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Assessing Tolerance for Wildlife: Clarifying Relations Between Concepts and Measures

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Two parallel lines of inquiry, tolerance for and acceptance of wildlife populations, have arisen in the applied literature on wildlife conservation to assess probability of successfully establishing or increasing populations of controversial species. Neither of these lines is well grounded in social science theory, and diverse measures have been employed to assess tolerance, which inhibits comparability across studies. We empirically tested behavioral measures of tolerance against self-reports of previous policy-relevant behavior and behavioral intentions. Both composite behavioral measures were strongly correlated ($r > .70$) with two attitudinal measures of tolerance commonly employed in the literature. The strong correlation between attitudinal and behavioral measures suggests existing attitudinal measures represent valid, parsimonious measures of tolerance that may be useful when behavioral measures are too cumbersome or misreporting of behavior is anticipated. Our results demonstrate how behavioral measures of tolerance provide additional, useful information beyond general attitudinal measures.

Keywords acceptance, attitudes, behavior, *Canis lupus*, policy, stewardship, tolerance, wolves

Introduction

Recently, a discussion has emerged regarding the importance of attitudes and behaviors related to carnivore conservation, both in the academic literature (Delibes-Mateos, 2014; Soto-Shoender & Main, 2013) and within the agencies charged with carnivore conservation. In June of 2013, the U.S. Fish and Wildlife Service (USFWS) proposed removing Endangered Species Act (ESA) protection for gray wolves *Canis lupus* throughout most of the United States. This proposal was largely predicated on the assertion that vast portions of gray wolves' historical range were no longer suitable due to lack of human tolerance. While both the FWS and critics of their proposal believe that wolves are potentially threatened by human intolerance (74 FR 15123), assessing the threat posed by intolerance is complicated by a lack in conceptual clarity (i.e., what exactly, is intolerance), inconsistent measurement, and a paucity of current data across much of wolves' historical range.

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This lack of clarity affects academic research as well, where negative attitudes toward carnivores are sometimes conflated with behaviors that negatively impact carnivore populations (Delibes-Mateos, 2014; Soto-Shoender & Main, 2013). The research presented here attempts to clarify the concept by empirically evaluating the relationship between two common measures (i.e., attitudes toward a carnivore, and wildlife acceptance capacity) and their ability to explain related self-reported behavior and behavioral intentions. We suggest that measuring behaviors (past, present, or in the future) intended to negatively impact populations provides researchers and policy makers with more useful information (over attitudinal measures) for setting conservation policy.

Existing Lines of Research

Interest in understanding how people formulate judgments concerning acceptability of wildlife populations has given rise to parallel lines of research on human “tolerance” *for* and “acceptance” *of* wildlife (Bruskotter & Fulton, 2012; Decker & Purdy, 1988; Treves, 2009; Treves & Martin, 2011). The concept of “tolerance” for a species or population has been explored in several studies focused on people’s attitudes toward carnivore populations and preferences regarding carnivore management (Naughton-Treves, Grossberg, & Treves, 2003; Treves, 2009; Treves & Martin, 2011). These studies have been valuable in determining, for example, whether payments for livestock depredation increase livestock producers’ tolerance for wolves (Naughton-Treves et al., 2003), and the extent to which hunters’ participation in wolf hunts will increase tolerance for wolves (Treves & Martin, 2011). They are also valuable for assisting policy makers in determining the extent to which human behavior threatens imperiled species (Bruskotter, Toman,ENZler, & Schmidt, 2010). However, these studies are largely atheoretical—that is, their conceptualization of tolerance (a latent, psychological construct) was intuitive, rather than guided by psychological theory and standard measurement practices (see Bruskotter & Fulton, 2012).

Similarly, researchers have employed measures of “Wildlife Acceptance Capacity” (hereafter, WAC) to understand the acceptability of wildlife populations within a given area. Conceptualized as reflecting the “maximum wildlife population level in an area that is acceptable,” WAC was originally proposed by Decker and Purdy (1988) for explaining how low levels of human tolerance could limit the frequency and distribution of species within a given area (Carpenter, Decker, & Lipscomb, 2000; Gigliotti, Decker, & Carpenter, 2000; Riley & Decker, 2000). When a population of animals is perceived to have exceeded a given individual’s internal threshold, that population becomes “unacceptable,” and the individual is presumably motivated to take action to reduce the population. WAC concepts have been operationalized by asking study participants whether they desire populations to increase, decrease, or stay about the same.

Bruskotter and Fulton (2012) argued that acceptance and tolerance share two important characteristics. First, inaction, or passive restraint on the part of affected individuals is the “normal” state (i.e., most people, most of the time, will not be motivated to act). Second, both concepts posit (either explicitly or implicitly) that there is some point at which individuals’ passive inaction ceases, and actions designed to reduce or negatively impact a population are undertaken, or alternatively, they may become motivated to act on behalf of a species or population. Pragmatically, researchers who study tolerance/acceptance of wildlife are seeking to answer the same fundamental question: At what point do individuals or societies take actions designed to impact wildlife populations? Therefore, Bruskotter and

Fulton (2012) argued that *acceptance of* and *tolerance for* wildlife represent the same construct, and offered a general framework for operationalizing this construct using multiple behavioral criteria (Ajzen & Fishbein, 2005; Weigel & Newman, 1976).

