


## Research Note

# The Role of Value Orientations and Experience on Attitudes Toward a Well-Liked Threatened Reptile

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*Eastern box turtles (Terrepena carolina carolina) are often negatively impacted by anthropogenic activities, such as mortality caused by vehicles or agricultural equipment. However, studies investigating human perceptions of a particular species are often directed toward charismatic megafauna or polarizing species, such as wolves. Given the worldwide decline of reptiles and box turtles' high potential for human-caused mortality, there is a need to investigate the factors affecting public perception of this species. This article investigated respondents' value orientations, attitudes, beliefs, and behavioral intentions directed at box turtles. Mail surveys were distributed to 1,378 respondents of the Blue River Watershed in southern Indiana. Respondents had generally positive attitudes toward the species. However, both attitudes and behavioral intentions were significantly influenced by respondents' wildlife value orientations, indicating that wildlife value orientations can serve as a predictor of attitudes even when directed at well-liked, but non-charismatic imperiled species.*

**Keywords** behavioral intentions, imperiled species, *Terrepena carolina*, wildlife value orientations

### Introduction

Nearly one in five reptiles are threatened with extinction (Böhm et al., 2013). Efforts to restore reptile populations may be hindered by reptiles' relatively low conservation priority; the public values preservation of mammals and birds more than other animal taxa (Czech, Krausman, & Borkhataria, 1998). People's relatively negative attitudes toward reptiles in general may lead to increased risk perceptions and lower acceptance of reptiles (Smithem & Mazzotti, 2008). Given that reptiles and other less-charismatic animals have been under-emphasized in the human dimensions literature (Perry-Hill et al., 2014), there is a particular need to examine what influences public attitudes and risk perceptions regarding threatened

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reptiles. In this article, we explored the role of value orientations, attitudes, and past experience on perceptions of, fear response toward, and behavioral intentions toward the Eastern box turtle (*Terrapene carolina carolina*) in Indiana.

The Eastern box turtle has been designated as a “special protected” species by the Indiana Department of Natural Resources (2007) and as “vulnerable” by the International Union for Conservation of Nature (van Dijk, 2013). Box turtles are particularly affected by detrimental human activities. In suburban environments, human-related mortalities accounted for more than twice as many box turtle deaths as natural causes (Brisbin, Kennamer, Peters, & Karapatakis, 2008). While many of the instances of mortality are accidental (e.g., Brisbin et al., 2008), some may be intentional. A study documenting road mortality using imitation reptiles, both fake turtles and fake snakes, found that drivers struck the dummies more often than expected due to chance alone (Ashley, Kosloski, & Petrie, 2007), which suggests that drivers may be intentionally killing reptiles through vehicular collisions. Instilling pro-conservation attitudes and behaviors in the public is a vital component of successful box turtle conservation.

Many factors may contribute toward public attitudes, risk perceptions, and behavioral intentions toward box turtles. Wildlife value orientations can predict attitudes, behaviors, and management preferences (e.g., Fulton, Manfredo, & Lipscomb, 1996; Hermann, Voß, & Menzel, 2013; Jacobs, Vaske, & Sijtsma, 2014; Perry-Hill et al., 2014; Zinn, Manfredo, Vaske, & Wittmann, 1998). Value orientations are groups of basic beliefs that organize themselves around values and give them meaning in context (Manfredo, Teel, & Henry, 2009). Conceptually, value orientations sit between values, which are general, and attitudes and norms, which are context-specific. Wildlife value orientations make manifest groups of values and beliefs in a wildlife context (Fulton et al., 1996). The primary wildlife value orientations have been labeled as domination and mutualism (Manfredo et al., 2009). Individuals with a domination orientation are utilitarian, believing in managing wildlife for human benefit. In contrast, individuals with a mutualism orientation are more egalitarian, viewing wildlife as having rights and being deserving of care and protection (Jacobs et al., 2014; Manfredo et al., 2009). Despite numerous studies on wildlife value orientations, there remains a need for more work on the role of value orientations in determining attitudes and behavioral intentions toward single species, especially herpetofauna (Perry-Hill et al., 2014).

Other factors may also influence public perception of non-charismatic species. Beliefs are items that individuals perceive as true without being objective facts (Vaske & Manfredo, 2012). Attitudes and beliefs are strongly related at similar levels of specificity (Zinn et al., 1998), so species-specific attitudes and beliefs may account for varying acceptance of management actions and reported behavioral intentions for box turtles better than general wildlife value orientations.

