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Research Article

The Role of Cognitions and Emotions in Human–Coyote Interactions

CARLY C. SPONARSKI,¹ JERRY J. VASKE,²
AND ALISTAIR J. BATH¹

¹Department of Geography, Memorial University, St. John's, Newfoundland, Canada

²Human Dimensions of Natural Resources, Colorado State University, Fort Collins, Colorado, USA

In this article, emotional and cognitive variables were used to explain reactions to human–coyote interactions. Anticipated emotional dispositions were hypothesized to mediate the influence of general attitude and symbolic existence beliefs toward coyotes on acceptability of killing a coyote. Residents around Cape Breton Highlands National Park in Canada were mailed a questionnaire in 2011 (n = 556; response rate = 70%). Acceptability of killing a coyote was evaluated for three situations: (a) a coyote crossed the trail, (b) a coyote approached you, and (c) a snarling coyote approached you. In all three scenarios, symbolic existence beliefs and anticipated emotional dispositions directly influenced acceptability of lethal management. Emotional dispositions also mediated the relationship between attitudes and symbolic existence beliefs on lethal management in all scenarios except for scenario 3 (snarling coyote). Acceptability of lethal control was best explained by symbolic beliefs, followed by anticipated emotional disposition.

Keywords attitudes, existence beliefs, emotions, human–coyote interaction, lethal control

Introduction

Cognitions are mental processes used in perceiving, remembering, thinking, and understanding, as well as the act of using these processes (Vaske & Manfredo, 2012). These cognitions have been arranged in a “hierarchy” from general to specific (Fulton, Manfredo, & Lipscomb, 1996). Human dimensions research has applied this “cognitive hierarchy” to wildlife (Bright, Manfredo, & Fulton, 2000; Manfredo, 2008; Whittaker, Vaske, & Manfredo, 2006), wildfire (Absher, Vaske, & Shelby, 2009), and forest planning issues (Vaske & Donnelly, 1999).

Address correspondence to Carly C. Sponarski, Geography Department, Science Building, Memorial University, 384 Elizabeth Avenue, A1B 3X9, St. John's, NL, Canada. E-mail: csponarski@gmail.com

The specificity principle lies at the heart of this line of research (Whittaker et al., 2006). Specificity refers to the level of measurement correspondence among concepts. When concepts are measured at the same or similar levels, correlations among the concepts have been shown to be larger (Fishbein & Ajzen, 1975). Specific cognitions, for example, are more likely to predict specific behaviors than more general cognitions (Rokeach, 1973). The influence of general cognitions on more specific cognitions, however, has also been studied in the human dimensions literature (Bruskotter, Vaske, & Schmidt, 2009; Fulton et al., 1996; Manfredo, Teel, & Henry, 2009).

Studies using the cognitive hierarchy typically explain approximately 50% of the variability in an individual's approval or disapproval of a management action such as lethal control of wildlife (Vaske, Roemer, & Taylor, 2013). Researchers have suggested that emotions might account for some of the remaining variability, and initial research into the role of emotions has shown promise in providing greater understanding of human–wildlife interactions (Jacobs, Vaske, & Roemer, 2012; Vaske et al., 2013). Understanding the roles of cognitive and emotional concepts that influence acceptance of wildlife management actions may provide insight for targeting outreach to support conservation. This article examined relationships between emotions and concepts in the cognitive hierarchy within the context of lethal control of coyotes.

Emotional Dispositions

Although the definition of *emotions* is debated (Izard, 2007), there is agreement that they consist of four components: (a) physiological responses such as increasing heart rate, (b) physical expressions such as frowning, (c) behavioral responses such as running, and (d) cognitively experiencing the emotion such as worry or fear (Bradley & Lang, 2000; Jacobs, Vaske, Dubois, & Fehres, 2014). Emotions are the physiological and behavioral responses to a situation, and they can initiate and drive human attraction or aversion toward wildlife (Manfredo, 2008). *Emotional dispositions* involve the cognitive understanding or reflection on the emotions experienced. For example, human emotional dispositions toward interactions with wildlife (e.g., attacks on humans, depredation of livestock) often elicit strong memories (Vaske et al., 2013), influence attitudes toward wildlife (Ajzen, 2005), and inform decisions regarding behavior toward wildlife (Slagle, Bruskotter, & Wilson, 2012).