A Behavioral Model of Tolerance Toward Wildlife

This framework posits that behaviors can be arrayed along a continuum from those that are undertaken to negatively impact wildlife, which are indicative of “intolerance” (or opposition to a species or population), to those that are undertaken to positively impact wildlife, which are indicative of “stewardship” (or support for a species or population). Treves (2012) countered that there are two relevant continua when assessing tolerance of wildlife, attitudinal and behavioral, and both are potentially relevant for management (Treves & Bruskotter, 2014). On this point we agree. A useful analog to conceptualize tolerance toward wildlife species is provided in the literature on racial prejudice. Linn (1965) defined “prejudice” as an attitude, while reserving the term “discrimination” for overt, discriminatory behaviors (i.e., behaviors undertaken with the intent to impact persons or groups of people). The analogy becomes more useful when one considers that discriminatory behavior does not always involve behaviors designed to negatively affect a group of people, but can also be applied to behaviors that show a preference for a certain group of people (Schneider, 2004). For example, if a recruiter were to hire a candidate with poor scores based upon their race, ethnicity, gender, or other such characteristics, this type of preferential treatment is also a form of discrimination.

Using this approach to construct a measurement of tolerance toward wildlife allows researchers to separate “prejudicial” attitudes toward wildlife from “discriminatory” behaviors. These “discriminatory” behaviors could have a larger impact on species than would a prejudicial attitude. An attitude that is not acted upon in some fashion is unlikely to have any impact on a species or population at all. The model advocated by Bruskotter and Fulton (2012) takes a similar view of “discriminatory” behavior directed at wildlife by allowing such behavior to take both positive (supportive) and negative (oppositional) forms.

For clarity, it is not our intent to insist that tolerance/acceptance studies adopt behavioral measures. We argue that much can be learned from studying attitudes and other cognitions that provide potential internal mechanisms for understanding such behavior (see Slagle et al. 2012, for example). Rather, we assert that the psychological literature on prejudice and discrimination provides a guide for conceptualizing “tolerance” constructs, and to date, overt behavioral measures have been largely neglected in the broader literature on tolerance for or acceptance of wildlife.

The conceptual model advocated by Bruskotter and Fulton (2012) requires that discriminatory behaviors are undertaken intentionally. In the parlance of attitude theory, this model assumes that the target behavior is volitional and directed at a particular outcome (i.e., negatively or positively impacting a species/population). This model limits the behaviors of interest to those that are under an individual’s control and purposeful (i.e., undertaken with intent to do harm or good). For example, we would not classify behaviors undertaken to *avoid* conflict with wildlife as intolerant or discriminatory, nor would we classify the accidental killing of wildlife with a motor-vehicle as intolerant behavior.

The importance of external factors that prevent or constrain individuals from carrying out behaviors aimed at a specific species cannot be overemphasized. Even if one was

willing to break the law in order to kill an endangered wolf, for example, following through on such a task requires a great deal of time and effort, as well as some skill. One must have access to a firearm (or other means of killing the animal), the competence to discharge it (i.e., marksmanship), as well as the ability to track, find, or otherwise encounter the subject of their intolerance. Recognizing that individuals who desire to engage in a particular behavior are often hindered by such external factors, Ajzen (1991) added “perceived behavioral control” to the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), one of the most oft-used theoretical frameworks for predicting volitional behavior. Perceived behavioral control has been an important contribution to the model in cases where an individual’s ability to engage in a particular behavior is limited (Armitage & Conner, 2001).

From a behavioral perspective, acting in a discriminatory fashion requires intent—meaning only those actions taken of one’s own free will (i.e., volitional behavior) with the intent of negatively impacting an individual animal, population or species should be viewed as intolerant. To be clear, however, intent applies only to behavioral expressions of intolerance—not internal “attitudinal” expressions (e.g., anger, fear, dislike; see Treves, 2012). Although external factors limit the ability of people who would illegally kill wildlife, behavioral expressions of intolerance are not limited to illegal killing. *Any action* that an individual takes with the intent of negatively impacting a particular wildlife population or species can be considered a behavioral expression of intolerance (e.g., writing or calling one’s representative to complain about a nuisance species, signing a petition or participating in a ballot initiative to remove/reduce a population, donating money to an organization that opposes the conservation or restoration of a particular species).

An individual’s *intent* is a critical aspect of behavioral expressions of intolerance. Human hunters regularly kill animals for recreational and/or subsistence purposes. While such actions have the potential to negatively impact wildlife populations, they should not necessarily be viewed as intolerant because they may be motivated by their enjoyment of the recreational experience of hunting. Hunters have a vested interest in ensuring that a harvestable surplus of animals exists so that hunting traditions may continue. Likewise, some animals may be killed unintentionally via collisions with motor vehicles or the alteration of habitat. Again, such actions should not be viewed as intolerant.

While the model advocated by Bruskotter and Fulton (2012) applies to “negative” or “positive” outcomes for a specific species, population or habitat, the outcomes to other wildlife species and at a larger ecological level need to be considered as well. For example, intolerance expressed toward an overabundant species (e.g., deer in Eastern urban areas) or invasive species (e.g., Asian carp in the Mississippi River basin) might lead to positive outcomes for other native species. The term intolerance does not necessarily imply socially undesirable actions.

