1.11</td>
<td></td>
</tr>
<tr>
<td>Write a letter to the editor of your local newspaper opposing wolf recovery</td>
<td>-0.58</td>
<td>1.67</td>
<td>0.55</td>
<td></td>
</tr>
</tbody>
</table>

---

1. Scale ranged from -5 (Very negative) to 0 (Neutral) to 5 (Very positive).
2. Answers were scored and totaled as follows: False (-2), Probably false (-1), I don’t know (0), Probably true (1), True (2). Factually false statements were reverse scored and then added to the total.
3. Scale ranged from -3 (Very unlikely) to 0 (Not sure) to 3 (Very likely).
Figure 3.1. Hypothetical model of behavioral intentions

Figure 3.2. Affect as a predictor of supportive actions.
Figure 3.3. Affect as predictor of oppositional actions.
Chapter 4: Assessing a Hazard Model of Tolerance for Wolves among the General Public

Abstract

Large predators are returning to ecosystems in the U.S., and their conservation is an ongoing challenge for wildlife agencies. Current research on the drivers for public tolerance of carnivores is limited by scale, little theoretical direction, and use of context-specific measures that are difficult to replicate in other contexts. This study applies a theoretical hazard-acceptance model for carnivores to U.S. wolf conservation using data from a national sample. We used structural equation modeling to predict tolerant and intolerant behavior among the U.S. public using standard measures of perceptions of risk, benefit, and control, trust in the U.S. Fish and Wildlife Service, and affect toward wolves. Results predict a small to moderate amount of the variance for stewardship behaviors ($r^2 = .22-.25$) and intolerant, oppositional behaviors to wolf conservation ($r^2 = .14-.22$). Variables predicting increased public tolerance echo previous local and state-level findings, and emphasize recommendations to increase perceptions of benefits of carnivores on the landscape to increase tolerance of these species among less attentive publics.

Key words: carnivores, wolves, *Canis lupus*, public, risk, hazard, benefit, trust, tolerance.

Introduction

Recent literature suggests that in places where large mammals co-occur on the landscape with people, costs are far more important than benefits in predicting human attitudes toward the animals (Kansky & Knight, 2014). In particular, intangible (or perceived) costs, were far more predictive of attitudes than the tangible costs of direct monetary losses, and similarly,
intangible benefits were more predictive than tangible benefits. As the authors point out, those familiar with the psychological literature will be unsurprised by these findings as psychologists in the field of judgment and decision making have been investigating perceived costs (in the form of risk) and benefits related to hazards like nuclear power and genetically modified organisms for decades (Siegrist, 2000; Slovic, 1987). Similarly, social scientists working within the field of conservation have highlighted the potential for investigating wildlife conflict as a special case of environmental hazards (Bruskotter & Wilson, 2014). Here, we test a hazard acceptance model of carnivore conservation with a national sample in the U.S., using the gray wolf as our model species: a wide-ranging carnivore species, capable and adaptable to living near human settlement (Linnell et al., 2001; Mech & Boitani, 2003). In order to link to both theoretical literature and policy, we predict intentional behaviors to conserve wolf and to oppose wolf conservation via easy to perform political behaviors. Our results fill a gap in the literature for large scale application of a risk/benefit model in wildlife conservation, link to existing psychological theory, and cast a new light on the importance of perceived costs and benefits to conservation.

Carnivores have always been hazardous to humans, but considering them as classic environmental hazards is a recent development in the literature (Bruskotter & Wilson, 2014). Acceptance of hazards (i.e. nuclear power or wildfire) is related to perceptions of risk and benefit (Slovic, 1993). While describing acceptance in terms of risk and benefit implies a considered and rational cost/benefit approach to managing a carnivore species, in reality it is the human perceptions of these risks and benefits that matter (Alhakami & Slovic, 1994; Siegrist, 2000; Slovic, 1987), and these perceptions are not always accurate (Tversky & Kahneman, 1974). Furthermore, perceptions of risk and benefit are driven in part by general feeling surrounding a hazard, also known as affect (Johnson & Tversky, 1983; Peters, 2006). Negative affect toward
hazards like carnivores can tip the scale in favor of increased risk perceptions and lower perceptions of benefit. Also tipping the scales toward increased perceptions of risk is a decreased perception of control, which is an integral component of both risk perceptions (Slovic, 1987), and social trust in the agencies charged with managing hazards on our behalf (Earle & Cvetkovich, 1995). Pulling these together—trust, control, affect, risk, benefit, and acceptance—into a hazard-acceptance model of carnivore tolerance, may provide further insight to those human judgments, decisions and behaviors concerning the conservation of large carnivores.

Empirical investigation of the perceived risks and benefits related to predator conservation is recent, but patterns have emerged in the findings. Riley and Decker (2000) examined wildlife acceptance capacities (a measure of human tolerance for wildlife) for cougars, and its relationship to risk perceptions, and found that lower risk perceptions were related to higher support for an increase in cougar populations. Gore et al. (2006), after interviewing campers in rural New York about black bears, found certainty and dread, two hypothesized dimensions of risk perceptions (Slovic, 1987), to influence the perceptions of the threats posed by black bears. Specifically, certainty about the known risks of black bears and how to prevent exposure likely drove lower risk perceptions, however dread related to the risk from black bears was mixed, in that campers reported feeling highly variable levels of dread. Furthermore, the two factors suggested by the data were different from the psychometric paradigm mentioned above. A follow-up, large sample mail survey again confirmed these findings (Gore et al., 2007). Generally, their results suggest that psychologically, threats related to black bears were indeed perceived similarly to other hazards, in that similar characteristics of the hazard influenced risk perceptions (volition, serious consequences, dread, control). Also studying black bears in rural New York, Siemer et al. (2009) found that positive beliefs about black bears were negatively associated with concern about the risks from black bears, a classic, inverse relationship of risk
and benefit that is robust in the judgment and decision making field (Alhakami & Slovic, 1994). Tolerance to black bears in Ohio was well explained ($R^2 = 62\%$) almost equally by risk and benefit, which were, in turn, driven by trust and control (Zajac et al., 2012). Similarly, perceptions of risk and benefit are very predictive of tolerances for tiger populations, though benefits are the more important of the two (Carter, Riley, & Liu, 2012; Inskip et al., 2016). And indeed, tolerance for wolves among an interested and knowledgeable public was driven by perceptions of risk and benefit, and benefit again was the more important direct predictor (Slagle et al., 2012), however the indirect effects showed affect towards wolves was the primary driver. Clearly, these risk and benefit perceptions have a role in predator conservation, given their significant impact on public acceptance in the literature, but variables like trust, control, and affect are likely important as well, though relatively less studied.

Affect, the global, positive or negative feeling towards something, would at first appear a subjectively poor determinant of whether or not to conserve carnivores. Why should we trust a gut feeling to lead us to the right answer? While using affect as a decision making heuristic can lead to lapses in judgment from a normative, rational perspective, it also helps us make decisions in an information-rich environment. Affect as a heuristic enables us to sift through information and come to a decision more efficiently than an endless quest for a tabulation of pros and cons might (Peters, 2006). Damasio suggests that as we experience life, we mentally tag these experiences with our emotional state in the moment, tags he calls “somatic markers.” We then access these tags whenever these experiences are salient, and use them to guide present decision making (Damasio, 1994). When this ability is removed by an injury to the brain, individuals can no longer create somatic markers, and actually perform worse on analytical and daily tasks (Bechara, 2004; Bechara, Tranel, Damasio, & Damasio, 1996). And reaching back to the inverse relationship we mentally create between risk and benefit—it appears to be driven by
affect (Ascher, Wilson, & Toman, 2012; Finucane et al., 2000; Peters & Slovic, 1996). Positive affect pulls perceived benefits up and pushes perceived risks down, and negative affect does the reverse. So while affect does serve important, practical purposes in our lives, it can still lead us to over-emphasize risk or benefit in instances where both risk and benefits may be present and their careful consideration critical to conservation. Affect is hardly alone in its impact on risk and benefit, however, as trust and control can play a similar role in influencing these perceptions.

The precise definition of trust continues to inspire debate across the social sciences, but two views are commonly associated with risk and the environment (Earle, 2010): trust in the managing agency to handle the risk at hand (Siegrist, 2000; Siegrist, Cvetkovich, & Roth, 2000) and trust as salient values similarity (Cvetkovich & Winter, 2003; Earle & Cvetkovich, 1995). Trust in the management agency, also known as calculative trust or confidence, allows us as citizens to shift responsibility and management for species to our local, state, and federal agencies. We are taking a calculated risk in doing so: do we believe the agency is trustworthy and capable in their management? If so, we entrust them with responsibilities ranging from saving endangered carnivores to protecting us from recovered carnivore populations. Calculative trust is easily lost, however, because it assumes that behavior is consistent and predictable, and that the context is known and controllable. Trust as salient values similarity, also known as relational trust, is the perception that the agency holds the same values as we do in this issue and will act in a similar manner as we would. When we perceive a similarity, we trust the agency to do the right thing, whatever we perceive that to be, because we expect those who think like us to act like us. Relational trust is based in knowing the intentions of the agency, and is resilient because of its basis in shared values. Trust acts as a decision making shortcut, similar to affect, in that it simplifies our choices. Applied to carnivore conservation, trust is expected to contribute to lower risk perceptions and increased tolerance for carnivores.
What happens when we ourselves have agency, or control, over the risk? Perceived control is an important dimension of risk perceptions (Slovic, 1987), and can play a critical role in predicting our behavior (Ajzen, 2002). As a dimension of risk, when a given hazard is perceived to be uncontrollable, among other factors, it is also perceived to be more risky. As a predictor of behavior, perceived control can interrupt even the best of intentions. Even if I believe strongly in the value of conservation, and I think it’s the norm among my friends to act on this value, I will not act on these beliefs if I perceive some barrier to acting on these notions. Several studies have examined the impact of control over risk in predator management. Zajac et al (2012) found lower personal control greatly increased risk perceptions, which in turn decreased acceptance of black bears in Ohio. When combined with explanations of the benefits of recovered carnivores, however, outreach aimed at increasing a sense of personal control increased tolerance for black bears in Ohio, likely by increasing perceptions of benefits, increasing a sense of control, and lowering risk perceptions (Slagle, Zajac, Bruskotter, Wilson, & Prange, 2013). In Norway, residents that had lower perceptions of control found carnivore behaviors in general to be less acceptable (Kleiven, Bjerke, & Kaltenborn, 2004), and sheep farmers with a higher sense of control had fewer negative attitudes towards carnivores (Bjerke, Vittersø, & Kaltenborn, 2000). Focusing on tigers in Nepal, Carter et al (2012) found that one’s lower perceived ability to adapt to or avoid risks was associated with a preference for fewer tigers. A sense of control within stakeholders appears to lower risk perceptions, and can increase tolerance for carnivores. Control lends agency to the individual, whether that be agency in managing conflict on one’s property or the ability to influence policy and management on some level.

By seeking to answer the question, “How does a theoretical hazard-acceptance model of large carnivore tolerance perform among a sample of the general public in the U.S.?” (Figure 4.1) this study extends previous work in three ways: first, it takes a national level approach to a species
with a wide potential geographical distribution, where typically only state-level approaches have been completed in prior work. Second, it is guided by existing psychological theory and measures, and therefore standardizes the measurement of these variables for potential future work and allows this work to potentially feed back into more basic psychological understandings of risk (Bruskotter et al., 2015). Finally, this model explicitly tests the relationship between perceptions of risk and benefits and actions impacting conservation, a relationship implied by previous work focusing on attitudes as the dependent variable.