Wildlife value orientations are also closely connected to emotions, which can reflect how we innately respond to animals (Dayer, Stinchfield, & Manfredo, 2007). Emotions are affective constructs that influence cognition of and response to wildlife during a wildlife encounter and affect a person’s interpretation of an encounter after the fact (Jacobs, 2012; Wiczorek Hudenko, 2012). People may exhibit emotional dispositions toward specific objects, such as experiencing fear of a spider or snake (Cook & Mineka, 1989). Emotional responses to wildlife were the subject of a recent special issue of *Human Dimensions of Wildlife* (Volume 17, issue 1). There remains a need for systematic explorations of emotions and how they relate to other cognitive traits, such as wildlife value orientations, when directed at wildlife (Jacobs, Vaske, & Roemer, 2012). Thus, there is value in examining the role of wildlife value orientations and species-specific attitudes in emotional dispositions

toward a species. This article focused on fear, an emotional response often associated with other reptilian species. In addition to influencing people's reactions to animals, fear may influence their willingness to conserve them (Johansson, Sjöström, Karlsson, & Brännlund, 2012).

Demographic factors have also been demonstrated to influence perceptions of animals. Specifically, a person's gender has been shown to influence their perceptions of wildlife. Women tend to hold higher "negativistic" responses to wildlife (Kellert & Berry, 1987), characterized by indifference, dislike, or fear (Kellert, 1980). Additionally, men tend to have higher "ecologicistic" attitudes, meaning they placed more importance on ecological valuing of animals compared to women (Kellert & Berry, 1987). More recent studies, however, have indicated a shifting view of wildlife by women. Women were demonstrated as having no statistically significant difference in their valuing of wildlife compared to men, with both genders citing ecological factors as a top reason for prioritizing conservation (Czech, Denvers, & Krausman, 2001). This article sought to identify if gender is an influencing factor in determining attitudes and fear-levels directed at a single species, especially given reptiles' relatively low conservation priority (Czech et al., 1998).

Additionally, people's interaction with a box turtle may influence their perceptions. Children who were able to view captive snakes in an aquarium or snakes handled by an adult had significantly more positive attitudes compared to those who only experienced a typical educational program about snakes (Morgan & Gramann, 1989). Respondents who have encountered a wild or captive box turtle may have more positive perceptions of the species compared to those who have not, which could indicate potential for incorporating interaction with educational animals into outreach schemes for species of conservation concern, such as the box turtle.

In this article, we examined the role of attitudes, wildlife value orientations, emotions, gender, and past encounters on public perceptions and behavioral intentions toward Eastern box turtles in Indiana. Specifically, we investigated public attitudes toward the box turtle and explored the influence of (a) wildlife value orientation and species-specific beliefs and (b) past encounters on attitudes, fear response, and behavioral intentions toward the box turtle.

## Methods

A mail survey was conducted in the Blue River watershed, Indiana, defined as the region containing all 5-digit zip codes within 10 miles of the Blue River watershed boundary. The study area consisted of approximately 140,000 individuals living in approximately 60,000 households (U.S. Census, 2010). This study area is mostly rural with little available public transportation. Therefore, we assumed most potential respondents would be drivers.

### *Survey Design and Administration*

A survey of awareness of and attitudes toward box turtles was developed as part of a related survey of attitudes toward the eastern hellbender (*Cryptobanchus alleganiensis alleganiensis*; Mullendore et al., 2014; Perry-Hill et al., 2014; Reimer et al., 2014), an imperiled aquatic salamander in Indiana. The study area was selected because it is the only place in Indiana with the eastern hellbender. Potential respondents were identified through two methods: a random sample of heads-of-household and a census of riparian landowners along the lower reach of the Blue River to reach a suite of individuals that may interact with box turtles on their property or while driving in the area. The random sample

of 1,096 Blue River watershed heads-of-household was purchased from Survey Sampling International. The census of 281 of landowners was collected from online property tax records. The combined survey population was 1,377.