What follows is an empirical test of the measure of wildlife tolerance proposed by Bruskotter and Fulton (2012) that is linked with commonly used attitudinal measures and with a multi-act measure of policy-relevant behavior. This test shows how assessment of multiple self-reported behaviors that are undertaken to both positively *and* negatively impact a species provides more useful information for conserving/managing a species than the measurement of general attitudes.

A Measure of Wildlife Conservation Behavior

Conceptualizing stewardship and intolerance as a continuum of behaviors offers a number of advantages. First, the model is intuitive, and can be easily explained to interested

stakeholders. The term “behavior” means the same thing to lay people as it does to academics, while terms like “tolerance,” “norms,” or “attitudes” are jargon that often have different meanings depending on context. Second, the model clarifies the relationship between tolerance and acceptance (as assessed in prior studies) and thus unites lines of research from wildlife management with lines from social psychology (i.e., prejudice, discrimination). Third, this conceptual model allows for the ready application of a number of psychological theories that have been employed in the prediction of behavior (e.g., Value-Belief-Norm theory, the Theory of Planned Behavior), thus helping to reconcile the applied research from the field of wildlife conservation with theoretical studies from psychology.

The greatest advantage of conceptualizing intolerance and stewardship as a continuum of behaviors is that it simplifies measurement, while simultaneously increasing the relevancy of measures to policy makers. In our view, beyond direct observations of behavior, two forms of commonly used behavioral measures are relevant: (a) previous behaviors and (b) behavioral intentions (i.e., the intention to engage in a particular behavior at some future point). Researchers may choose to employ either or both of these types of measures; however, it is critical that multiple types of behaviors and/or behavioral intentions are assessed. The logic here is simple. Behavioral expressions of stewardship and intolerance are likely to take many forms. If a researcher measures only one of these behaviors they may falsely conclude that someone who does not exhibit the measured behavior is tolerant of the species/population in question. This logic was elegantly demonstrated in a now classic study linking general attitudes to behavior. Weigel and Newman (1976) first measured people’s attitudes toward the environment; next, over the course of eight months, they offered individuals the opportunity to engage in a variety of environmentally relevant behaviors (e.g., sign a petition, participate in a recycling program). They found specific behaviors often exhibited nonsignificant correlations with attitudes ($p > .05$ for 5 of 14) and found the average correlation across these measures was “quite modest” (mean $R = .29$). However, when these behaviors were treated as an index (i.e., all behavioral measures were summed), they found strong correlations (mean $R = .62$) between various measures of environmental attitudes and environmentally relevant behavior (Weigel & Newman, 1976). Likewise, Fishbein and Ajzen (1974) showed that while the correlation between an individual’s attitude and *prior* specific behaviors were low to nonsignificant (mean $R = .14$ to $.18$, depending on scale type), the correlation between attitudes and a summary index of prior behavior was considerably higher (R ranged from $.70$ to $.90$, depending on scale type). The message of these studies for researchers interested in assessing tolerance for wildlife is clear: there are a variety of avenues through which one may express intolerance for a species. Measuring but one of these behaviors increases your likelihood of falsely concluding that study subjects are tolerant.

Policy-Relevant Behavior

In the context of wildlife conservation and management, some types of behaviors are more likely than others to have population-level impacts. Thus, while illegally killing an animal may seem like the ultimate expression of intolerance, this action is unlikely to have population-level effects—unless such behavior is very common. Such actions may be aimed specifically at individual offending animals (e.g., crop raider or livestock depredator), and therefore, while they certainly indicate intolerance for the specific animal (i.e., the animal that is killed or removed), they may be a poor proxy for intolerance for a

species/population. For example, an urban resident may hire a trapper to remove a raccoon that invades his/her home without harboring any ill will toward raccoons in general, nor any desire to reduce the resident population. While we acknowledge that actions undertaken to harm/benefit individual animals are important indicators of intolerance/stewardship, we contend that the most relevant behaviors are overtly political in nature, such as writing or phoning one's congressperson, speaking out at a public meeting concerning wildlife management, or attending a political rally. Because such behaviors are undertaken specifically to influence people that determine wildlife policy and set population objectives, they are far more likely to have population level impacts, and are therefore highly relevant indicators for wildlife policy makers.

The primary objective of this article was to assess the validity of our approach by testing operational measures of wildlife conservation behavior against two commonly used attitudinal measures of acceptance/tolerance: wildlife acceptance capacity and one's general attitude toward a species (in this case, wolves). Specifically, we sought to determine the association between these two attitudinal measures and respondents' (a) previous behaviors that are indicative of stewardship or intolerance and (b) intentions to engage in future behaviors that are indicative of stewardship or intolerance. Because we examined the relationship between WAC and self-reports of behavior, our research also provides the first empirical test of the predictive validity of the WAC measure.

Methods

Data for this article were gathered via a popular wildlife blog (*The Wildlife News*, www.thewildlifeneeds.com) that frequently posts about wildlife and public lands management issues in the western United States. Importantly, it was not our intent to collect a representative sample of any particular population, but rather, to contact highly motivated and engaged individuals—what political scientists refer to as an “issue public” (Converse, 1964; Krosnick, Holbrook, & Visser, 2000). By collecting responses from individuals who were likely to take political action we are able to collect responses from people most likely (through their activism) to affect policy outcomes. Research conducted by Bright and Manfredi (1996) showed that the level of personal importance of reintroducing wolves in Colorado was a significant moderator of attitudes toward wolves and voting behavior. An approach targeting an issue public allowed us to increase the frequency of reporting the behaviors of interest over what we would have likely found in a probability sample survey of households, which, would have likely yielded far fewer individuals who actually engaged in the behaviors of interest.