Methods

**Sampling and data collection.** We conducted an online survey of a representative sample from a panel of respondents maintained by GfK, a marketing research firm. In order to approximate traditional mail samples, GfK recruits members via multiple contacts at their mailing address. To overcome coverage issues plaguing online samples due to a lack of internet access, GfK provides internet access to recruits that do not have access in exchange for their participation in the online panel. Recruits that already have internet access are compensated with points, which translate to roughly $4-$6 per month, a nominal remuneration unlikely to bias responses. GfK then draws a sample of respondents from their recruited panel members for study. To ensure sample representativeness, post-hoc sampling weights were constructed using U.S. Census Bureau data, accounting for respondent age, race and/or ethnicity, level of education, household income, census region, metropolitan area residence, and whether or not respondent had household access to the Internet. Research on this method of sampling suggests that it is almost identical to telephone surveys (Berrens et al., 2003), but lacks other biases associated with telephone surveys (coverage bias due to cellphone use and social desirability.

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bias; (Chang & Krosnick, 2009). For more detail on panel construction see (Berrens et al., 2003; The GfK Group, 2013).

The Ohio State University’s Office of Responsible Research Practices reviewed and approved the methods used in this research (protocol number 2013E0553). Prior to the full survey period, we pre-tested the survey instrument for function and length, and found it necessary to reduce survey burden to respondents. To achieve this, we limited respondents’ assessment of trust in the USFWS to those respondents at least somewhat familiar with the agency. Respondents not at all familiar with the agency skipped to the next bank of questions. Additionally, responses to the 10-item bank of benefits and risks to wolf recovery were randomly assigned, such that each respondent received a random set of 8 of the 10 questions. These changes resulted in a final average survey length of 12.5 minutes. We gathered all responses using Qualtrics, an online survey platform, and the full survey period occurred over an 11 day period in February 2014. Respondents were contacted up to 3 times, twice by email and a final automated telephone call.

Operationalization of variables. There are several variables of interest in this study: affect, benefits, risks, control, trust, and tolerance (specific measures can be found in Table 4.1).

Measurement of affect followed the method proposed by Slovic and colleagues (Peters & Slovic, 2007; Peters & Slovic, 1996). This work draws on Damasio’s “somatic markers” hypothesis to tap affect related to the image of interest. Respondents are asked to write down the first thought or image that comes to mind when considering wolves. They are then asked to rate on a bipolar scale how positive or negative they feel about what they wrote. After this, they are asked to perform the same task up to five more times. Slagle, Bruskotter and Wilson (2012)
used a single measure of this type, however to increase the measure’s usefulness and better follow existing literature, the measure was asked twice here (Peters & Slovic, 2007).

Measurement for benefits and risks are taken directly from Bright and Manfredo (1996). Cronbach’s alpha is not reported for either of these scales in Bright and Manfredo (1996); however, in Slagle, Bruskotter, and Wilson (2012) the reliabilities for these scales were 0.87 for beliefs about negative outcomes (risks), and 0.91 for beliefs about positive outcomes (benefits; both acceptable according to ( Vaske, 2008). Benefits and risks are measured by agreement with statements regarding various outcomes of a recovered wolf population. Five statements describe negative outcomes like depredation, effects on game species and rancher losses. Five statements describe positive outcomes like a return of “naturalness,” benefits of tourism, and “balanced” wildlife populations.

Control is measured through agreement with a series of four statements that assess both control over the risk from wolves themselves (Zajac et al., 2012), as well as control over the policy process (Johansson & Karlsson, 2011).

Agency trust was assessed for the U.S. Fish and Wildlife Service through measures aimed at both relational trust and calculative trust (Earle, 2010). Salient values statements tapping relational trust focus on the extent to which an individual feels the agency in question shares their values and would take similar action (Cvetkovich & Winter, 2003; Earle & Cvetkovich, 1995). Trust in ability, or calculative trust, is measured in straightforward statements regarding the agency’s ability to manage wildlife.

Finally, tolerance for wolves is measured as the intentions to perform a variety of politically-relevant behaviors. Tolerance can be thought of as a continuous scale ranging from stewardship of wildlife to passive tolerance to active intolerant behaviors (Bruskotter et al. 2015). Here, tolerance is measured with a set of behavioral intentions to oppose and support
wolf recovery, which are largely replicated from Slagle, Bruskotter and Wilson (2012). These include writing one’s Congressperson, signing a petition, and contributing to a non-profit organization. We have added 2 more behaviors that might be more accessible or typical of the general public: contacting a wildlife manager and making a post to social media related to wolf conservation.

Model measurement and analyses. Testing the hazard acceptance model required measuring 6 latent variables via 30 survey items: trust, control, affect, risk, benefit, and tolerance, which was divided into support and opposition for purposes of analysis (Table 4.1). Latent psychological variables are impossible to measure directly, and as such, are observed through their influence on other human behaviors (here, responding to items on a survey questionnaire). Structural equation modeling allows for these latent—observed variable relationships to be maintained by building confirmatory factor analyses into the measurement models, while also testing for the theoretical relationships between the latent variables themselves (Schumacker & Lomax, 2004). Ideally, each latent variable will be measured through at least 3 observed variables, with factor loadings greater than 0.30 generally considered significant by convention in psychology (Field, Miles, & Field, 2012). However, with sample sizes of 1000, a loading of 0.16 would be significant at an alpha level of .01 (Stevens, 2002). Model fit was assessed using multiple indices, specifically the Comparative Fit Index (CFI), Root Mean Squared Error of Approximation (RMSEA), and the Standardized Root-Mean Squared Residual (SRMR). Following Diamantopoulos and Siguaw (2000) and Schumacker and Lomax (2004), RMSEA and SRMR values between .05 and .08 were seen as having “reasonable fit,” while anything less than .05 was a “good fit.” We sought CFI values of .95 or greater, but levels of .90 or greater were considered as having “reasonable fit” (Hu & Bentler, 1999).
Structural equation modeling requires data missingness to be explicitly handled prior to analysis. Where some software programs automatically use pairwise or listwise deletion of incomplete cases, leaving the user sometimes unaware of missingness at all, structural equation modeling forces an explicit decision on how to handle incomplete responses. Methods for dealing with missingness have grown substantially, and methods should be adapted to the data on hand (Li, 2010). For the present study, we used a two-pronged approach for recovering data and testing the model from both theoretical and generalizable standpoints. In order to assess the theoretical fit of the model to the data, we used a full information likelihood approach, which does not impute any missing values but as the name implies, uses all information available in the dataset to estimate model parameters through an iterative process. Using this technique in structural equation modeling software, a likelihood function for each case is estimated using all available information. The likelihood function is then summed across all cases for an overall model estimate. This approach has the benefit of providing unbiased estimates despite violations of normality, high levels of missingness, and varying sample sizes (Allison, 2003; Li, 2010).

Unfortunately, full information maximum likelihood is unavailable for weighted analyses in R (R Development Core Team, 2016), so for the purposes of testing generalizability, we needed to use a different missing data treatment. Linear interpolation uses regression to model missing data for each respondent, imputing the value suggested by the regression line. While linear interpolation is marginally better than mean substitution imputation, in that it accounts for relationships with other variables to impute values, it still carries similar challenges as mean substitution in that it can reduce variability in the data and produce inflated correlations (Allison, 2003). For these reasons, we compare the parameter estimates for model relationships for a maximum likelihood model of the imputed data and the full information maximum
likelihood model of the data with missingness maintained, prior to weighted analyses. Finally, we use the imputed data with weights to adjust our sample and approximate sociodemographics of the U.S. national population, and investigate the generalizability of the hazard-acceptance model to a broader context.

To reiterate, responses to items measuring trust in the USFWS were limited to those respondents at least somewhat familiar with the agency; respondents who were not at all familiar with the agency did not answer any trust items (n = 266), and were removed from weighted analyses using imputed data, but were maintained in the full information maximum likelihood model assessing theoretical fit. To impute missing data for weighted analyses, we used the linear interpolation method using ordinary least squares regression in IBM SPSS (IBM Corp, 2013) to recover planned missingness in benefit and risk (10 items total, between 20-24% missing completely at random), as well as random missingness in the remaining model variables (18 items total, between 2-6% missing at random). One dataset with missingness maintained and one dataset with imputations were transferred to R for all structural equation model analyses. Measurement confirmatory factor analyses and structural equation model analyses were performed in R using the lavaan and lavaan.survey packages (Oberski, 2014; R Development Core Team, 2016; Rosseel, 2012) Descriptive analyses were performed in IBM SPSS (IBM Corp, 2013).

Results

GfK contacted a total of 2,020 potential respondents, and received 1,287 completed surveys for a response rate of 63.7%. Prior to weighting procedures, respondents were more female than male (46.0% male), white (83.5%), from metropolitan statistical areas (73.0%) and had internet access separate from GfK (84.5%). The average age was 50.8 years, and 50.9% of
respondents reported a household income of less than $59,000 per year. Weights were created using demographics from the 2009—2011 American Community Survey conducted by the United States Census Bureau, and the minimal impacts of adding sociodemographic weights to descriptive analyses for observed variables can be seen in Table 4.1, where fairly small or nonexistent changes to means, standard deviations, and skewness are evident.

Bearing the thresholds for factor loadings and model fit indices in mind, we aimed to ensure good measurement models while not discarding observed variables out of hand. We assessed affect with two items, which required an averaged composite measure rather than a latent variable model. Trust was measured via 4 items, and responses to these items was limited to those individuals who reported being at least somewhat familiar with the U.S. Fish and Wildlife Service. Still, a measurement model resulted in poor fit (CFI = .87, RMSEA = .46, SRMR = .07), but indicated high factor loadings (>0.80) for the two items focused on trustworthiness and capability in management. These items were averaged for a composite measure of trust, or more specifically, calculative trust or confidence. Control was also measured through 4 items, resulting in marginally acceptable fit of the overall measurement model (CFI = .94, RMSEA = .15, SRMR = .05), but poor factor loadings for 2 items of < 0.10. Again, we created a composite measure for control by averaging the 2 items with factor loadings of > 0.50, measuring personal control over exposure to the risk and prevention of conflict with wolves. The remaining 4 latent variable measurement models (benefit, risk, support and opposition) all had acceptable fits for at least 2 of the 3 fit indices used here (CFI > .95, SRMR < .05), and factor loadings greater than 0.16 for each observed variable, and thus were maintained in full (Table 4.1).

The full information likelihood models with missing data achieved a reasonable fit for both support and opposition to wolf conservation (support: CFI = 0.91, RMSEA = .07, SRMR =
.07; opposition: CFI = .92, RMSEA = .07, SRMR = .08; Figure 4.2), and explained 22% and 18% of
the variance, respectively. Modification indices did not suggest any theoretically justified
relationships, so no attempt was made to improve model fit. All relationships were in the
expected direction (Figure 4.1), however, trust was not a significant predictor for risk in either
opposition or support. This could relate to the fact that individuals without trust scores and little
familiarity with the federal management agency for the species were included in these model
analyses. Affect also failed to carry a significant direct relationship with opposition.

An identical unweighted model with missing data imputed and respondents without
trust scores removed was run in order to assess any differences that may be due to missing data
treatment methods rather than weighting procedures. Again, full information maximum
likelihood modeling is not currently compatible with weighted samples, so a linear interpolation
was performed to impute missing data for weighted analyses. This model also achieved a
reasonable fit for both support and opposition (support: CFI = .92, RMSEA = .06, SRMR = .06;
opposition: CFI = .93, RMSEA = .06, SRMR = .06; Figure 4.3), explained 25% and 22% of the
variance respectively, and all relationships were in the expected directions, though many did
indeed increase in strength, as might be expected with linear interpolation (Allison, 2003). Again
in this model, affect did not significantly predict opposition, but trust and control flipped their
relationships with risk, such that control was no longer a significant predictor of risk, and trust
now had the same small relationship with risk that control did in the full information maximum
likelihood model ($\beta = -.13$). This is likely due to the loss of respondents without trust scores or
familiarity with USFWS.