Emotional dispositions have been used to study emotions toward wildlife (Jacobs et al., 2012). When emotions are measured as traits, the disposition reflects who a person is now or in the past. Traits are always present, even if they are not active, and like all mental dispositions, emotional dispositions can be examined through reflection (e.g., the reflection of the feeling of being scared when seeing a bear). Emotional dispositions are mental traits that act as criteria against which the emotional relevance of stimuli is judged.

In this article, the specificity principle is used to understand how anticipated emotional dispositions for specific scenarios influence the acceptability of lethal coyote control. Using previous research on emotions by Izard (2007) and Jacobs et al. (2014), discrete emotional dispositions were used to ascertain the anticipated emotional state of respondents. These discrete emotions are assumed to be different qualitatively and can be communicated using culturally recognized adjectives such as fear, joy, or anger (Izard, 2007).

Minimal human dimensions research has explored some aspects of emotions. Both self-reported fear toward a species and perceived risk, for example, have been examined as human responses toward carnivore species (Arrindell, 2000; Davey et al., 1998; Kaltenborn, Bjerke, & Nyahongo, 2006; Tucker & Bond, 1997). Fear of carnivores has been shown

to be greater than fear of physically non-threatening species such as birds (Davey et al., 1998). Fear also tends to be greater when asking people about specific species or scenarios versus more general statements (Kaltenborn et al., 2006). Different species and different contexts result in different levels of fear toward carnivores (Jacobs et al., 2014). Likewise, Johansson and Karlsson (2011) examined fear of brown bears and wolves. Fear was linked to the perceived danger the animal posed and the perceived uncontrollability of the animal. Perceived unpredictability of the animal's movements and feelings of disgust played less of a role in fear responses. The appraisal dimensions (i.e., potential harm, uncontrollability) in the fear of bears and wolves could be due to the animal's physical attributes (e.g., sharp teeth, size) and attacks on people by these species (Flykt, Johansson, Karlsson, Lindeberg, & Lipp, 2013).

Recent research has explored relationships between emotions and management policy (Jacobs et al., 2014). As fear of carnivores increased, willingness to pay for management decreased (Johansson, Sjöström, Karlsson, & Brännlund, 2012). Anger about the presence of wolves, sympathy for wolves, and sympathy for ranchers influenced acceptability of using lethal control in wolf management (Vaske et al., 2013). Similarly, both positive and negative emotions influence beliefs about wolf recovery (Slagle et al., 2012).

Emotional Dispositions in Relation to Cognitions

Relationships between beliefs and attitudes have been explored extensively in human dimensions (Manfredo, 2008). Psychologists define attitudes as a mental state reflected by cognitive (beliefs) and affective (e.g., emotions) components (Eagly & Chaiken, 1993; Manfredo & Fulton, 1997). Attitudes represent negative or positive evaluations of a general or specific object (Vaske & Manfredo, 2012). For example, a general attitude might refer to an individual's overall evaluation of coyotes across different contexts, whereas a specific attitude might focus on his or her evaluation of coyotes in Cape Breton National Park of Canada (CBHNPC) when hiking in the summer of 2014. Research has shown that people with positive attitudes toward a species are less likely to support the use of lethal control to manage the species (Bremner & Park, 2007; Bruskotter et al., 2009; Infield, 2003; Kellert, 1985; Zinn, Manfredo, Vaske, & Wittmann, 1998). This article examined the influence of general attitudes toward coyotes on specific anticipated emotional dispositions and acceptability of lethal management of the species.

Beliefs are what people think are true, but are not necessarily true in fact (Vaske & Manfredo, 2012). Like attitudes, beliefs are not static, but can change depending on the situation (Vaske & Whittaker, 2004). For the purposes of this research, symbolic existence beliefs focused on general beliefs about coyotes in an area (e.g., whether the species has the right to exist). General symbolic existence beliefs were predicted to influence a specific anticipated emotional disposition and the acceptability of lethal control.