After obtaining permission from website moderators, we posted a link to a Web-based questionnaire, along with a blog post describing the intent of the study. Data were collected for a total of seven days in mid-March of 2011. During this period, a settlement was reached between the USFWS and a collection of environmental groups to remove wolves in Idaho, Montana, and parts of Oregon, Utah, and Washington from ESA protections, which produced substantial discussion on the blog, and helped generate participation in our survey (note: this agreement was later invalidated by the federal district court in Montana).

Measurement of Variables

Prior Behavior. We assessed prior stewardship behavior by asking individuals whether they had engaged in three policy-relevant actions (i.e., donating to an organization that supports wolf recovery, contacting their congressperson in support of wolf recovery, and

writing a letter to a newspaper in support of wolf recovery) during the past six months. We used the same three behaviors to assess prior intolerant behaviors, except that word “support(s)” was replaced with “oppose/opposition.” We then combined these two indices (i.e., prior stewardship *minus* prior intolerance) to create a single composite measure of prior conservation behavior.

Behavioral Intentions. Similar to prior behaviors, we measured behavioral intentions by asking respondents to estimate their likelihood of engaging in nine behaviors on a 5-point, bipolar scale from *very unlikely* (−2) to *very likely* (2), with *not sure* as a midpoint (0) (Ajzen & Fishbein, 1980). We classified behavioral intentions into two groups: (a) four items measuring stewardship intentions: three items used to assess prior behavior plus an item that asked respondents to estimate how likely they were to “sign a petition in support of further wolf reintroductions by the federal government” and (b) five items measuring intolerant intentions: the same four items used to measure stewardship intentions (changing support to oppose) plus an item asking how likely respondents were to “shoot a wolf if you saw one.” We created a summary measure of intentions by combining these indices (i.e., stewardship intentions *minus* intolerant intentions).

Wildlife Acceptance Capacity. Two items were used to assess an individual’s acceptance for wolves. These items isolated respondents’ preferences for future wolf populations both locally (i.e., in their state of residence), and nationally. Responses were measured on 5-point, bi-polar scales ranging from a preference for wolf populations to “decrease greatly” to a preference for populations to “increase greatly” (Riley & Decker, 2000).

Attitudes Toward Wolves. We employed semantic-differential scales to assess individual’s attitudes toward wolves (hereafter attitudinal measures). Respondents were first confronted with the text “I think wolves are . . .”; this text was followed by four scales ranging from 1 to 7, and anchored at each end with opposing adjectives (i.e., harmful–beneficial, unpleasant–pleasant, bad–good, and worthless–valuable). Each individual’s attitude score was represented by the mean of their responses across these four items.

Analyses

We calculated descriptive statistics (i.e., frequencies, means, standard deviations) as appropriate for each measure and used Pearson’s correlation coefficient as a measure of association between individual behavioral measures and attitudinal measures. We calculated Pearson’s correlation between attitudinal measures and summary indices representing (a) prior stewardship behavior, (b) prior intolerant behavior, (c) all prior behavior, (d) stewardship intentions, (e) intolerant intentions, and (f) all intentions. We hypothesized that each of the behavioral measures would exhibit significant correlations with each of the attitudinal measures. Following Weigel and Newman (1976) and Fishbein and Ajzen (1974), we anticipated that the correlations between attitudinal measures and our composite behavioral measures would be greater than the average correlation between the attitudinal measures and individual behavioral measures.

Results

The online questionnaire elicited 811 responses over a 7-day period in March 2011. The percentage of respondents that reported having engaged in prior stewardship behaviors

ranged from 8% (wrote a letter to newspaper in support of wolf recovery) to 26% (wrote, phoned, or e-mailed congressperson; see Table 1). In total, 33% of respondents reported having engaged in at least one of three stewardship behaviors in the previous six months. The percentage of respondents who reported having engaged in prior intolerant behaviors ranged from 4% (wrote a letter to newspaper in opposition to wolf recovery) to 22% (wrote, phoned, or e-mailed congressperson; see Table 1). In total, 26% of respondents reported having engaged in at least one of the three intolerant behaviors during the previous 6 months.

Table 1
Descriptive statistics for all behavioral and attitudinal measures

Concept	Response item	% Yes	Mean	Std. dev.
Prior stewardship behavior (past 6 months)				
	Donated to an organization that supports wolf recovery.	24		
	Wrote, phoned, or e-mailed my congressperson in support of wolf recovery.	26		
	Wrote a letter to my newspaper in support of wolf recovery.	8		
	Prior Stewardship ^a	33	0.59	0.934
Prior intolerant behavior (past 6 months)				
	Donated to an organization that opposes wolf recovery.	17		
	Wrote, phoned, or e-mailed my congressperson in opposition to wolf recovery.	22		
	Wrote a letter to my newspaper in opposition to wolf recovery.	4		
	Prior Intolerance ^b	26	0.42	0.78
Intention to engage in stewardship behavior ^c				
		% Likely or very likely		
	Write your congressperson in support of further wolf recovery efforts.	43	−0.24	1.73
	Contribute to an organization that supports further wolf recovery efforts.	43	−0.25	1.73
	Sign a petition in support of further wolf reintroductions.	44	−0.19	1.81
	Write a letter to the editor of your local newspaper in support of wolf recovery.	45	−0.46	1.62
Intention to engage in intolerant behavior ^c				
	Write your congressperson to oppose further wolf recovery efforts.	33	−0.38	1.76