Finally, we tested the model on weighted, imputed data to understand the
generalizability of such a model among a national public. Model fit dropped to a marginal fit for
support and a poor fit for opposition (support: CFA = .89, RMSEA = .08, SRMR = .06; opposition: CFI = .86, RMSEA = .09, SRMR = .07; Figure 4.4), and explained 22% and 14% of the variance, respectively. The trust relationship with risk was reduced and no longer significant, and affect no longer had a significant direct influence on support. While the model fit is poor for opposition, an interesting shift in the relationship between risk, benefit, and opposition occurs in this model: risks and benefits are almost equally predictive of opposition (risk β = .23; benefit β = -.19), where in previous models the influence of benefits on support and opposition dwarfed the influence of risk (Figure 4.2 and Figure 4.3).

Discussion

We tested a hazard-acceptance model of carnivore tolerance on a national sample in order to assess the generalizability of such models, link explicitly to psychological theories of judgment and decision making, and link perceptions of risks and benefits to behaviors impacting conservation. The model (Figure 4.1) had a reasonable fit to the data under two missing data treatment scenarios, predicting 18-25% of the variance in intentions to oppose or support wolf conservation, but became marginal to poor once weights adjusting for sociodemographics within our sample were applied. Adjusting for measurement model fit results, we reduced measures of trust to only calculative (non-relational) trust, and control was limited to control over conflict with wolves (not control over the management process). All relationships within the fitted models were in the expected hypothesized directions, though in every model, the impacts of trust and control on risk were minimal, and the direct effects of affect on behavior were minimal to nonexistent. Trust remained a moderate predictor of benefits in every model, and for every model save the weighted opposition model, benefits maintained a moderate relationship with conservation related behaviors, both supportive and oppositional. Model fit
for opposition was consistently poorer than that for support, and possibly related to the mildly non-normal nature of those observed variables; relatively few people were likely or very likely to perform opposition behaviors (less than or equal to 14% for any given action). Indeed, 33% of our sample were unlikely or very unlikely to perform any of the behaviors we included in our measure, although this means 67% were at least uncertain of whether or not they would act and at best very likely to act to influence wolf policy. Overall, this research suggests when placed in context with other models of human behavior, the hazard acceptance model provides some insight into the way the general public approaches wolf management, and perhaps more broadly, carnivore management.

Considering another psychological model frequently used to predict behavior, the theory of planned behavior (Fishbein & Ajzen, 2010) predicts around 34% of the variance, on average, in behavioral intention (Armitage & Conner, 2001), we might conclude that the model here is lower but close in predictive ability. The hazard acceptance model was tested on a geographically diverse sample, where the specific relevance of wolf management would be expected to vary spatially. When using psychological models to assess behavior in cross-sectional studies, like the one performed here, in order to properly assess the model one must apply the principle of compatibility (Ajzen, 2005). This means that all measures should refer back to the same attitude target, time, and context, and indeed, in terms of object (wolves) and time (at any point) this is largely the case for measures in the present study. However, when considering context, we might take the large spatial scale to indicate different contexts for different people, and for this to reduce some of the variance explained within our model. That context matters would seem to influence the larger variances explained in tolerance for other large carnivores that have been limited in geographical scale (76-93%, Bright & Manfredo, 1996; 51%, Carter et al., 2012; 62%, Zajac et al., 2012). Findings here might temper any extrapolation
of these local and state level findings to larger spatial scales. Likewise, previous work has predicted preferred carnivore populations (Carter et al., 2012; Inskip et al., 2016; Zajac et al., 2012), a measure that may actually approximate attitude towards the species and while correlated to behavioral intentions, is not necessarily a proxy for behavioral intentions (Bruskotter et al., 2015). Again, one of the aims of the present study was to link tolerance for carnivores to theoretical explanations of human behavior, and by explaining behavior as opposed to attitudes, we allow this research to link to future work informed by other social models of behavior.

The one-third of our respondents unlikely to perform any of the behaviors we included could be deemed “tolerant,” in the sense that they are not choosing to impact wolves in any fashion (Bruskotter & Fulton, 2012; Bruskotter et al., 2015). Understanding inaction may be just as important for future research as understanding active stewardship or intolerance. Is inaction related to weak attitudes related to wildlife, a lack of political efficacy, or a generalized trust of the government to handle this type of risk? Alternatively, could a lack of trust in the government or a belief in governmental ineptitude to handle the risk drive inaction, such that any action to affect change in wolf management is perceived as a waste of time? The implications are different for each and warrant further study. Weak attitudes, or disinterest in the issue, might indicate that these individuals are open to information that might sway them in one direction or another. It might be difficult to catch the attention of a disinterested public with weak attitudes, but for agencies or groups wanting to nudge this group in a specific direction, watching for “policy windows” and being prepared to take advantage of them could be a useful strategy (Kingdon & Thurber, 1984). Indeed, groups concerned about climate change have started to consider extreme weather events as policy windows—opportunities to engage the public and connect weather with climate (Cutting, 2012). Advice to anyone planning to reach out to the
general public during policy windows might include starting with the bigger picture of carnivore management and where we are in the process of conserving such species. Next, to the extent possible, connect specific events triggering the policy window to larger trends in conservation of the species. And finally, ensure any message comes from a trusted source. Policy windows like wolf sightings or wolf attacks open opportunities to talk to the public, but the format for engagement with the general (and possibly, uninterested) public frequently happens in small bites—news clips, brief interviews, or perhaps news articles that do not allow for depth of information. Following a strategy of first big picture, followed by links to trends, and all coming from trusted sources can allow for more simplified messaging than a full-length journal article.

The lack of strong effect of control or trust on risk could be due to challenges in measuring these concepts. Measurement models for both control and trust required simplification to a composite, meaned measure instead of the planned, latent variable, suggesting further consideration may need to be given to how these variables can be reliably measured in a concise manner. Prior work measuring personal control related to black bear management found poor measurement model fit and a low Cronbach’s alpha (0.50; a typical lower threshold for this measure of reliability would be 0.60; Vaske, 2008). Additionally, current field work on carnivore conflict in South Africa has proven the control variable particularly challenging to measure, requiring repeated adjustment to wording and additional questions (Benjamin Ghasemi, pers. comm.). Other work suggests that the control variable might be better measured as part of a cognitive vulnerability model, which was developed specifically for human interactions with animals and combines factors measuring control/danger, unpredictability, and disgust (Johansson & Karlsson, 2011). Typical measures of control have been drawn from psychological literature aimed at predicting general human behavior (Ajzen, 2002; Bandura, 1977; Rotter, 1966). While it is possible that greater contextual specificity will generally increase
the predictive ability of psychological models (Fishbein & Ajzen, 2010), it comes at the cost of additional survey items—the cognitive vulnerability model required 14 items, 3.5 times more items to fully measure control than used in the present study, and combines the distinct psychological constructs of control and emotion (in the form of disgust). However, the type of control measured in the present model focused on control over the risk of conflict with wolves. As mentioned previously, the sample here covered a large geographical area with varying levels of exposure to the risk of conflict with wolves. Control is typically an important factor of risk perception (Slovic, 1987), and our sample expressed relatively high agreement with the statement regarding their personal ability to prevent conflict by taking precautions, as well as overall agreement with statements regarding the less specific risks resulting from expanded wolf populations (Table 4.1). It seems that respondents may have distinguished between their personal ability to control the risk, and the general existence of the risk elsewhere. While someone in Chicago could control their risk of conflict with wolves easily, they could also acknowledge that there are risks stemming from expanded wolf populations outside of their current range, because even that expansion may still seem far away. Moreover, individuals who are geographically distant from the risk of wolves and unengaged with the issue may not find measures assessing control over wolf management or policy processes particularly salient, creating a challenge for measuring this type of control among the general public. Future work will need to carefully weigh better, more specific measurement against survey space and respondent fatigue when considering the contribution of control to tolerance for carnivores.

Trust relies on more standard measures than control, particularly in the area of risk and decision making (Earle, 2010), however due to survey length, we chose to both limit the number of items used to measure it and allow respondents unfamiliar with the agency to skip the question of trust altogether. Excluding unfamiliar respondents from analysis resulted in a
significant relationship between trust and risk, suggesting for those familiar with an agency, greater trust could reduce risk perceptions. This relationship was no longer significant once sampling weights were applied, calling into question the public’s familiarity with the agency and limiting generalizability of the finding. The relationship between trust and benefit remained throughout all iterations of the hazard acceptance model, however, emphasizing not only previous recommendations for agencies to include benefits as part of their outreach efforts to increase tolerance (Bruskotter & Wilson, 2014; Slagle et al., 2013), but also the importance of building trust with the public. The ever-present inverse relationship between risk and benefit indicates that an increase in perceived benefits could subsequently serve to lower risk perceptions, and increase tolerance for carnivores both directly and indirectly. The above recommendation regarding policy windows might allow the public to engage with information they may not have previously considered, but should still come from a trusted source. To increase trust, agencies, or other entities, might choose to emphasize their effectiveness in carnivore management and any other successes in species conservation. This part of agency outreach would likely fit into the advice to focus on the wider context of wolf or carnivore conservation initially within a message. Here, greater trust related to greater perceptions of benefit, suggesting higher trust in the agency may promote a greater belief the benefits of carnivore conservation.

The expected relationships between affect, risk, and benefit were maintained in all of the models, but the direct relationship between affect and conservation related behavior was either weak or unsupported. When affect was predictive of conservation behavior, it was positively predictive of supportive behavior \((\beta = 0.12 - 0.13, \text{full information maximum likelihood model and linear interpolation model without weights, respectively})\). This relationship is similar to previous findings among an issue public sample in regards to support \((\beta = 0.16; \text{Slagle et al.,})\).
2012), but is vastly different for opposition. Among the issue public, affect showed a stronger relationship with oppositional, intolerant behaviors ($\beta = -0.35$), possibly suggesting some motivated reasoning among this group (Taber & Lodge, 2006, 2016). With motivated reasoning, automated affect and acts as a contagion, spreading throughout cognitive schema and influencing the way in which we consider new information. This influence comes mostly in the form of discounting information that disconfirms our existing biases and placing greater value on information that confirms our initial affective evaluation. Relevant to the current differences between a national public and an engaged and informed issue public, this contagion effect of affect resulting in motivated reasoning is indeed more pronounced among political sophisticates like those represented by the issue public—those one might presume to be most immune to it (Lodge & Taber, 2005; Taber & Lodge, 2006). Less engaged individuals on the wolf issue, and likely other carnivore conservation issues, may lack the existing strong affective reactions or cognitive schema that drive the potentially motivated reasoning of an issue public, and could give more careful consideration and cognitive effort to weighing risk and benefit, though this is admitted rare (Taber & Lodge, 2016).

From a more practical perspective, no more than 13% of our respondents were willing to contact a wildlife manager or agency in support or opposition to wolf recovery. Wildlife managers and agencies frequently fret over being contacted by members of the public, and sometimes take such calls as reflective of the general population. Managers and the agencies they serve in would do well to maintain perspective regarding contacts from the general public—it was a very small group in our sample that would consider this a viable action for impacting a charismatic and heavily contested carnivore species. One might conclude that any contact from constituents regarding lower profile species or issues probably represent an even smaller portion of the general public. While these contacts from the public could be interpreted
as a sign of bigger issues, such interpretations should be investigated further before warranting major shifts in policy or protocol.