Acceptability of lethal control has been defined as a normative belief (or norm). There are various ways to conceptualize norms (see Vaske & Whittaker, 2004, for review). Normative beliefs of the acceptability of wildlife management actions can be defined as "shared beliefs concerning the acceptability of a particular action or situation" (Bruskotter et al., 2009, p. 120). This conceptual approach has been used to examine the acceptability of different wildlife management actions (Bruskotter et al., 2009; Needham, Vaske, & Manfredo, 2004; Zinn et al., 1998) across a variety of situations such as managing chronic wasting disease (Needham et al., 2004), wolves (Bruskotter et al., 2009), feral cats (Lloyd & Miller, 2010), and coyotes (Vaske & Needham, 2007).

Hypotheses

Based on the specificity principle (i.e., general to specific), general attitude toward coyotes and general symbolic existence beliefs were predicted to influence specific anticipated emotional dispositions linked to different scenarios, and these emotions and cognitions were predicted to influence acceptability of lethal control. The hypothesized relationships are shown in [Figure 1](#):

- H1 Individuals with a positive general attitude toward coyotes are less accepting of lethal control of this species.
- H2 Individuals with a positive general attitude toward coyotes express less extreme emotional dispositions toward this species (e.g., less nervous, tense, upset, scared).
- H3 Individuals with positive symbolic existence beliefs toward coyotes are less accepting of lethal control of this species.
- H4 Individuals with positive symbolic existence beliefs toward coyotes have less extreme emotional dispositions (e.g., less nervous, tense, upset, scared).
- H5 Individuals with less extreme emotional dispositions (e.g., less nervous, tense, upset, scared) toward coyotes are less accepting of lethal control of this species.
- H6 Emotional disposition will mediate the influence of general attitude and existence beliefs on the acceptability of a specific lethal management action (i.e., killing a coyote—an agency behavior).

Study Context

Coyotes naturally dispersed into the province of Nova Scotia around 1977 (Moore & Millar, 1986) and onto the island of Cape Breton in the 1980s (E. Muntz, personal communication, January 2011). Negative human–coyote interactions (e.g., attacks on domestic pets, following people) have occurred on the island, including an internationally publicized incident where a coyote killed a human in Cape Breton Highlands National Park in 2009. This fatality and the associated media coverage likely heightened fear among residents. Researchers have shown that negative media attention influences fear of a species (Røskraft, Bjerke, Kaltenborn, Linnell, & Andersen, 2003).

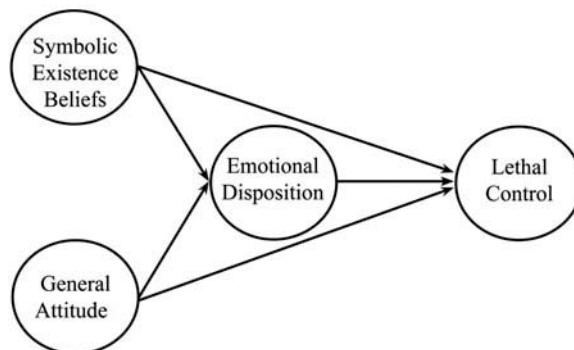


Figure 1. Hypothesized relationships among general attitude, existence beliefs, emotional disposition, and lethal control.

Methods

Sampling Protocol

Data were obtained in the fall of 2011 from randomly selected residents (age ≥ 18) living around CBHNP in the Inverness and Victoria Counties on Cape Breton Island. Given that many people in this area still have a landline number (due to poor cellular telephone reception) and are listed in the telephone book, telephone directories were used as the sampling frame. Telephone calls were used to contact 800 participants (response rate = 76%) and: (a) select the individual in the household whose birthday was coming up next and who was older than 18 years of age, (b) confirm willingness to participate, and (c) verify the participant's mailing address.