(Continued)

Table 1
(Continued)

Concept	Response item	% Yes	Mean	Std. dev.
	Contribute to an organization that opposes further wolf recovery efforts.	38	−0.41	1.76
	Sign a petition to stop any further wolf reintroductions by the federal government.	43	−0.19	1.87
	Write a letter to the editor of your local newspaper opposing wolf recovery.	33	−0.58	1.67
	Shoot a wolf if you saw one.	16	−0.98	1.42
Attitude toward wolves ^d		% positive (coded: 5,6,7)		
	I think wolves are . . . (harmful, beneficial)	56	4.61	2.49
	I think wolves are . . . (unpleasant, pleasant)	48	4.37	2.26
	I think wolves are . . . (bad, good)	50	4.52	2.32
	I think wolves are . . . (worthless, valuable)	63	5.03	2.27
Wildlife acceptance ^e		% Increased or greatly increased		
	Wolf populations in my state should be . . . [decreased greatly to increased greatly]	42	3.06	1.41
	Wolf populations nationwide should be . . . [decreased greatly to increased greatly]	50	3.09	1.49

^aPrior stewardship ranged from 0 to 3 (behaviors in previous 6 months).

^bPrior intolerance ranged from 0 to 3 (behaviors in previous 6 months).

^cBehavioral intentions were measured on scales ranging from *very unlikely* (−2) to *very likely* (2).

^dScales ranged from 1 = *negative adjective* to 7 = *positive adjective*; Cronbach's alpha for attitude scale = 0.96.

^eWildlife acceptance items were measured on scales ranging from 1 = *decrease greatly* to 5 = *increase greatly*.

The four attitudinal measures exhibited strong, significant ($p < .001$) correlations with one another. The mean attitude score toward wolves was correlated at $R = .83$ ($n = 668$) and $.88$ ($n = 667$) with acceptance (in home state) and acceptance (nationwide), respectively. The two measures of acceptance were also strongly related ($R = .85$, $n = 659$).

Correlations between the two acceptance measures, mean attitude score and single-item measures of prior intolerant and stewardship behavior were all significant ($p < .001$) and ranged from $R = .30$ to $.59$ (Table 2). We found a strong positive association between attitudinal measures and the composite measure of *prior stewardship* (in home state: $R = .60$, $n = 668$; nationwide: $R = .63$, $n = 667$; attitude: $R = .62$, $n = 689$).

Table 2
Pearson's Correlation between all attitudinal and behavioral measures

	Pearson's (point-biserial) Correlation		
	WAC measures ^a		Attitude toward wolves
	In my state	Nationwide	
Prior behavior and behavioral intentions			
Prior stewardship behavior			
A. Donated to an organization that supports wolf recovery	.52	.56	.55
B. Contacted your congressperson in support of wolf recovery	.56	.59	.58
C. Written a letter to newspaper in support of wolf recovery	.30	.31	.30
- Prior Stewardship: (Sum of items A–C)	.60	.63	.62
Prior intolerant behavior			
E. Donated to an organization that opposes wolf recovery	–.48	–.56	–.55
F. Contacted your congressperson in opposition to wolf recovery	–.52	–.60	–.60
G. Written a letter to newspaper in opposition to wolf recovery	–.25	–.25	–.25
- Prior Intolerance (Sum of items E–G)	–.57	–.65	–.65
- Composite behavioral measure [(A+B+C) – (E+F+G)]	.70	.76	.75
Mean absolute correlation with behavioral measures:	.44	.48	.47
Stewardship intentions			
F. Write your congressperson in support of further wolf recovery efforts	.70	.75	.74
G. Contribute to an organization that supports further wolf recovery efforts	.78	.84	.81
H. Sign a petition in support of further wolf reintroductions	.78	.84	.81
I. Write a letter to the editor of your local newspaper in support of wolf recovery	.71	.77	.75
- Stewardship Intentions (Sum of items F–I)	.79	.85	.83
Intolerant intentions			
J. Write your congressperson to oppose further wolf recovery efforts	–.69	–.76	–.77
K. Contribute to an organization that opposes further wolf recovery efforts	–.76	–.84	–.85

(Continued)

Table 2
(Continued)

	Pearson's (point-biserial) Correlation		
	WAC measures ^a		Attitude toward wolves
	In my state	Nationwide	
Prior behavior and behavioral intentions			
L. Sign a petition to stop any further wolf reintroductions by the federal government	-.78	-.86	-.85
M. Write a letter to the editor of your local newspaper opposing wolf recovery	-.73	-.79	-.81
N. Shoot a wolf if you saw one.	-.67	-.70	-.70
- Intolerant Intentions (Sum of items J-N)	-.80	-.88	-.88
- Composite measure of wolf conservation intentions	.83	.90	.90
Mean absolute correlation with behavioral intention measures:	.74	.80	.80

^aAll correlations were significant at $p > .001$.

Similarly, there was a strong negative association between attitudinal measures and the composite measure of *prior intolerance* (in home state: $R = -.57$, $n = 668$; nationwide: $R = -.65$, $n = 667$; attitude: $R = -.65$, $n = 689$).