The hazard acceptance model largely fit data from a nationally-representative sample, indicating that it is useful for explaining some of the individual choice to impact carnivore conservation. Many in our sample were unlikely to undertake any of the behaviors we investigated, suggesting either a passive tolerance of wolves on their part or that our list of behaviors needs to be more inclusive. Where Kansky and Knight (2014) found the most predictive strength in intangible and tangible risks when considering attitudes towards large mammals among communities in close proximity, we found tangible and intangible benefits to be better predictors of intentions to behave among a broader, spatially distant sample. We also note the important differences between measuring attitudes toward conservation and conservation-related behaviors—predicting human behavior is more difficult, but better links to existing social science theory, better guidance to policy makers, and allows for stronger linkages to conservation outcomes. We echo previous calls for additional exploration of the importance of explaining benefits of carnivore conservation, and issue caution to managers heavily weighting the contacts they receive from the public, as this likely represents a very small portion of their constituents.

Conclusion

Public tolerance for wolves in a general public sample does not appear to be driven by affective feeling for wolves, but rather by perceptions of the benefits of expanded wolf populations, which were moderately predictive of both oppositional, intolerant behaviors and supportive, tolerant behaviors. However, recognizing that a significant portion of the public is unengaged with the wolf issue and unlikely to perform tolerant or intolerant behaviors, agencies
or other entities focused on wolf conservation might consider using policy windows as an opening to communicate and build trust with the general public, and further, leverage the positive relationship between benefits and tolerance for wolves to meet their goals for public acceptance of wolves. As might be expected by the compatibility principle, the hazard acceptance model tested at a large geographical scale here did not perform as well as similar models of tolerance at the state and local level, although it provides useful insights into the possibility of building acceptance through trust and perceived benefits even among a less engaged audience. We would expect that researchers and conservationists at the local level might find the model even more predictive and informative for public engagement around issues that are more proximal and relevant to a local population.
Table 4.1. Factor loadings, unweighted and weighted descriptive statistics of items used to measure latent model variables. Weighted descriptive statistics are in parentheses.

<table>
<thead>
<tr>
<th>Latent Variables and Items</th>
<th>Mean (W)</th>
<th>SD (W)</th>
<th>Skew (W)</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affect&lt;sup&gt;15&lt;/sup&gt;</td>
<td>3.50</td>
<td>1.11</td>
<td>-0.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.57)</td>
<td>(1.03)</td>
<td>(-0.28)</td>
<td></td>
</tr>
<tr>
<td>When considering the first thought or image you just mentioned, how negative or positive do you feel about the thought or image?</td>
<td>3.59</td>
<td>1.26</td>
<td>-0.50</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(3.62)</td>
<td>(1.22)</td>
<td>(-0.56)</td>
<td></td>
</tr>
<tr>
<td>When considering the first thought or image you just mentioned, how negative or positive do you feel about the thought or image?</td>
<td>3.41</td>
<td>1.28</td>
<td>-0.27</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(3.51)</td>
<td>(3.51)</td>
<td>(-0.33)</td>
<td></td>
</tr>
<tr>
<td>Trust&lt;sup&gt;25&lt;/sup&gt;</td>
<td>3.52</td>
<td>0.94</td>
<td>-0.61</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.54)</td>
<td>(0.92)</td>
<td>(-0.63)</td>
<td></td>
</tr>
<tr>
<td>I feel that the U.S. Fish and Wildlife Service...</td>
<td>3.50</td>
<td>0.90</td>
<td>-0.53</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>(3.48)</td>
<td>(0.88)</td>
<td>(-0.71)</td>
<td></td>
</tr>
<tr>
<td>...shares similar values as me.</td>
<td>3.35</td>
<td>0.94</td>
<td>-0.41</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>(3.35)</td>
<td>(0.93)</td>
<td>(-0.53)</td>
<td></td>
</tr>
<tr>
<td>...takes similar actions as I would.</td>
<td>3.50</td>
<td>0.99</td>
<td>-0.58</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>(3.52)</td>
<td>(0.96)</td>
<td>(-0.63)</td>
<td></td>
</tr>
<tr>
<td>...is trustworthy in their management of wildlife in the U.S.(c)</td>
<td>3.55</td>
<td>0.97</td>
<td>-0.63</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>(3.56)</td>
<td>(0.94)</td>
<td>(-0.64)</td>
<td></td>
</tr>
<tr>
<td>...is capable in their management of wildlife in the U.S.(c)</td>
<td>4.84</td>
<td>1.15</td>
<td>-0.26</td>
<td></td>
</tr>
<tr>
<td>Control&lt;sup&gt;25&lt;/sup&gt;</td>
<td>4.84</td>
<td>1.15</td>
<td>-0.26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.82)</td>
<td>(1.19)</td>
<td>(-0.32)</td>
<td></td>
</tr>
<tr>
<td>Please tell us how much you agree or disagree with the following...</td>
<td>4.63</td>
<td>1.59</td>
<td>-0.50</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>(4.68)</td>
<td>(1.56)</td>
<td>(-0.47)</td>
<td></td>
</tr>
<tr>
<td>People can choose whether or not they are exposed to risks associated with wolves. (c)</td>
<td>5.04</td>
<td>1.49</td>
<td>-0.78</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>(5.07)</td>
<td>(1.51)</td>
<td>(-0.76)</td>
<td></td>
</tr>
<tr>
<td>I can prevent conflict with wolves by taking precautions. (c)</td>
<td>4.65</td>
<td>1.64</td>
<td>-0.35</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>(4.57)</td>
<td>(1.65)</td>
<td>(-0.36)</td>
<td></td>
</tr>
<tr>
<td>This country is run by a few people in power and there is not much the little guy can do about decisions regarding wolves.</td>
<td>4.34</td>
<td>1.46</td>
<td>-0.42</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>(4.31)</td>
<td>(1.47)</td>
<td>(-0.56)</td>
<td></td>
</tr>
</tbody>
</table>

Contd.
<table>
<thead>
<tr>
<th>Latent Variables and Items</th>
<th>Mean (W)</th>
<th>SD (W)</th>
<th>Skew (W)</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risks</strong>&lt;sup&gt;3&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow wolf populations to expand into other areas (outside of those areas they currently occupy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...result in large numbers of wolf attacks on livestock</td>
<td>4.73 (4.57)</td>
<td>1.46 (1.50)</td>
<td>-0.27 (0.25)</td>
<td>0.76</td>
</tr>
<tr>
<td>...result in ranchers losing money</td>
<td>4.74 (4.65)</td>
<td>1.44 (1.45)</td>
<td>-0.30 (0.29)</td>
<td>0.70</td>
</tr>
<tr>
<td>...result in wolf attacks on humans</td>
<td>3.83 (3.81)</td>
<td>1.64 (1.67)</td>
<td>-0.08 (0.67)</td>
<td>0.49</td>
</tr>
<tr>
<td>...result in wolves wandering into residential areas</td>
<td>4.62 (4.66)</td>
<td>1.46 (1.42)</td>
<td>-0.36 (0.30)</td>
<td>0.46</td>
</tr>
<tr>
<td><strong>Benefits</strong>&lt;sup&gt;3&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allow wolf populations to expand into other areas (outside of those areas they currently occupy)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...help control coyote populations.</td>
<td>4.30 (4.34)</td>
<td>1.22 (1.12)</td>
<td>-0.31 (0.61)</td>
<td>0.27</td>
</tr>
<tr>
<td>...keep deer and elk populations in balance</td>
<td>4.52 (4.61)</td>
<td>1.56 (1.45)</td>
<td>-0.54 (0.56)</td>
<td>0.57</td>
</tr>
<tr>
<td>...increase tourism in areas where wolves have moved into</td>
<td>3.48 (3.51)</td>
<td>1.46 (1.42)</td>
<td>0.04 (0.01)</td>
<td>0.29</td>
</tr>
<tr>
<td>...preserve the wolf as a wildlife species</td>
<td>4.71 (4.75)</td>
<td>1.46 (1.41)</td>
<td>-0.53 (0.54)</td>
<td>0.53</td>
</tr>
<tr>
<td>...return the natural environment back the way it was</td>
<td>4.16 (4.18)</td>
<td>1.56 (1.55)</td>
<td>-0.35 (0.45)</td>
<td>0.54</td>
</tr>
</tbody>
</table>
Table 4.1, contd.

<table>
<thead>
<tr>
<th>Latent variables and Items</th>
<th>Mean (W)</th>
<th>SD (W)</th>
<th>Skew (W)</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supportive Behavioral Intentions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below are a number of actions you could take in order to INCREASE wolf populations in the US. Please indicate how likely or unlikely you are to...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write your congressperson in support of further wolf recovery efforts</td>
<td>1.93</td>
<td>1.16</td>
<td>0.95</td>
<td>0.86</td>
</tr>
<tr>
<td>(1.93)</td>
<td>(1.14)</td>
<td>(0.89)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sign a petition in support of further wolf reintroductions</td>
<td>2.46</td>
<td>1.44</td>
<td>0.36</td>
<td>0.60</td>
</tr>
<tr>
<td>(2.57)</td>
<td>(1.45)</td>
<td>(0.24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribute to an organization that supports</td>
<td>2.07</td>
<td>1.26</td>
<td>0.80</td>
<td>0.71</td>
</tr>
<tr>
<td>further wolf recovery efforts</td>
<td>(2.12)</td>
<td>(1.26)</td>
<td>(0.72)</td>
<td></td>
</tr>
<tr>
<td>Post to Facebook or Twitter in support of wolves</td>
<td>2.07</td>
<td>1.23</td>
<td>1.12</td>
<td>0.51</td>
</tr>
<tr>
<td>(1.96)</td>
<td>(1.24)</td>
<td>(0.96)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact a wildlife manager/management agency in support of</td>
<td>1.96</td>
<td>1.15</td>
<td>0.84</td>
<td>0.87</td>
</tr>
<tr>
<td>further wolf recovery efforts</td>
<td>(1.99)</td>
<td>(1.15)</td>
<td>(0.80)</td>
<td></td>
</tr>
<tr>
<td><strong>Oppositional Behavioral Intentions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below are a number of actions you could take in order to REDUCE wolf populations in the US. Please indicate how likely or unlikely you are to...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact a wildlife manager/management agency to oppose further wolf recovery efforts.</td>
<td>1.73</td>
<td>1.08</td>
<td>1.30</td>
<td>0.90</td>
</tr>
<tr>
<td>(1.68)</td>
<td>(1.06)</td>
<td>(1.34)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write a letter to your Congressperson to oppose</td>
<td>1.69</td>
<td>1.05</td>
<td>1.38</td>
<td>0.92</td>
</tr>
<tr>
<td>further wolf recovery efforts</td>
<td>(1.65)</td>
<td>(1.00)</td>
<td>(1.28)</td>
<td></td>
</tr>
<tr>
<td>Contribute to an organization that opposes further wolf</td>
<td>1.68</td>
<td>1.07</td>
<td>1.38</td>
<td>0.79</td>
</tr>
<tr>
<td>recovery efforts</td>
<td>(1.66)</td>
<td>(1.04)</td>
<td>(1.36)</td>
<td></td>
</tr>
<tr>
<td>Sign a petition to stop further wolf recovery efforts</td>
<td>1.93</td>
<td>1.28</td>
<td>1.08</td>
<td>0.66</td>
</tr>
<tr>
<td>(1.87)</td>
<td>(1.26)</td>
<td>(1.17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post to Facebook or Twitter in support of wolves*</td>
<td>1.62</td>
<td>1.03</td>
<td>1.46</td>
<td>0.45</td>
</tr>
<tr>
<td>(1.64)</td>
<td>(1.05)</td>
<td>(1.45)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Scale ranged from 1 (Very negative) to 3 (Neutral) to 5 (Very positive). †Scale ranged from 1 (Strongly disagree) to 3 (Neutral) to 5 (Strongly agree). ‡Scale ranged from 1 (Strongly disagree) to 4 (Neither agree nor disagree) to 7 (Strongly agree). §Scale ranged from 1 (Very unlikely) to 5 (Undecided) to 5 (Very likely). Mean and SD for composite variables are calculated using items followed by (c). *This item was mistakenly worded identically to support; however, factor loadings suggest respondents interpreted the question in light of the opening sentence referring to reductions, so it has been kept for analysis.
Figure 4.1. Hypothetical hazard acceptance model, with signs indicating direction of relationships.
Figure 4.2. Structural equation model coefficients estimated using full information maximum likelihood for both support and opposition. Where different, the opposition model coefficients are in italics. Bolded lines represent pathways significant at the $p < .01$ level for both models, dotted lines represent non-significant paths in both models. Discrepancies in path significance between models is noted with n.s. following the appropriate path coefficient.
Figure 4.3. Structural equation model coefficients estimated using data imputed with linear interpolation for both support and opposition. Where different, the opposition model coefficients are in italics. Bolded lines represent pathways significant at the p < .01 level for both models, dotted lines represent non-significant paths in both models. Discrepancies in path significance between models is noted with n.s. following the appropriate path coefficient.
Figure 4.4. Structural equation model coefficients estimated using weighted data imputed with linear interpolation for both support and opposition. Where different, the opposition model coefficients are in italics. Bolded lines represent pathways significant at the p < .01 level for both models, dotted lines represent non-significant paths in both models. Discrepancies in path significance between models is noted with n.s. following the appropriate path coefficient.
Chapter 5: Conclusions