To capture attitudes toward the box turtle, respondents were presented with a picture of a box turtle and asked to complete a series of semantic differential items related to the box turtle. In these items, respondents were presented with a seven-point scale with the first and last numbers labeled with opposing adjectives. Respondents were asked to circle the number that “best describes your opinion of the animal in the pictures above.” The opposing adjective pairs included Good–Bad, Important–Unimportant, Beautiful–Ugly, Friendly–Not Friendly, Warm–Cold, Pleasant–Unpleasant, Valuable–Worthless, Clean–Dirty, Hardy–Fragile, Harmless–Dangerous, and Dry–Slimy. Fear response was evaluated by asking respondents to rate whether “I would be scared if I saw one of these animals in the wild” on a five-point scale from *Strongly Disagree* to *Strongly Agree*.

The survey also included questions to elicit respondents’ wildlife value orientations. Fifteen wildlife value orientations questions were adapted from Fulton et al. (1996). The items were selected for relevance after pre-testing the survey with undergraduate students. In some cases, question wording was slightly changed to reflect the midwestern context of the survey. For more details on the wildlife value orientations question selection, see Perry-Hill et al. (2014). Wildlife value orientations questions were measured on a seven-point scale and are listed in Table 1.

Respondents were also asked whether they had encountered a box turtle either in the wild or in captivity and were asked a series of demographic questions including gender, age, and education level. The survey was administered in the summer of 2011 using the Tailored Design Method (Dillman, Smyth, & Christian, 2008). Survey recipients were given the option to either complete and return a mail-in survey or take the survey online using Qualtrics survey software. All recipients who completed the surveys were entered in a drawing for a \$30 prize.

### ***Data Analysis and Models***

*T*-tests were used to determine group-level differences in attitudes and beliefs. Since we were using a subset of Fulton et al.’s (1996) original wildlife value orientation questions, we conducted an exploratory principal components factor analysis with varimax rotation to reduce the wildlife value orientations questions into interpretable factors. Factors were retained based on the examination of a scree plot and factor variables were retained for further analysis.

Multiple regression models were created to measure the effects of wildlife value orientations, demographics, and whether or not respondents had encountered a box turtle (the independent variables) on the following dependent variables: (a) attitudes toward the box turtle and (b) fear response. Attitudes toward the box turtle were also used as an independent variable in the latter model. Additionally, a logistic regression with the same independent variables was used to predict whether respondents indicated they would perform a conservation action: stopping and moving a box turtle out of the road if they encountered it while driving. Regression models are inferential tools commonly used to survey data (Vaske, 2008), have been used in research on other species using this questionnaire (Perry-Hill et al., 2014), and are suitable for modeling categorical variables such as some of the ones in this analysis (Nunkoo & Ramkissoon, 2012). Results were considered significant at the  $p = .05$  level.

**Table 1**  
Wildlife value orientations

Item	Mean	SD	Factor loading	Group alpha
<i>Management of wildlife</i>				.72
Humans should manage wild animal populations so that humans benefit	4.55	1.82	.78	
The loss of some individual wild animals is acceptable if the population of animals is not jeopardized	4.91	1.72	.66	
It is okay to use wildlife for human benefit as long as the animal populations are not threatened	5.66	1.41	.59	
It is important for humans to manage the populations of wild animals	5.39	1.54	.75	
<i>Non-hunting wildlife experiences</i>				.90
An important part of my community is the wildlife I see there from time to time	6.11	1.17	.85	
Having wildlife around my home is important to me	6.05	1.32	.86	
One of the reasons I take trips to the outdoors, like camping, hiking or sightseeing, is for the chance to see wildlife	5.84	1.42	.83	
It's important to me to know that there are healthy populations of wildlife in Indiana	6.16	1.12	.89	
<i>Ethics of hunting</i>				.87
Hunting and fishing enable people to enjoy the outdoors in a positive manner*	6.16	1.22	.52	
Hunting is cruel and inhumane to the animals	2.52	1.80	.86	
Hunting makes people insensitive to suffering	2.48	1.77	.88	
People who fish cause fish to suffer needlessly	2.18	1.55	.83	
Fishing helps people appreciate natural processes*	5.43	1.51	.48	
I object to hunting because it violates the right of an individual animal to exist	2.29	1.78	.83	
Hunting and fishing are important wildlife management tools*	5.88	1.54	.53	

\*Item reverse coded for the factor analysis.

## Results

A total of 541 people responded to the survey, a response rate of 40% after removing mail returned with incorrect addresses. The two populations had different response rates: 35% of the 1,046 Blue River Area residents responded compared to 58% of the 271 riparian landowners. Most respondents (63%) were male. The average age was 59, and 29% of respondents had obtained at least a 4-year college degree. Respondents were more likely to be male and had higher education than the study area as a whole. However, since the response rate was adequate, we believe the sample is not overly biased.