Correlations between attitudinal measures and single-item measures of behavioral intention were all significant ($p < .001$) and ranged from $R = .70$ to $.85$ (Table 2). We found a strong relationship between each attitudinal measure and *stewardship intentions* (in my state: $R = .79$, $n = 668$, $p < .001$; nationwide: $R = .85$, $n = 667$; $p < .001$; attitude: $R = .83$, $n = 689$, $p < .001$), as well as *intolerant intentions* (in my state: $R = -.80$, $n = 668$, $p < .001$; nationwide: $R = -.88$, $n = 667$, $p < .001$; attitude: $R = -.88$, $n = 689$, $p < .001$).

Following Weigel and Newman (1976) and Fishbein and Ajzen (1974) we calculated the average absolute correlation between each of the three prior political behaviors and each of the four attitudinal measures, as well as the average absolute correlation between each of the nine behavioral intentions and the four attitudinal measures. The mean correlation between all behavioral items and each of the attitudinal measures was $R = .44$ (in home state), $R = .48$ (nationwide), and $R = .47$ (attitudes; see Table 2). The mean correlation between behavioral intention measures and attitudinal measures was $R = .74$ (in home state), $R = .80$ (nationwide), and $R = .80$ (attitudes). As expected, the correlation between attitudinal measures and all three composite measures of behavior (i.e., prior stewardship, prior intolerance, all prior behavior) were greater than the mean correlation between attitudinal measures and individual behavioral measures (Figure 1). A 95% confidence interval drawn around the mean correlations between attitudinal and individual behavioral measures did not overlap with confidence intervals drawn around the correlations between attitudinal measures and behavioral indices. Likewise, the correlation between attitudinal measures and all three composite behavioral intention measures

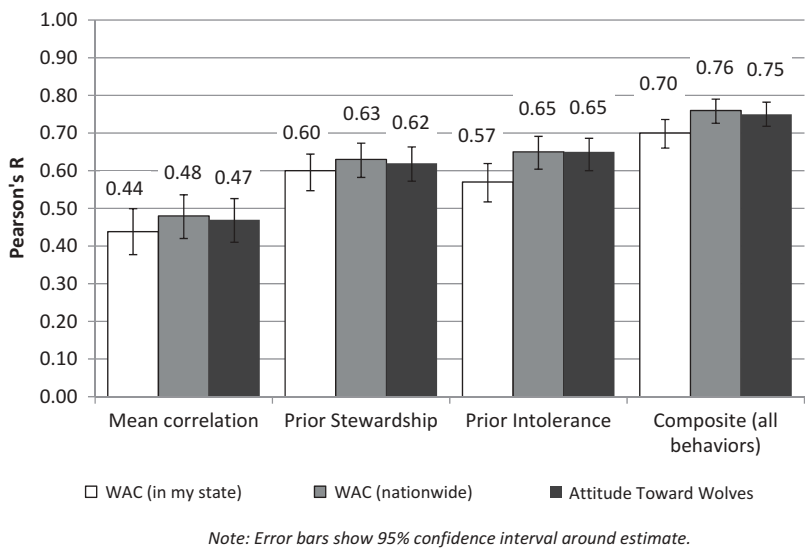


Figure 1. Correlation between attitudinal measures and prior behaviors.

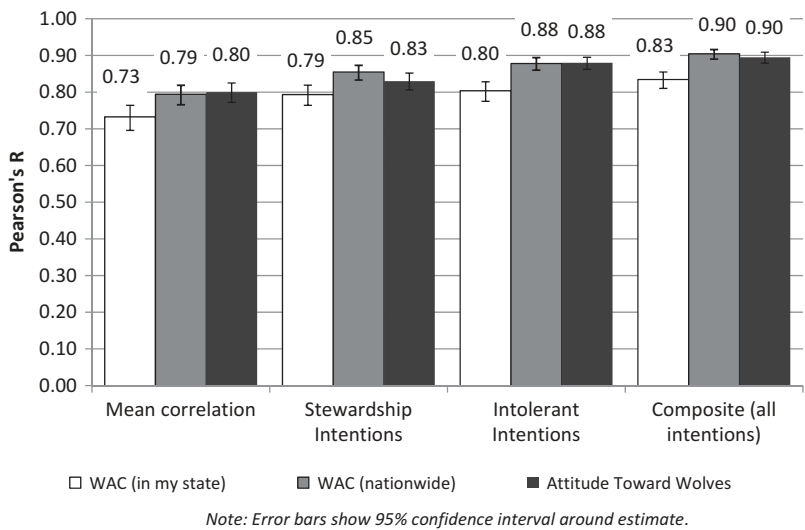


Figure 2. Correlation between attitudinal measures and behavioral intentions.

was greater than the mean correlation between attitudinal measures and individual behavioral intention measures (Figure 2). A 95% confidence interval drawn around the mean correlations between attitudinal measures and behavioral intentions overlapped only with confidence interval drawn around the index of stewardship intentions. We conclude that the use of multi-item indices of past behavior and behavioral intention generally improved the strength of the relationship between attitudinal measures and behavioral measures over what was observed in single-item measures.