Residents were then mailed questionnaire packages (i.e., cover letter, questionnaire, return postmarked envelope). Two weeks after the initial mailing, all participants were mailed a reminder postcard. Individuals who had not responded two weeks after this reminder postcard were mailed a second questionnaire package. Budget constraints did not allow any additional contacts. The response rate for the mailed questionnaire was 70% ($n = 556$ usable questionnaires).

Variables in Model

This article focused on 13 observed items, organized in four latent constructs: general attitude toward coyotes (3 items), general symbolic existence beliefs toward coyotes (3 items), specific anticipated emotional disposition (4 items per scenario), and the acceptability of lethal coyote management (1 item per scenario * 3 scenarios). All questions were originally asked on a 7-point scale from 1 to 7 and were then recoded from -3 to $+3$ during analyses.

The three attitudinal questions were: "In general do you think of coyotes as: (a) good/bad; (b) beneficial/harmful; and (c) positive/negative?" Each attitude was measured on the 7-point scale. For example, for the question, "In general do you think of coyotes as beneficial/harmful," the recoded scale was *extremely harmful* (-3), *moderately harmful* (-2), *slightly harmful* (-1), *neither* (0), *slightly beneficial* (1), *moderately beneficial* (2), and *extremely beneficial* (3). The same scale, replacing the adjective, was used for the "good/bad" and "positive/negative" questions.

The general symbolic existence belief items were: (a) "coyotes have a right to exist in Cape Breton Highlands National Park"; (b) "the presence of coyotes in Cape Breton Highlands National Park is a sign of a healthy environment"; and (c) "I may never see a coyote, but it is important to know they exist in the park." Items were measured on 7-point recoded scales of *strongly disagree* (-3) to *strongly agree* (3).

The four specific anticipated emotional disposition questions were scenario-based. The scenarios were: (a) "seeing a coyote"; (b) "a coyote approaches you"; and (c) "a coyote approaches you, snarling." Each anticipated emotional disposition was measured on 7-point semantic differential scales. For example, Scenario 1 asked: "If you were walking on a trail in the park and saw a coyote cross the trail ahead of you, to what extent would you feel: (a) relaxed/nervous; (b) calm/tense; (c) pleased/upset; and (d) not scared/scared?" The recoded scales ranged, for example, from *relaxed* (-3) to *nervous* (3). These four anticipated emotional dispositions were asked in each scenario.

The lethal control norm was "how unacceptable or acceptable would it be for Parks Canada to kill the coyote?" This question was also based on the three scenarios and measured on 7-point recoded scales of *extremely unacceptable* (-3) to *extremely acceptable* (3).

Analysis

Confirmatory factor analysis was used to empirically verify the legitimacy of the conceptual distinctions among the observed variables. Internal consistency (i.e., measurement reliability) of the general existence beliefs, general attitudes, and specific emotional disposition latent concepts were investigated using Cronbach's alpha (Cronbach, 1951; Vaske, 2008). A structural equation model was used to assess relationships among the latent concepts. For each scenario, Lisrel 8.8 was used to fit two separate models (full vs. partial mediation) using the covariance matrix. The overall model fit was examined using a variety of goodness-of-fit indices, including chi-square ($\Delta\chi^2$, χ^2/df), comparative fit index (CFI; an acceptable CFI value $> .90$), root mean square error of approximation (RMSEA; an acceptable RMSEA value $.05 > .08$), and normed fit index (NFI; an acceptable NFI value $> .95$) (Hu & Bentler, 1999).

Results

Measurement Models

Confirmatory factor analysis empirically verified the legitimacy of the conceptual distinctions among the observed variables and latent constructs. All of the items loaded on their associated constructs with all factor loadings $\geq .68$ on the latent variable (Figure 2) except for the third belief observed variable (BEL3) that had factor loadings of .40. The three items measuring general attitude toward coyotes had a Cronbach's alpha reliability of .92 and for the three items in the general symbolic existence beliefs toward coyotes scale, alpha was .69 (Table 1). Reliabilities for the three anticipated emotional dispositions were: (a) scenario 1 = .90, (b) scenario 2 = .91, and (c) scenario 3 = .86.