### Awareness and Attitudes

Nearly all (92%) respondents indicated that they had heard of a box turtle before, and 88% indicated that they had seen a box turtle either in the wild or captivity. Respondents had generally favorable attitudes toward the box turtle: the average response to each of the semantic differential questions was on the more favorable side of the scale (Figure 1). Average fear response was 1.27 (*SD* 0.66) on a 5-point scale, with lower scores being associated with lower levels of fear.

### Wildlife Value Orientations

All three factors with eigenvalues over 1.0 were retained in the wildlife value orientation analysis, explaining 62% of the variance (Table 1). The three factors were interpreted as management of wildlife, non-hunting wildlife experiences, and the ethics of hunting. All three factors were internally consistent, with alpha levels ranging from .72–.90. As in prior work on this set of wildlife value orientations questions (Perry-Hill et al., 2014), the management of wildlife and the ethics of hunting factors reflected a domination wildlife value orientation, with higher scores being associated with stronger preference for human dominance over wildlife. The non-hunting wildlife experiences factor reflected a mutualism wildlife value orientation, with higher scores being associated with a preference for a more mutualistic relationship between humans and wildlife.

### Regression Analyses

Both linear regression models (attitudes and fear response) and the logistic regression model (predicting intention to remove turtles from the road) were significant ( $p < .001$ ). The non-hunting wildlife experience (NHWE) mutualism wildlife value orientation was the strongest significant predictor of attitudes toward the box turtle ( $\beta = -.35$ ) and of the positive behavioral intention to remove box turtles from the road ( $OR = 1.32$ ), with a stronger NHWE value orientation being associated with more favorable attitudes and behavioral

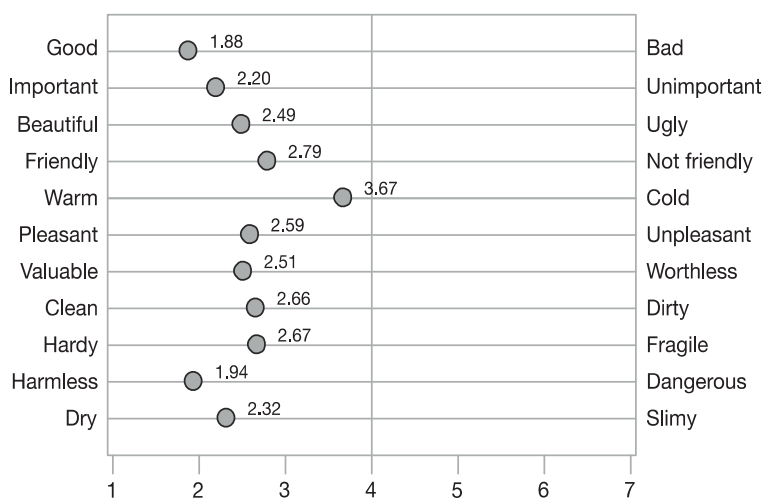


Figure 1. Average attitudes toward box turtle among Blue River watershed, Indiana residents.

**Table 2**  
Regression models

Independent variable	Model 1: Attitudes ( $\beta$ )	Model 2: Fear response ( $\beta$ )	Model 3: Remove it from road (odds ratio)
<i>Domination wildlife value orientations</i>			
Management of wildlife	-0.07	-0.07	0.82
Ethics of hunting	-0.04	0.03	1.22
<i>Mutualism wildlife value orientations</i>			
Non-hunting wildlife experiences	-0.35***	0.07	1.32*
Negative attitudes toward box turtles	NA	0.31***	0.66**
Past encounter	-0.17***	-0.25***	2.23
Male	0.08	0.01	0.59*
Age	0.10	-0.01	0.02*
Education	0.01	0.03	0.98
Adjusted $R^2$	.18	.17	0.10

\*Item significant at the  $p = .05$  level; \*\*Item significant at the  $p = .01$  level; \*\*\*Item significant at the  $p = .001$  level.

intentions toward the box turtle. Neither of the other wildlife value orientations (management of wildlife or ethics of hunting) was significant in any of the models. Having a prior encounter with box turtles significantly predicted a lower fear response ( $\beta = -25$ ) and less negative attitudes ( $\beta = -17$ ) toward the box turtle (Table 2). Having a prior encounter with box turtles was not a significant predictor of the intention to remove the turtle from the road. Finally, gender and age were significant predictors of the intention to remove box turtles from the road: being younger and/or female increased the odds of intending to remove turtles from the road.