Discussion

Our data offer some empirical evidence on the long debate in the field of social psychology regarding the consistency between attitudes and behavior (e.g., Ajzen & Fishbein, 2005; Fazio & Zanna, 1978b; Krosnick, 1988; LaPiere, 1934; Wicker, 1969). Ajzen and Fishbein (2005, p.184) succinctly summarized prior research on attitude–behavior correspondence; they noted that “general attitudes toward physical objects, institutions, ethnic or religious groups, and so on are good predictors of behavioral patterns or multiple-act criteria” whereas single behaviors are best explained by attitudes toward specific behaviors. Following prior research linking general attitudes to a broad class of behavior, our study found strong associations between commonly employed measures of attitudes toward wildlife (wolves) and measures of prior behavior toward wolves, as well as intention to engage in future behaviors related to that species.

Similar to the findings of Weigel and Newman (1976) and Fishbein and Ajzen (1974), our results demonstrated that the strength of the association between general attitudinal measures of tolerance and behavioral measures increased when individual behavioral measures were summed into composite “multi-act” scores. However, in contrast to these studies, *all* of our individual behavioral measures also exhibited significant correlations with the attitudinal measures. Three of the six measures of prior behavior and all nine measures of behavioral intention exhibited correlations with WAC (in home state) that Vaske (2008, p. 108) calls “substantial” (i.e., $>.50$)—meaning the effect size was relatively large. This result may be due to the fact that our study targeted an issue public consisting of extremely motivated people who were generally interested and involved in the wolf issue. Prior research suggests that the consistency between attitudes and behaviors is increased when people are highly involved, believe an issue is important, or are confident about their attitudes (Fazio & Zanna, 1978a, 1978b; Krosnick, 1988; Krosnick & Petty, 1995). In this regard, we again caution that these data should not be viewed as representative of the general public. In particular, we would expect the behaviors assessed to be far less frequent in the general population—which could serve to attenuate the relationship between attitudes (i.e., WAC) and single item measures of behavior witnessed in this study (however, see Wilson & Bruskotter, 2009).

The strong correlation between WAC measures and the behavioral measures suggests WAC is a valid measure of tolerance for wildlife, and supports Treves’ (2012) view that tolerance can be assessed either by measuring attitudes or behaviors. We note that WAC/attitudinal measures of tolerance may be particularly useful when researchers are limited in the number of items they can employ, or when they believe their study population may be motivated not to answer behavioral measures honestly (e.g., as when one is asked to report on illegal activities such as poaching). However, our study also exposes a potential weakness in studies that rely on such attitudinal measures. Such measures do not provide any specific information on the behaviors in which individuals have previously or are likely to engage. This limitation of WAC hampers researchers’ ability to predict specific types of behavior, and therefore, make specific policy recommendations.

Some researchers may question why we did not seek to determine the reliability of our composite behavioral measures. The use of multi-item scales for measurement of psychological constructs assumes that each item is a “parallel measure” of the latent construct of interest (Crocker & Algina, 1986; Nunnally & Bernstein, 1994). Items are expected to be highly correlated, although they often are not (Noar, 2003). In contrast, we had no reason to believe that these behaviors represented equivalent, parallel measures of stewardship or

intolerance; rather, each individual measure represents a distinct behavior (or intentions), which likely require different levels of motivations and different skills to undertake.

Additional research is needed to more fully develop measures of intolerance and stewardship. The list of items employed in this study was limited to just six prior behaviors. Research should seek to develop a more comprehensive list of behaviors and behavioral intentions; preferably, one that can be applied across various species and taxa. In particular, while a number of items employed in this study capture politically relevant behaviors (e.g., writing one's congressperson), only one (writing one's newspaper) captures socially relevant behavior. Thus, we may be explaining behavior on the ends of the continuum quite well, while missing out on more "passive" forms of intolerance based on the level of effort required (e.g., complaining to one's neighbor, posting responses on internet blogs) and stewardship. Future studies may find the measurement of passive behaviors allows for a more nuanced understanding of behaviors relevant to wildlife conservation.

Our results provide a precautionary tale for agencies interested in assessing stakeholder/public tolerance for wildlife. Specifically, using prior self-reports of individual behaviors indicates between 4% to 22% of those sampled are intolerant, depending on which item one uses; however, use of the composite behavioral measure indicates that 26% of those sampled have engaged in an intolerant behavior in the previous six months. Likewise, while only 16% of our sample indicated they would be likely or very likely to "shoot a wolf if [they] saw one," 43% suggested they would be likely or very likely to "sign a petition to stop any further wolf reintroductions by the federal government" if given the opportunity. If we think of each behavioral measure as a "test" the lesson becomes clearer: use of single item measures increases the risk of a "false negative" (or Type II error). This increased risk occurs because there are a variety of relevant behaviors through which one may express their intolerance for a species. Researchers who intend to estimate tolerant or intolerant behavior in a population can generate more accurate estimates by employing multiple behavioral measures. Without multiple measures, the risk of falsely classifying someone as tolerant or intolerant increases substantially. Conversely, while our study finds that attitudinal measures of tolerance are strongly associated with political behaviors aimed at wildlife, these measures provide no information about the types of behaviors in which people have engaged, nor any information regarding what they intend to do in the future. Thus, while they may be useful for gauging tolerance generally, they are not useful when specific information is needed to inform management action or develop policy.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracín, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes* (pp. 173–221). Mahwah, NJ: Lawrence Erlbaum Associates.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, 40, 471–499.
- Bright, A. D., & Manfredi, M. J. (1996). A conceptual model of attitudes toward natural resource issues: A case study of wolf reintroduction. *Human Dimensions of Wildlife*, 1, 1–21.
- Bruskotter, J. T., & Fulton, D. C. (2012). Will hunters steward wolves? A comment on Treves and Martin. *Society & Natural Resources*, 25, 97–102.