On average, resident responses were slightly below neutral on each of the three attitude items (i.e., $M = -.89$ [bad], -1.17 [harmful], $-.91$ [negative], Table 1), but they held slightly positive symbolic existence beliefs (i.e., $M = .56, .06, .97$). As the severity of the scenario increased from scenario 1 to 3, the anticipated emotional dispositions were progressively more negative (i.e., more nervous, tense, upset, scared). The acceptability of lethal management also increased as the severity of the scenarios increased (i.e., $M = -.04, .09, 1.00$).

Structural Models

Scenario 1—Seeing a Coyote. The fit indices for the model were acceptable ($\chi^2/df = 2.60$, NFI = .98, CFI = .99, RMSEA = .05) (Hu & Bentler, 1999) (Table 2). The data supported four of the five relationships hypothesized (Figure 3a). The first hypothesis (H_1) was not supported in scenario 1, as general attitude was not significantly related to the management option. Attitude was indirectly related to the acceptability of lethal control through the emotional disposition. Symbolic existence belief was directly related to the management option and indirectly through emotional disposition.

In scenario 1, for individuals with a positive general attitude toward coyotes, the specific emotional disposition was less extreme ($\beta = -.35$, $p < .05$, H_2). For individuals with positive symbolic existence beliefs toward coyotes, the emotional disposition was less extreme ($\beta = -.14$; $p \leq .05$, H_4), and acceptance of lethal management decreased ($\beta = -.50$; $p < .05$, H_3). As the emotional disposition became more extreme (i.e., more nervous, tense, upset, scared), acceptance of lethal management increased ($\beta = .17$; $p < .05$, H_5).

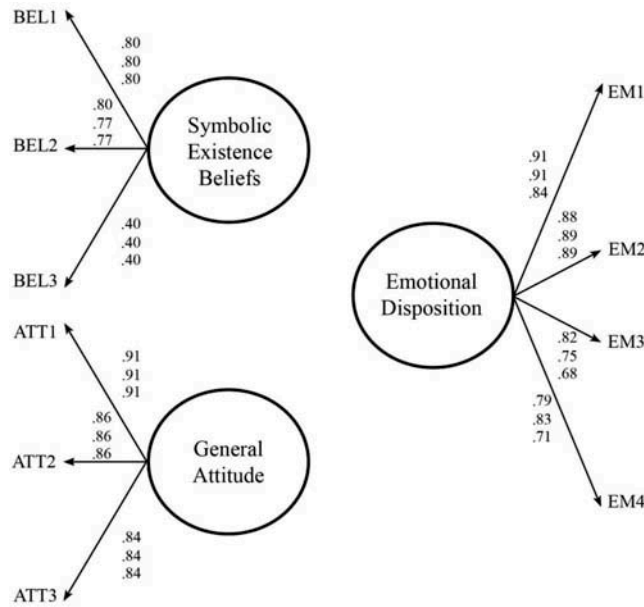


Figure 2. The factor loadings for the confirmatory factor analysis of the three latent variables: Symbolic Existence Beliefs, General Attitude, and Emotional Dispositions. The factor loadings are presented for the three scenarios therefore the top loading is for scenario 1, followed by scenario 2, and then scenario 3.

General attitude did not influence acceptance of lethal control ($p > .05$, H1). Symbolic existence beliefs about coyotes were the strongest predictor of the acceptability of lethal control and attitude was the stronger predictor of anticipated emotional disposition. The model explained 20% of the variance in emotional disposition and 39% of the variance in acceptability of lethal control.