The studies described above were aimed at exploring symbolic thoughts related to wolves, examining the role of affect in tolerant and intolerant behaviors towards wolf recovery, and testing a conceptual model of hazard acceptance for carnivores on a nationally representative sample. We found support for the existence of abstract, symbolic thinking related to wolves, and found evidence for variation in the tendency to think of wolves abstractly or concretely according to region and social identity. For the portion of the public particularly engaged in the wolf issue, we found a moderate to large effect for negative affect in determining both perceptions of risk and benefit, and behaviors opposing wolf recovery. Importantly, we found little role for biological knowledge in the model, save the role affect played in influencing knowledge, such that greater positive affect was related to more accurate knowledge of wolf biology. Finally, the hazard acceptance model largely served as a good fit to the national public data explaining oppositional and supportive behaviors toward wolf conservation, though model fit was appreciably reduced once weights were applied, drawing into question the true generalizability of the model beyond interested populations. The findings here continue to emphasize the importance of benefits in acceptance of and tolerance for carnivores found in previous literature, and highlights the need to explore the notion of benefits more fully in the future.

Claims that social conflict over wolves is driven by symbolism have been short on empirical evidence (Douglas & Veríssimo, 2013; Lopez, 1978; M. A. Nie, 2003; Wilson, 1997), but findings here offer some broad support, as a majority of the respondents in two samples had
more abstract (than concrete) salient thoughts regarding wolves (75%). Standardized scales measuring symbolic existence beliefs correlated positively with abstract salient thoughts about wolves and negatively with concrete thoughts, indicating that individuals placing less importance on the existence values of wolves also tend to see them in a more concrete way. The concrete construal of wolves among this group means that when prompted to give their most salient thoughts or images regarding wolves, they focused on either examples of wolves on the landscape or on how they thought wolves should be managed. Concrete construals were more common among respondents living in the Northern Rocky Mountains (68%), precisely what might be most intuitively predicted from construal level theory—that close proximity with the animals results in more concrete construals. Problematically, this prediction does not hold up in the Western Great Lakes region, where wolves were more likely to be thought of abstractly (80%), despite wolves never having been extirpated from this area. Either respondents in the Western Great Lakes perceive the distance between themselves and wolves differently than those in the Northern Rocky Mountains, or some other domain of psychological distance is driving the abstract construal of wolves (temporal, social, or hypothetical). In any case, assuming residents of the Northern Rocky Mountains and residents of the Western Great Lakes see the challenges of wolf conservation in an identical way would be a poor assumption, and may lead to greater unintended conflict. Indeed, the rush to establish a hunting season in Michigan similar to those that took place in the West after delisting and the backlash that followed is a clear example that wolf management may look different there than in the Northern Rocky Mountains (Lute et al., 2014).

Abstract construals of wolves correlated strongly with positive affect towards wolves (Cramer’s V = .39), and while no formal prediction of construal level theory exists for this finding, it is typical for subjects in abstract conditions to generate more pro statements for a
course of action than con statements (Eyal et al., 2009). Considering the correlations between positive affect and abstract thoughts, and positive affect and agreement with the benefits of recovered wolf populations in the quantitative models, it is possible that intangible, abstract benefits may be more compelling or garner more agreement than concrete benefits. In the hazard acceptance model, two of the more tangible benefits items had relatively poor factor loadings: 0.27 for “help control coyote populations,” and 0.29 for “increase tourism in places where wolves have moved into.” The remaining benefits regarding balance, preservation, and a return of the environment to some past state all had factor loadings around 0.50. In their meta-analysis of factors predicting attitudes towards large mammals, Kansky and Knight (2014) found intangible benefits (i.e. benefits that are not immediately quantifiable) to be more important than tangible benefits, and in experiments successfully increasing tolerance for black bears, Slagle et. al (2013) listed primarily intangible benefits of recovered black bear populations (e.g. cultural, recreational, aesthetic, and ecological benefits). Future work to test the effects of intangible, abstract, and symbolic benefits on tolerance compared to the effects of tangible, concrete benefits would add nuance to this finding, and provide concrete guidance to conservation professionals. Finally, this study serves as an initial investigation of construal level theory in a non-experimental setting. While not necessarily a formal test of any one part of the theory, this study provides a first step towards bringing it out of the lab and into the applied research context. Understanding the usefulness of theories in practice is part of the vetting process in the scientific method, and we hope others continue to test this theory in the field.

The affect model and hazard acceptance models overall lend support to the conceptual hazard acceptance model for carnivores suggested by Bruskotter and Wilson (2014), though the results of the hazard acceptance model applied to a general population are nuanced. Expected relationships between affect, risk, benefit, and tolerance measures of opposition and support to
wolf recovery were present and significant, but the effects of trust and control on risk were small to non-significant, suggesting either a measurement issue for control and trust, or simply a different pathway in the case of trust. Trust maintained a significant and substantial relationship with benefit in every iteration of the hazard acceptance model, and benefit maintained its strong inverse relationship with risk, yet again highlighting the importance of the perception of benefits. The positive relationship between trust and agreement with benefit statements also means that those individuals with lower trust perceive fewer benefits. Added to this is the likelihood that those with negative affect also perceive fewer benefits, and are more likely to construe wolves concretely. An agency aiming to increase tolerance but aware of a lack of trust among its constituents may need to place emphasis on tangible, concrete benefits to reach this audience, but as discussed below, among their most polarized constituents, even these appeals may go unheard.

Comparing the affect and hazard acceptance models, the small but significant role of affect in directly predicting supportive behaviors remained largely the same across models (the weighted hazard model being the one exception), but differed greatly for models predicting opposition to wolf recovery. In the affect model, which was tested using data from the issue public sample (Slagle et al., 2012), affect showed a moderate relationship to oppositional behavior ($\beta = -0.35$), but none of the hazard acceptance models with national data resulted in a relationship between affect and oppositional behavior. One possible explanation for this lies in motivated reasoning (Taber & Lodge, 2006, 2016). Motivated reasoning suggests that individuals with greater knowledge of an issue and stronger existing attitudes—whom the authors call “political sophisticates”—are most susceptible to being led by affect in their political evaluations of individuals, groups and issues. Indeed, it is likely that because the political sophisticates of our issue public sample have so much knowledge of the issue that their existing mental schemas for
the issue are large, and therefore easily activated and primed by affect (Lodge & Taber, 2005).
Motivated reasoning guided by positive affect is evident among both samples for respondents
reporting supportive behaviors, however, the oppositional issue public provided greater
evidence for motivated reasoning overall, while motivated reasoning was not evident among
the general public engaging in oppositional behaviors. These results suggest that the
oppositional issue public are likely to be particularly recalcitrant to any attempts to sway their
tolerance for wolves, but among the presumably less knowledgeable general public, the
suggestion for a focus on tangible benefits above remains viable.

There are some limitations to these studies that warrant addressing. In order to reliably
code a relatively large number of open-ended responses, we chose to code a subsample of
roughly half of the responses to the affect question requesting the first thought or image that
comes to mind when thinking of wolves. Though this question was asked twice of the national
sample, we chose to limit analyses to the first question, in order to best assess salience. It is
possible that in limiting our assessments, we may have missed some of the more unique
representations of wolves. Similarly due to the large and varied nature of the responses, we
limited our analyses to abstract and concrete codes, choosing to highlight broad ideas rather
than detailed nuance in the responses. Future work that revisits these codes might uncover
additional insights through a more detailed, iterative coding process.

The issue public sample was collected over a one-week period and the link only posted
on one wildlife blog, though others may have shared the link elsewhere on the internet during
that time, we cannot know for sure. In survey parlance, this type of survey is known as a river
survey, and is known for producing interested, biased samples. While such a sample can still
provide insights to theory and the behavior of an engaged, interested public, it does not allow
for generalizability to other parts of the public. The nationally representative sample obtained via GfK indeed provided generalizability, but the general public would not have been willing to answer the same number of questions as the issue public sample, and so we were restricted in the number of items we could ask them. This produced gaps in the data that required extensive missing data treatment techniques that also limited the analyses we were able to perform. The weighted analyses achieved via linearly interpolated data probably suffered from the biases produced by that technique, but could not be achieved with more preferred techniques like full information maximum likelihood or multiple imputation. Any data collection requires tradeoffs, so addressing these limitations in the future may result in others that need to be navigated by carefully considering study objectives. Concise and reliable measures of trust and control would be useful for reducing the number of items, and decreasing response burden, which could increase generalizability and help forego the need for planned missingness.

Future research directions applying construal level theory to public samples and issues could add validity to the predictions suggested by its proponents, in that wider, cross-sectional samples are typically more generalizable than experimental samples, and provide some insight into salient construals, as opposed to relying on construal manipulation as is currently done. Likewise, investigating a more nuanced role for tangible and intangible benefits in tolerance for carnivores, and other wildlife as well, could result in concrete recommendations for conservation professionals tasked with developing communications and outreach materials aimed at increasing tolerance and managing risk. Nuisance species are similarly fraught with conflict as carnivores (indeed, they are sometimes one and the same), and might also be classed as a hazard, thus tolerance for nuisance species might also be explained via a hazard acceptance model.
Additionally, the application of a simplified version of the hazard acceptance model among the issue public provided insights to “political sophisticates” relevant to carnivore conservation, in that carnivore management may be no different from other hot-button political issues. To the extent that the issue of carnivore management is a political issue, there is evidence for the same motivated reasoning found among political sophisticates on a range of other common political issues like abortion and gun control. Another specific group worth investigating remains: private landowners. Land east of the Mississippi River is primarily privately owned, and landscape level conservation there will require the cooperation of private landowners. Understanding their willingness to engage in tolerant or intolerant behaviors will be critical to carnivore conservation specifically, and landscape level conservation broadly. It is possible that a hazard model would be useful in understanding tolerance among landowners, but as evidenced by the small to moderate variance explained in the hazard acceptance models here, psychological explanations are not the only drivers of behavior, and other theories explaining human behavior might lend additional insights in this area.