- Bruskotter, J. T., Toman, E.,ENZLER, S. A., & Schmidt, R. H. (2010). Gray wolves: Not out of the woods yet. *Science*, 327, 30–31.
- Carpenter, L. H., Decker, D. J., & Lipscomb, J. F. (2000). Stakeholder acceptance capacity in wildlife management. *Human Dimensions of Wildlife*, 5, 5–19.
- Converse, P. (1964). The nature of belief systems in mass publics. In D. Apter (Ed.), *Ideology and discontent* (pp. 206–261). New York, NY: Free Press.
- Crocker, L. M., & Algina, J. (1986). *Introduction to classical and modern test theory*. New York, NY: Holt, Rinehart, and Winston.
- Decker, D. J. & Purdy, K. G. (1988). Toward a concept of wildlife acceptance capacity in wildlife management. *Wildlife Society Bulletin*, 16, 53–57.
- Delibes-Mateos, M. (2014). Negative attitudes towards predators do not necessarily result in their killing. *Oryx*, 48, p. 16.
- Fazio, R. H., & Zanna, M. P. (1978a). Attitudinal qualities relating to the strength of the attitude-behavior relationship. *Journal of Experimental Social Psychology*, 14, 398–408.
- Fazio, R. H., & Zanna, M. P. (1978b). On the predictive validity of attitudes: The roles of direct experience and confidence. *Journal of Personality*, 46, 228.
- Fishbein, M., & Ajzen, I. (1974). Attitudes towards objects as predictors of single and multiple behavioral criteria. *Psychological Review*, 81, 59–74.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Gigliotti, L., Decker, D. J., & Carpenter, L. H. (2000). Developing the wildlife stakeholder acceptance capacity concept: Research needed. *Human Dimensions of Wildlife*, 5, 76–82.
- Krosnick, J. A. (1988). The role of attitude importance in social evaluation. *Journal of Personality and Social Psychology*, 55, 196–210.
- Krosnick, J. A., Holbrook, A. L., & Visser, P. S. (2000). The impact of the fall 1997 debate about global warming on American public opinion. *Public Understanding of Science*, 9, 239–260.
- Krosnick, J. A., & Petty, R. E. (1995). Attitude strength: An overview. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 1–24). Mahwah, NJ: Lawrence Erlbaum Associates.
- LaPiere, R. T. (1934). Attitudes vs. actions. *Social Forces*, 13, 230–237.
- Linn, L. S. (1965). Verbal attitudes and overt behavior: A study of racial discrimination. *Social Forces*, 43, 353–364.
- Naughton-Treves, L., Grossberg, R., & Treves, A. (2003). Paying for tolerance: The impact of livestock depredation and compensation payments on rural citizens' attitudes toward wolves. *Conservation Biology*, 17, 1500–1511.
- Noar, S. M. (2003). The role of structural equation modeling in scale development. *Structural Equation Modeling*, 10, 622–647.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. New York, NY: McGraw-Hill.
- Riley, S. J., & Decker, D. J. (2000). Wildlife stakeholder acceptance capacity for cougars in Montana. *Wildlife Society Bulletin*, 28, 931–939.
- Schneider, D. J. (2004). *The psychology of stereotyping*. New York, NY: Guilford Press.
- Slagle, K. M., Bruskotter, J. T., & Wilson, R. S. (2012). The role of affect in public support and opposition to wolf management. *Human Dimensions of Wildlife*, 17(1), 44–57.
- Soto-Shoender, J. R., & Main, M. B. (2013). Differences in stakeholder perceptions of the jaguar *Panthera onca* and puma *Puma concolor* in the tropical lowlands of Guatemala. *Oryx*, 47, 109–112.
- Treves, A. (2009). Hunting for large carnivore conservation. *Journal of Applied Ecology*, 46, 1350–1356.
- Treves, A. (2012). Tolerant attitudes reflect an intent to steward: A reply to Bruskotter and Fulton. *Society & Natural Resources*, 25, 103–104.
- Treves, A., & Bruskotter, J. T. (2014). Tolerance for predatory wildlife. *Science*, 344, 476–477.
- Treves, A., & Martin, K. A. (2011). Hunters as stewards of wolves in Wisconsin and the Northern Rocky Mountains, USA. *Society and Natural Resources*, 24(9), 984–994.

- Vaske, J. J. (2008). *Survey research and analysis: Applications in parks, recreation and human dimensions*. State College, PA: Venture Publishing.
- Weigel, R. H., & Newman, L. (1976). Increasing attitude-behavior correspondence by broadening the scope of the behavioral measure. *Journal of Personality and Social Psychology*, 33, 793–802.
- Wicker, A. W. (1969). Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects. *Journal of Social Issues*, 25, 41–78.
- Wilson, R. S., & Bruskotter, J. T. (2009). Assessing the impact of decision frame and existing attitudes on support for wolf restoration in the United States. *Human Dimensions of Wildlife*, 14, 353–365.