## Discussion

The box turtle, although perhaps not charismatic in the sense of wolves or other mammals, is well liked by much of the public. The majority of respondents had heard of the box turtle, and a large portion (88%) had seen a box turtle either in the wild or captivity. Respondents had generally favorable attitudes toward the box turtle, as indicated by the responses in the semantic differential pairings. Even among a well-liked species, attitudes were significantly influenced by respondents' wildlife value orientations. A more mutualistic orientation toward non-hunting wildlife experiences significantly predicted more positive attitudes toward the box turtle and increased the likelihood that individuals would intend to remove a box turtle from the road. However, neither of the domination-oriented orientations was significant in any of the models, consistent with other work based on this survey (Perry-Hill et al., 2014). The reasons for this are not obvious. One factor may be the fact that the box turtle is a non-game species and the questions eliciting these orientations were related to hunting and population management. Regardless, this finding adds

to our knowledge of the influence of wildlife value orientations in people's attitudes and conservation behavioral intentions toward reptiles and shows that wildlife value orientations are important, though subtle, predictors of attitudes and behavioral intentions even among well-liked species. Future work should examine the relationship between non-game species, likability, and wildlife value orientations.

Interestingly, wildlife value orientations were not significant predictors of fear response though negative species-specific attitudes were. The relationship between the two items may be similar to that of attitudes, beliefs, and behavioral intentions, in that the relatedness is stronger at similar levels of specificity (Zinn et al., 1998). Wildlife value orientations may be more predictive of other emotional dispositions or those measured at a more general level of specificity than directed at a single species.

Although other studies have found that women tend to exhibit more negativistic attitudes toward wildlife (Czech et al., 2001; Kellert & Berry, 1987), we found no significant correlation between gender and attitude toward the box turtle when controlling for other factors. Women were more likely to report that they would move box turtles off the road, however, suggesting that gender remains an influencer of behavioral intentions. Some of the discrepancy between men and women might be explained by an individual's personal attachment to animals, which is manifest in the "caring" facet of mutualistic wildlife value orientations (Dayer et al., 2007; Teel & Manfredi, 2009). Caring was omitted from the survey for space considerations; future work should explore the relationship between caring and behavioral intentions, especially since fear response to turtles was low in our population.

While we found several factors that influence people's attitudes, fear response, and behavioral intentions toward a single species, the models are not comprehensive. We did not ask respondents to indicate how frequently they drove a car, which may introduce error in the behavioral intentions model if many of the respondents did not drive. There are potentially other, unmeasured variables that influence people's response to box turtles. However, both wildlife value orientations and past encounters remain as significant factors that influence how individuals perceive a reptilian species, which is notable in and of itself.

## Implications for Conservation

It may be relatively easy to garner public support for conservation actions that benefit box turtles given the low levels of fear and generally positive attitudes that respondents had toward them. This in turn may impact other species within the ecosystem as box turtles have been identified as sensitive to a suite of habitat changes and threats that impact other species within the ecosystem (Hess & King, 2002). While mutualistic wildlife value orientations were predictive of species-specific attitudes, past encounters were also a significant predictor of positive species-specific attitudes. Given the slower-changing nature of value orientations in the cognitive hierarchy, managers might want to focus on programs to affect public perception of this species specifically rather than value orientations generally. Public support might be increased through encounter programs, since encounters with box turtles were associated with more positive attitudes and less fear; this is similar to Morgan and Gramann's (1989) finding about interaction with snakes. Although the influence of encounter programs may be lessened by the fact that many respondents had already encountered box turtles, it's possible that repeated exposure to box turtles will further influence species-specific attitudes and behavioral intentions. Additionally, the wildlife value orientations findings suggest that framing box turtle messaging in terms of non-hunting wildlife



experiences rather than in terms of wildlife or ecosystem management may be more effective. Future studies should explore the relative importance of seeing animals in the wild versus in captivity in impacting attitudes and behaviors.

As all respondents seem to have relatively neutral agreement to statements about government spending to protect the box turtle specifically, conservation for this species hinges upon encouraging behaviors that do not negatively impact box turtles. Management agencies looking to conserve either box turtles or other well known, but not necessarily ecologically valued species, should focus efforts on preventing behaviors that would force population decline to the point where government or management intervention is needed.

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