Still, several relevant findings from the study here remain: wolves are indeed symbolic, but probably more so for those supportive of wolf conservation, and the affect related to the way people think of wolves plays an important role in perceptions of risks and benefits. Furthermore, affect plays a direct role in influencing tolerance behaviors related to overall support for wolves, but even more so for political sophisticates opposed to wolves. As wolf populations continue to expand, we might see the issue of their conservation become a more common political issue, thus likely increasing the number of political sophisticates engaged with the issue. As this group increases, likely employing motivated reasoning, we might expect more polarization on this issue. However, tempering this possible conclusion is the finding in the Western Great Lakes, where wolves are nearing recovery, but have not yet inspired the same
level of polarization that is found in the Northern Rocky Mountains. Continued wolf recovery, and carnivore recovery generally, is taking place in the context of shrinking rural communities and increased urbanization, so another plausible scenario for recovery is the issue actually becomes less relevant for urbanized populations that see it as an issue unrelated to their lives. As more people view wolves as being disconnected from their lives, more of those people will likely see wolves as abstract, positive symbols. In either case, as the work here has shown, disagreements about the benefits of wolf recovery play an important role in predicting tolerance. While it may be tempting to consider resolving disagreements about the benefits of wolf recovery as a solution, particularly one answerable by science, perceptions of benefit are generally driven by affect; efforts to prove or disprove benefits may not influence public perceptions, but simply highlighting those benefits that might exist may increase support for wolf recovery, and more broadly, carnivore recovery.
Comprehensive Bibliography


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IBM Corp.


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Appendix A. SurveyMonkey survey instrument for issue public sample

1. Dear study participant:

Researchers at Ohio State University are conducting a study in order to understand people's preferences regarding the conservation and management of large carnivores in the United States. In particular, we are interested in the preferences of people who are knowledgeable and/or care deeply about these issues.

The survey consists of questions designed to assess your attitudes and preferences concerning carnivore conservation, endangered species restoration, and wolf conservation and management. The questionnaire should take you about 10 to 15 minutes to complete. Note: Your participation is completely voluntary—you may choose to quit the survey at any time. We also want to assure you that your answers are confidential; we will not be able to link individual people to their responses.

This research is not affiliated with nor sponsored by any interest group or agency. Should you have any questions or comments about the study, please do not hesitate to contact us at the number listed below.

Thank you for your participation!

Jeremy Bruskotter, PhD

(614) 247-2118

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at (614) 688-2231.
2. Wildlife Damage Management

Wildlife Damage Management includes a number of activities designed to help prevent and mitigate the damage to personal property that is sometimes caused by wildlife.

We are interested in your opinions regarding who should be responsible for such damages and what types of actions are acceptable to prevent or mitigate damages caused by predators such as wolves, bears, coyotes, or mountain lions.

1. In general, who do you feel should have responsibility for damage caused by wildlife? (Please choose all that apply.)
   - [ ] Local (e.g., county, township) government
   - [ ] The individual whose property was damaged
   - [ ] Federal government
   - [ ] State government
   - [ ] Other (please specify) __________

2. When considering the selection of predator management methods, how important do you feel each of the following factors should be? (Please rank these considerations from 1=Most important to 5=Least important)

   |  | 1 = Most Important | 2 | 3 | 4 | 5 = Least Important |
---|---|---|---|---|---|
Public opinion | [ ] | [ ] | [ ] | [ ] | [ ] |
Cost | [ ] | [ ] | [ ] | [ ] | [ ] |
Environmental impacts | [ ] | [ ] | [ ] | [ ] | [ ] |
Animal suffering | [ ] | [ ] | [ ] | [ ] | [ ] |
Human safety | [ ] | [ ] | [ ] | [ ] | [ ] |
3. People hold different beliefs concerning the acceptability of various aspects of wildlife damage management. Below is a list of statements that reflect what some people believe. Please indicate how much you agree or disagree with each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is acceptable to remove predators that prey on livestock.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>It is acceptable to remove predators that prey on domestic animals.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>It is unacceptable to remove native predators that prey on threatened and endangered species.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Predator control is unacceptable.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The careful use of poison is an acceptable method to control predator populations.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Predator control is acceptable if there is evidence that wildlife damage is the cause of economic loss.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>It is unacceptable to kill predators in order to increase populations of game species.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>It is acceptable to kill predators in order to increase populations of endangered species.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

The Endangered Species Act of 1973 was enacted "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species..."

We are interested in your opinions about the Endangered Species Act, and especially, the protection of endangered carnivores. Please keep in mind there are no right or wrong answers, we are only interested in your thoughts and opinions.

1. As you may know, the Endangered Species Act is an environmental law established to protect all wildlife, plants and fish that are in danger of extinction. Based on what you know, would you say that you support or oppose Endangered Species Act?
   - Strongly support
   - Somewhat support
   - Neutral / not sure
   - Somewhat oppose
   - Strongly oppose

2. Please choose an item from the list below to finish the following sentence: "The Endangered Species Act is..."
   - "...far too protective..."
   - "...a little too protective..."
   - "...appropriately protective..."
   - "...not quite protective enough..."
   - "...not at all protective..."

3. Please choose an item from the list below to finish the following sentence: "In the best interests of the nation, the Endangered Species Act should be..."
   - "...revised..."
   - "...weakened to provide less protection to species..."
   - "...remain unchanged..."
   - "...strengthened to provide more protection to species..."
4. To what extent do you oppose or support protecting the following species in the lower 48 United States under the Endangered Species Act of 1973?

<table>
<thead>
<tr>
<th>Species</th>
<th>Strongly oppose</th>
<th>Somewhat oppose</th>
<th>Slightly oppose</th>
<th>Neutral</th>
<th>Slightly support</th>
<th>Somewhat support</th>
<th>Strongly support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grey Wolf</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Florida Panther</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Jaguar</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Grizzly Bear</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Please use this image as a reference when answering the next two questions:

Dark gray areas represent the percentage of a species' historic range that has been lost.
5. "Historic range" refers to areas that a species occupied sometime in the past, but may or may not occupy in the present. What percentage of a species' historic range could be lost worldwide before you would consider that species to be endangered worldwide?

In general, I would consider a species to be "endangered" when [enter a number; do not include the % symbol]

6. What percentage of a species' historic range could be lost within the United States before you would consider the species to be endangered within the United States?

In general, I would consider a species to be "endangered" when [enter a number; do not include the % symbol]

7. "Reintroduction" occurs when people physically transport animals of a particular species into parts of their historic range in order to re-establish populations in these areas.

To what extent do you oppose or support reintroducing the following species into portions of their historic range where they do not currently live?

<table>
<thead>
<tr>
<th>Species</th>
<th>Strongly oppose</th>
<th>Somewhat oppose</th>
<th>Slightly oppose</th>
<th>Neutral</th>
<th>Slightly support</th>
<th>Somewhat support</th>
<th>Strongly support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray Wolf</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florida Panther</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jaguar</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Grizzly Bear</td>
<td></td>
<td></td>
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</tbody>
</table>

8. If you have additional comments concerning the Endangered Species Act, or about how this questionnaire could be improved, please feel free to share them here.
4. Gray Wolves

Gray wolves once lived in much of the lower 48 United States. They were only absent from a portion of California, the southwest corner of Arizona and from the red wolf range in the southeastern United States. By 1974, when gray wolves were listed as an endangered species, their breeding range had been reduced to a small corner of northeastern Minnesota and Isle Royale, Michigan. Individual wolves were periodically observed in the West, but there were no breeding packs. Recovery efforts have since helped to restore wolves to portions of the northern Rocky Mountains, the western Great Lakes Region, and the Southwest (see map below).

Historic and current (2009) range of gray wolves in the 48 lower states (adapted from the US Fish & Wildlife Service)

---

1. We are interested to know your views about the importance of the issue of wolf conservation and management.

<table>
<thead>
<tr>
<th>In general, how important is the issue of wolf conservation and management to you personally?</th>
<th>Not at all important</th>
<th>Slightly important</th>
<th>Moderately important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>How important is it to you personally that you keep up to date with the issue of wolf conservation and management?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How important is it to you personally that future decisions about wolf conservation and management are consistent with your views on the issue?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. In a few words, what is the first thought or image that comes to mind when you think about wolves?

3. How strong are your negative or positive feelings about wolves?

-5  -4  -3  -2  -1  0  1  2  3  4  5

Very negative  Neutral  Very positive

4. Please indicate if you believe the statements about wolves listed below are true or false.

<table>
<thead>
<tr>
<th>Statement</th>
<th>False</th>
<th>Probably False</th>
<th>I don't know</th>
<th>Probably True</th>
<th>True</th>
</tr>
</thead>
<tbody>
<tr>
<td>In areas where wolves live close to humans, wolf attacks on humans are common.</td>
<td></td>
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<tr>
<td>Wolves generally avoid contact with humans.</td>
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<tr>
<td>In areas where wolves prey on livestock, their primary food is sheep and cattle.</td>
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<tr>
<td>Wolves are found outside of North America.</td>
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<tr>
<td>Wolves will not eat animals that are already dead.</td>
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<tr>
<td>On average, adult wolves weigh from 70 to 110 lbs.</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please take a few moments to examine each of the 7 pictures below, then use these images to respond to the following question.

5. Using the images above, please rate your personal reaction to wolves. For example, choose the image labeled “7” if your reaction is one of feeling happy, pleased, satisfied, contented, hopeful or relaxed, and choose the image labeled “1” if your reaction is one of feeling unhappy, annoyed, unsatisfied, melancholic, despairing, or bored.

1  2  3  4  5  6  7

Please take a few moments to examine each of the 7 pictures below, then use these images to respond to the following question.
6. Using the images above, please rate your personal reaction to wolves. For example, choose the image labeled "7" if your reaction is one of stimulated, excited, frenzied, jittery, wide-awake, or aroused, and choose the image labeled "1" if your reaction is one of feeling relaxed, calm, sluggish, dull, sleepy or unaroused.

Please take a few moments to examine each of the 7 pictures below, then use these images to respond to the following question.

7. Using the images above, please rate your personal reaction to wolves. For example, choose the image labeled "7" if your reaction is one of controlling, influential, in control, important, dominant or autonomous, and choose the image labeled "1" if your reaction is one of feeling controlled, influenced, cared-for, awed, submissive, guided.

8. To what extent do you agree or disagree with the following...

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Slightly Disagree</th>
<th>Neutral</th>
<th>Slightly Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
| **Most people who are important to me**
| oppose wolf recovery efforts | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ |
| **Most people who are important to me**
| would approve of me taking action in support of wolf recovery efforts | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ |
| **Most of the people whom I care about are already taking action to oppose further efforts to recover wolves** | ❌ | ❌ | ❌ | ❌ | ❌ | ❌ |
5. Gray Wolves - Continued

1. For the following questions about wildlife management, please circle the response that best fits your opinion about the statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Slightly disagree</th>
<th>Neutral</th>
<th>Slightly agree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have the ability to protect my property from wildlife.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The average citizen can have an influence on wildlife management decisions.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Whether or not I get into a conflict with a wolf is mostly a matter of luck.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Wolf conflicts are not a matter of luck, rather bad personal decision making.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I am not familiar with the risks posed by wolves.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I am vulnerable to the risks posed by wolves.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>I can prevent conflict with wolves by taking precautions around my home.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>Conflict with wolves will be reduced as people learn to live with wolves.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>Encounters with wolves are likely to result in fatal consequences.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>People can choose whether or not they are exposed to risks associated with wolves.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>I fear having an encounter with a wolf.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
2. I think wolves are...

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harmful</td>
<td></td>
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</table>

3. ...

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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasant</td>
<td></td>
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</tbody>
</table>

4. ...

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<tr>
<th>1</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unpleasant</td>
<td></td>
<td></td>
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</tbody>
</table>

5. Good

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

6. Bad

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

6. Allowing wolf populations to expand into other areas (outside of those areas they currently occupy) would...

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Slightly disagree</th>
<th>Neutral</th>
<th>Slightly agree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>...result in large numbers of wolf attacks on livestock.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>...result in ranchers losing money.</td>
<td></td>
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</tr>
<tr>
<td>...keep deer, elk and moose populations in balance.</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>...increase tourism in areas where wolves have moved into.</td>
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</tr>
<tr>
<td>...result in wolf attacks on humans.</td>
<td></td>
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<tr>
<td>...preserve the wolf as a wildlife species.</td>
<td></td>
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</tr>
<tr>
<td>...return the natural environment back to the way it was.</td>
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</tr>
<tr>
<td>...result in wolves wandering into residential areas.</td>
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</tr>
<tr>
<td>...result in ranchers killing wolves.</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...lead to greater control of rodent populations.</td>
<td></td>
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</tr>
<tr>
<td>...lead to fewer deer, elk and moose available to hunters.</td>
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<td></td>
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</tr>
</tbody>
</table>
7. Below are some beliefs people may hold regarding wolves and governmental efforts to conserve them. Please indicate the extent to which you agree or disagree with each of the following statements.

<table>
<thead>
<tr>
<th>Wolves are prey to environmental groups to restrict use of federal public lands.</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Slightly disagree</th>
<th>Neutral</th>
<th>Slightly agree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is important that the U.S. always have an abundant wolf population.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>In the places where wolves have been reintroduced, wolves have more rights than people.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>The federal government is using wolves to restrict activities on federal public lands.</td>
<td></td>
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</tr>
<tr>
<td>Wolves are not so bad, it's the people who support them that I cannot stand.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>It is important to maintain wolf populations in the U.S. so future generations can enjoy them.</td>
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<td></td>
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</tr>
<tr>
<td>Whether or not I would get to see a wolf, it is important to me that they exist in the U.S.</td>
<td></td>
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</tr>
<tr>
<td>It would be important to me to know that there are healthy populations of wolves in the U.S.</td>
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</tr>
</tbody>
</table>
6. Groups and Affiliations

1. Have you been a member of any of the following organizations during the past 5 years? (Check the box next to each organization)

- Sierra Club
- Defenders of Wildlife
- National Wildlife Federation
- National Resources Defense Council
- World Wildlife Fund
- National Audubon Society
- Nature Conservancy
- Wilderness Society
- Wildlife Conservation Society
- Gunowners
- The Humane Society of the United States
- People for the Ethical Treatment of Animals
- The National Rifle Association
- The Sportsmen for Fish & Wildlife
- The Rocky Mountain Elk Foundation
- Mule Deer Foundation
- Whitetails Unlimited
- Ducks Unlimited
- National Wild Turkey Federation
- Safari Club International
- National Shooting Sports Foundation
- Pheasants Forever
- The U.S. Sportsmen’s Alliance
- Boone & Crockett Club

2. Please indicate the extent to which you identify yourself as a/an...

<table>
<thead>
<tr>
<th>Do not identify with group</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly identify with group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wildlife advocate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal rights advocate</td>
<td></td>
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</tr>
<tr>
<td>Hunter</td>
<td></td>
<td></td>
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<tr>
<td>Gun rights advocate</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmentalist</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Conservationist</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Farmer/rancher</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Property rights advocate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. When it comes to politics, please indicate which of the following you consider yourself.

<table>
<thead>
<tr>
<th>Extremely liberal</th>
<th>Liberal</th>
<th>Slightly liberal</th>
<th>Moderate/Middle of the road</th>
<th>Slightly conservative</th>
<th>Conservative</th>
<th>Extremely conservative</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 7. Policy Preferences for Wolf Management

**1. Below are some possible wolf management options. We are interested in the extent to which you support or oppose the following options.**

<table>
<thead>
<tr>
<th>Option</th>
<th>Strongly oppose</th>
<th>Somewhat oppose</th>
<th>Slightly oppose</th>
<th>Neither oppose nor support</th>
<th>Slightly support</th>
<th>Somewhat support</th>
<th>Strongly support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classifying wolves as a nuisance so they could be killed at any time.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classifying wolves as a game species so killing a wolf required a hunting license and/or special permit.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Classifying wolves as a &quot;protected&quot; species—only killing wolves that killed domestic animals (i.e., pets or livestock)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classifying wolves as a &quot;protected&quot; species—only killing wolves that posed a potential threat to people.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Federal legislation that limits where, when and how wolves are hunted.</td>
<td></td>
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</tr>
<tr>
<td>Leaving wolves under the protection of the ESA.</td>
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<td></td>
</tr>
</tbody>
</table>

**2. Below are a number of actions you could take in order to impact wolf populations in the US. Please indicate how likely or unlikely you are to...**

<table>
<thead>
<tr>
<th>Action</th>
<th>Very Unlikely</th>
<th>Unlikely</th>
<th>Not Sure</th>
<th>Likely</th>
<th>Very Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write your Congressperson in support of further wolf recovery efforts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write your Congressperson to oppose further wolf recovery efforts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribute to an organization that supports further wolf recovery efforts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribute to an organization that opposes further wolf recovery efforts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sign a petition to stop any further wolf reintroductions by the federal government.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sign a petition in support of further wolf reintroductions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoot a wolf if you saw one.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write a letter to the editor of your local newspaper in support of wolf recovery.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write a letter to the editor of your local newspaper opposing wolf recovery.</td>
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</tr>
</tbody>
</table>
3. Have you engaged in any of the following activities in the past 6 months? (If "yes" check the box next to the activity listed)

- [ ] Donated to an organization that supports wolf recovery
- [ ] Donated to an organization that opposes wolf recovery
- [ ] Wrote, phoned, or emailed my congressman in support of wolf recovery
- [ ] Wrote, phoned, or emailed my congressman in opposition to wolf recovery
- [ ] Wrote a letter to my newspaper in support of wolf recovery
- [ ] Wrote a letter to my newspaper in opposition to wolf recovery
- [ ] Other (please specify)

4. We are interested in your preferences for wolf populations both locally (in your state) and nationwide.

<table>
<thead>
<tr>
<th></th>
<th>Decreased greatly</th>
<th>Decreased</th>
<th>Stay about the same</th>
<th>Increased</th>
<th>Increased greatly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wolf populations in my state should be...</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Wolf populations nationwide should be...</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

5. We would appreciate any additional thoughts you wish to share regarding wolf conservation and management in the United States.
8. About you

This next set of questions are to help us understand a little bit more about you. Please feel free to skip questions if you do not feel comfortable providing this information.

1. I am...
   - Male
   - Female

2. What is your age?
   Age in years: 

3. What state do you live in?
   Please choose from the menu to the right. If you do not live in the U.S., please indicate which country you live in below.
   Other (please specify):

4. If you live in the U.S., what county do you live in?

5. What is the highest grade or highest degree that you have received.
   - No schooling completed, or less than 1 year
   - Nursery, Kindergarten, and elementary (Grades 1-4)
   - High school (Grades 9-12, no degree)
   - High school graduate (or equivalent)
   - Some college (1-4 years, no degree)
   - Associate’s degree (including occupational or academic degrees)
   - Bachelor’s degree (BA, BS, AB, etc)
   - Master’s degree (MA, MS, MENG, MSW, etc)
   - Professional school degree (MD, DDS, JD, etc)
   - Doctorate degree (PhD, EdD, etc)

6. Have you regularly hunted at any time in your life?
   - No
   - Yes
7. Have you hunted big game during the past three years? (Note: "Big game" include such species as deer, elk, moose, big horn sheep, bear, cougar, etc.)
   -  No
   -  Yes
   -  Not sure

8. Have you hunted bears, wolves or mountain lions at any time in the past?
   -  No
   -  Yes

9. Will you hunt wolves when they are removed from the federal list of endangered species?
   -  Definitely will not
   -  Probably will not
   -  Not sure
   -  Probably will
   -  Definitely will
9. Additional Comments

1. If you are interested in participating in a follow up study on wolves, please provide your email address in the box below. NOTE: We will not use your email for any other purpose.

2. If you have any further comments, please enter them in the box provided below.

Thanks for your participation!
Appendix B. Qualtrics survey instrument for GfK-provided nationally representative sample
Block 5

Study Information

Thank you for continuing to be part of the KnowledgePanel®. This survey asks about your thoughts regarding carnivore management and conservation in the U.S. (for example: coyotes, cougars, bears, wolves, etc.). Changes in the environment in the U.S. due to urbanization, converting land to agriculture, and protection of land in some cases, have contributed to changing predator populations in the U.S., and represent a continuing issue in land management.

This survey is being conducted by The Ohio State University. The study will help researchers understand the public's thoughts about carnivore management, and provide guidance to agencies that manage these animals. Respondents to the survey will receive 1000 points.

Your Rights as a Respondent

As with all KnowledgePanel® surveys, your response to this survey, or any individual question on the survey, is completely voluntary, and you may skip any question you feel uncomfortable answering. You may withdraw at any time without penalty or loss of benefits. You will not be individually identified and your responses will be used for analyses only.

This survey should take between 12-15 minutes to complete. If you have questions about your rights as a participant in this survey, or are dissatisfied at any time with any aspect of the survey, you may contact the KnowledgePanel Panel Member Support at 800-782-6899.

You may also contact Kristina Slagle, co-principal investigator of this study, at slagle.44@osu.edu regarding specific aims of the study or other study-related questions. Additionally, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at OSU at 1-800-678-6251 for questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team or GfK (Knowledge Networks).

Species Conservation under the Endangered Species Act of 1973
We would like to know a few of your thoughts concerning your relationship with animals—especially wildlife. Please tell us how much you disagree or agree with each of the statements below.

<table>
<thead>
<tr>
<th>Wildlife have no value whatsoever.</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wildlife have inherent value, above and beyond their utility to people.</td>
<td></td>
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</tr>
<tr>
<td>Wildlife are only valuable if people get to utilize them in some way.</td>
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</tr>
<tr>
<td>I take great comfort in the relationships I have with animals.</td>
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<td></td>
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</tr>
<tr>
<td>Animals should have rights similar to the rights of humans.</td>
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</tr>
<tr>
<td>I feel a strong emotional bond with animals.</td>
<td></td>
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<tr>
<td>Humans should manage fish and wildlife populations so that humans benefit.</td>
<td></td>
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</tr>
<tr>
<td>The needs of humans should take priority over fish and wildlife protection.</td>
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</tr>
</tbody>
</table>

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Please indicate to what extent you like or dislike the following types of animals:

<table>
<thead>
<tr>
<th>Animal</th>
<th>Strongly Dislike</th>
<th>Dislike</th>
<th>Somewhat Dislike</th>
<th>Neither Like nor Dislike</th>
<th>Somewhat Like</th>
<th>Like</th>
<th>Strongly Like</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elephant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rat</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Wasp</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Shark</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Turtle</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cat</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Skunk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rattlesnake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salmon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coyote</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cougar / Mountain Lion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wolf</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horse</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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The Endangered Species Act of 1973 was enacted "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species..."

We are interested in your opinions about the Endangered Species Act, and especially, the protection of endangered carnivores. Please keep in mind there are no right or wrong answers, we are only interested in your thoughts and opinions.
As you may know, the Endangered Species Act is an environmental law established to protect all wildlife, plants and fish that are in danger of extinction. Based on what you know, would you say that you support or oppose the Endangered Species Act?

- Strongly oppose
- Somewhat oppose
- Neither oppose nor support
- Somewhat support
- Strongly support

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The U.S. Fish and Wildlife Service is a federal agency in the Department of the Interior charged with the management and conservation of species listed as threatened or endangered under the Endangered Species Act.

How familiar are you with the U.S. Fish and Wildlife Service?

- Not at all
- Somewhat familiar
- Fairly familiar
- Very familiar
- Extremely familiar
To what extent do you agree or disagree with the following statements concerning the U.S. Fish and Wildlife Service?

I feel that the U.S. Fish and Wildlife Service...

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>...shares similar values as me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...takes similar actions as I would.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...is trustworthy in their management of wildlife in the U.S.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...is capable in their management of wildlife in the U.S.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Species that are not listed as threatened or endangered under the Endangered Species Act are generally managed by state fish and wildlife agencies. How familiar are you with your state wildlife management agency?

- Not at all
- Somewhat familiar
- Fairly familiar
- Very familiar
- Extremely familiar

To what extent do you agree or disagree with the following statements concerning the fish and wildlife management agency in your state?

I feel that my state wildlife management agency...

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>...is an agency I don't know much about.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...shares similar values as me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...takes similar actions as I would.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...is trustworthy in their management of wildlife in my state.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Gray Wolves in the U.S.

In a few words, what is the first thought or image that comes to mind when you think about wolves?

When considering the first thought or image you just mentioned, how negative or positive do you feel about the thought or image?

- Very positive
- Somewhat positive
- Neither positive nor negative
- Somewhat negative
- Very negative

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In a few words, what is the second thought or image that comes to mind when you think about wolves?
When considering the second thought or image you just mentioned, how **negative or positive** do you feel about the thought or image?

- Very positive
- Somewhat positive
- Neither positive nor negative
- Somewhat negative
- Very negative

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We are interested to know your views about the importance of the issue of wolf conservation and management.

| In general, how important is the issue of wolf conservation management to you personally? |
|---------------------------------------------------------------|-------------------------------|-------------------|-------------------|-------------------|
| Not at all Important | Slightly Important | Moderately Important | Very Important |

**Wolf populations in my state should be...**

- Decreased greatly
- Decreased
- Stay about the same
- Increased
- Increased greatly
- I don’t know
Wolf populations *nationwide* should be...

- Decreased greatly
- Decreased
- Stay about the same
- Increased
- Increased greatly
- I don't know

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Allowing wolf populations to expand into other areas (outside of those areas they currently occupy) would...

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Slightly Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Slightly Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>...result in wolves wandering</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>into residential areas.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...lead to fewer deer, elk and</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>moose available to hunters.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...return the natural environment back to the way it was.</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>...result in large numbers of wolf attacks on livestock.</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>...result in wolf attacks on humans.</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>...increase tourism in areas where wolves have moved into.</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>...keep deer, elk and moose populations in balance.</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>...result in ranchers losing money.</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>
Please tell us how much you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>People can choose whether or not they are exposed to risks associated with wolves.</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Slightly Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Slightly Agree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can prevent conflict with wolves by taking precautions.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>This country is run by a few people in power and there is not much the little guy can do about decisions regarding wolves.</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>By taking an active part in political and social affairs, people can control the presence of wolves locally.</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Generally speaking, I think wolves are...

<table>
<thead>
<tr>
<th>Harmful</th>
<th>Beneficial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unpleasant</td>
<td>Pleasant</td>
</tr>
<tr>
<td>Worthless</td>
<td>Valuable</td>
</tr>
<tr>
<td>Bad</td>
<td>Good</td>
</tr>
</tbody>
</table>

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Policy preferences regarding gray wolves in the U.S.

There are a number of policies and actions that can be undertaken in relation to wolves in the U.S. In this section, we ask about your preferences and actions related to policy governing wolves.
Have you engaged in any of the following activities in support of wolf recovery in the past 6 months? Please select all that apply.

- Donated to an organization that supports wolf recovery
- Spoken with family/friends in support of wolf recovery.
- Posted to Facebook, Twitter or other social media in support of wolf recovery
- Wrote, phoned, or emailed my congressperson in support of wolf recovery
- Wrote a letter to my newspaper in support of wolf recovery
- Contacted a wildlife manager/management agency in support of wolf recovery
- Did not do any of these in the past 6 months.

Have you engaged in any of the following activities in opposition to wolf recovery in the past 6 months? Please select all that apply.

- Donated to an organization that opposes wolf recovery
- Spoken with family/friends in opposition to wolf recovery.
- Posted to Facebook, Twitter or other social media in opposition to wolf recovery
- Wrote, phoned, or emailed my congressperson in opposition to wolf recovery
- Wrote a letter to my newspaper in opposition of wolf recovery
- Contacted a wildlife manager/management agency in opposition to wolf recovery
- Did not do any of these in the past 6 months.
**[SUPPORTIVE ACTIONS]** Below are a number of actions you could take in order to **INCREASE** wolf populations in the US. Please indicate how likely or unlikely you are to...

<table>
<thead>
<tr>
<th>Action</th>
<th>Very Unlikely</th>
<th>Somewhat Unlikely</th>
<th>Undecided</th>
<th>Somewhat Likely</th>
<th>Very Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact a wildlife manager/management agency in support of further wolf recovery efforts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write your Congressperson in support of further wolf recovery efforts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post to Facebook or Twitter in support of wolves.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribute to an organization that supports further wolf recovery effort.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sign a petition in support of further wolf reintroductions.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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**[OPPOSITION ACTIONS]** Below are a number of actions you could take in order to **REDUCE** wolf populations in the US. Please indicate how likely or unlikely you are to...

<table>
<thead>
<tr>
<th>Action</th>
<th>Very Unlikely</th>
<th>Somewhat Unlikely</th>
<th>Undecided</th>
<th>Somewhat Likely</th>
<th>Very Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact a wildlife manager/management agency to oppose further wolf recovery efforts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Write your Congressperson to oppose further wolf recovery efforts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post to Facebook or Twitter in support of wolves.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribute to an organization that opposes further wolf recovery efforts.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sign a petition to stop any further wolf reintroductions by the federal government.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoot a wolf if you saw one.</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Wildlife damage management

Wildlife Damage Management includes a number of activities designed to help prevent and mitigate the damage to personal property that is sometimes caused by wildlife.

We are interested in your opinions regarding who should be responsible for such damages and what types of actions are acceptable to prevent or mitigate damages caused by predators such as wolves, bears, coyotes, or mountain lions.

Have you personally experienced wildlife damage in the past 5 years?

- Yes
- No

Please tell us how much you disagree or agree with the following statements about the control of wildlife.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is unacceptable to remove native predators that prey on threatened and endangered species</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is acceptable to use small and big game hunting as a tool to control wildlife that do crop damage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildlife populations should not be managed by humans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is acceptable to remove predators that prey on livestock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildlife control is acceptable if there is evidence that wildlife damage is the cause of economic loss</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How humane or inhumane would you consider each of the following practices in predator damage management?

<table>
<thead>
<tr>
<th>Practice</th>
<th>Not at all humane</th>
<th>Somewhat humane</th>
<th>Fairly humane</th>
<th>Very humane</th>
<th>Completely humane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertility control (birth control; non-lethal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shooting animals from aircraft (lethal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poisons for predators (lethal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck Snares (lethal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guard animals (e.g. dogs; non-lethal)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical repellents (non-lethal)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Under what circumstances would it be justified to shoot a wolf?

- None
- Only with a permit
- Without a permit under some circumstances.

Under which circumstances would it be justified to shoot a wolf without a permit? (check all that apply)

- If a wolf approached a person and would not leave
- If a wolf was on someone's property
- If a wolf approached someone's pets or farm animals
- If a person saw a wolf while hunting other game (outside of wolf season)
- Under none of these circumstances would it be justified to shoot a wolf without a permit
A few questions about you

Have you been a member of any hunting or shooting organizations in the past 5 years?

- Yes
- No

During the past 5 years, which of the following organizations of you been a member of? (Choose all that apply)

- The National Rifle Association
- The Sportsmen for Fish & Wildlife
- The Rocky Mountain Elk Foundation
- Mule Deer Foundation
- Whitetails Unlimited
- Ducks Unlimited
- National Wild Turkey Federation
- Safari Club International
- National Shooting Sports Foundation
- Pheasants Forever
- The U.S. Sportsmen’s Alliance
- Boone & Crockett Club
- Other (Please specify)
- None of these

Have you been a member of any environmental, wildlife or animal-related organizations in the past 5 years?

- Yes
- No
During the past 5 years, which of the following organizations have you been a member of? (Choose all that apply)

- Sierra Club
- Defenders of Wildlife
- National Wildlife Federation
- Natural Resources Defense Council
- World Wildlife Fund
- National Audubon Society
- The Nature Conservancy
- Wilderness Society
- Wildlife Conservation Society
- Greenpeace
- The Humane Society of the United States
- People for the Ethical Treatment of Animals
- Other (please specify)
- None of these

To what extent do you identify with each of the following groups:

<table>
<thead>
<tr>
<th>Wildlife advocate</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Strongly</th>
<th>Very strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal rights advocate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hunter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gun rights advocate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmentalist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservationist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmer/rancher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property rights advocate</td>
<td></td>
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</tr>
</tbody>
</table>

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Click Count: 0 clicks.

Have you ever hunted at any point in your life?

- Yes
- No
Have you hunted big game during the past three years? (Note: "Big game" include such species as deer, elk, moose, big horn sheep, bear, cougar, etc.)

- Yes
- No
- Not sure if I did this in the past 3 years

Have you hunted bears, wolves or mountain lions at any time in the past?

- Yes
- No

Will you hunt wolves if/when they are removed from the federal list of endangered species in your state?

- Yes
- No
- Not sure

When it comes to politics, please indicate which of the following you consider yourself.

- Extremely liberal
- Liberal
- Slightly liberal
- Moderate/Middle of the road
- Slightly conservative
- Conservative
- Very conservative
How often can you trust the federal government in Washington to do what is right?

- Always
- Most of the time
- About half of the time
- Some of the time
- Never

How often can you trust your state government to do what is right?

- Always
- Most of the time
- About half of the time
- Some of the time
- Never

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Appendix C. Stop words

Stop words

1. about
2. all
3. and
4. are
5. but
6. can
7. for
8. have
9. into
10. many
11. not
12. other
13. our
14. part
15. some
16. that
17. the
18. their
19. them
20. there
21. they
22. this
23. too
24. very
25. was
26. what
27. with
Appendix D. Top 40 words, overall rank and variations

<table>
<thead>
<tr>
<th>Initial overall rank</th>
<th>Word</th>
<th>Variation/Misspellings</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>beautiful</td>
<td>beautiful, beatiful, beauty, beautiful, beautiful, beautiful, beautiful, beautiful, beautiful, beautiful-</td>
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<td>wild</td>
<td>wild, wilds</td>
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<td>wold, wolve, waves, wolves, wolf, wolf, wolves, wolf, wolves</td>
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<td>predators, preditor, preditors, predator, preditory, preditures, predators, preadtor, preadtores, predatory, preadtor</td>
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<td>6</td>
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<td>dangerous, danger</td>
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<td>7</td>
<td>need</td>
<td>need, needs, needed</td>
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<td>8</td>
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<td>elk</td>
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<td>ecosystem, ecosystems, eco-system</td>
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Top 40 words, overall rank and variations. Cont.

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<th>Word</th>
<th>Variation/Misspellings</th>
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<td>should</td>
<td>should, shoukd</td>
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