Scenario 2—Being Approached by a Coyote. For scenario 2, the fit indices for the model were acceptable ($\chi^2/df = 2.00$, NFI = .96, CFI = .99, RMSEA = .04; Table 2). The data supported four of the five relationships hypothesized (Figure 3b). Again, the first hypothesis (H1) was not supported, as general attitude was not significantly related to the management option. For scenario 2, general attitude had a significant relationship with the emotional disposition; as attitude toward coyotes became more positive, the emotional disposition was less extreme ($\beta = -.22$, $p < .05$, H2). As symbolic existence beliefs toward coyotes became more positive, the emotional disposition was less extreme ($\beta = -.20$; $p < .05$, H4), and acceptance of lethal management decreased ($\beta = -.50$; $p < .05$, H3). As the emotional disposition became more extreme (i.e., more nervous, tense, upset, scared), acceptance of lethal management increased ($\beta = .13$; $p < .05$, H5). Symbolic existence beliefs were the strongest predictor of the acceptability of lethal control, and attitude was the stronger predictor of anticipated emotional disposition. The amount of explained variance was 14% for emotional disposition and 34% for the acceptability of lethal control. These amounts of explained variance decreased in scenario 2 in comparison to scenario 1.

Table 1

Indicators for general attitudes and symbolic existence beliefs toward coyotes,
scenario-based emotional disposition, and acceptability of lethal control

Variable	Mean ^a	Standard Deviation	Cronbach Alpha if item deleted	Cronbach Alpha
<i>Attitudes Toward Coyotes^a</i>				.92
<i>In general do you think of a coyotes as . . .</i>				
ATT1	Good/bad	-.89	1.64	.87
ATT2	Beneficial/harmful	-1.17	1.72	.88
ATT3	Positive/negative	-.91	1.65	.90
<i>Symbolic Existence Beliefs^b</i>				.69
BEL1	Coyotes have a right to exist in Cape Breton Highlands National Park	.56	2.08	.48
BEL2	The presence of coyotes in Cape Breton Highlands National Park is a sign of a healthy environment	.06	1.97	.50
BEL3	I may never see a coyote but it is important to know they exist in the park.	.97	2.26	.76
<i>Emotional Disposition^c</i>				
<i>Scenario 1: coyote crosses the trail</i>				.90
ED1	Would you feel relaxed or nervous?	1.89	1.60	.87
ED2	Would you feel calm or tense?	1.63	1.85	.86
ED3	Would you feel pleased or upset?	1.34	1.90	.90
ED4	Would you feel not scared or scared?	1.62	1.73	.90
<i>Scenario 2: being approached by a coyote.</i>				.91
ED1	Would you feel relaxed or nervous?	2.18	1.37	.87
ED2	Would you feel calm or tense?	1.98	1.57	.87
ED3	Would you feel pleased or upset?	1.76	1.67	.91
ED4	Would you feel not scared or scared?	1.84	1.60	.88
<i>Scenario 3: being approached by a coyote, snarling.</i>				.86
ED1	Would you feel relaxed or nervous?	2.74	.88	.82
ED2	Would you feel calm or tense?	2.64	1.11	.79

(Continued)

Table 1
(Continued)

Variable		Mean ^a	Standard Deviation	Cronbach Alpha if item deleted	Cronbach Alpha
ED3	Would you feel pleased or upset?	2.55	1.21	.85	
ED4	Would you feel not scared or scared?	2.50	1.18	.84	
Management Option^d					
MO1	Scenario 1: How acceptable is it to kill a coyote	−.04	2.42		
MO1	Scenario 2: How acceptable is it to kill a coyote	.09	2.40		
MO1	Scenario 3: How acceptable is it to kill a coyote	1.00	2.31		

^aThe questions were on a 7-point semantic differential scale. For example, −3 = *bad* to +3 = *good*.

^bThe questions were on a 7-point scale of −3 = *strongly disagree* to +3 = *strongly agree*.

^cThe questions were on a 7-point semantic differential scale. For example, −3 = *relaxed* to +3 = *nervous*.

^dThere was one management option question per scenario therefore no reliability analysis was run on this latent variable. The questions were on a 7-point scale of −3 = *extremely unacceptable* to +3 = *extremely acceptable*.

Table 2
Goodness-of-fit Indices of the Structural Equation Models for scenarios 1, 2, and 3

Mediation models ^a	χ^2	<i>df</i>	<i>p</i> -value	χ^2/df	NFI	CFI	RMSEA
Scenario 1	98.98	38	<.05	2.60	.98	.99	.054
Scenario 2	72.36	38	<.05	2.00	.96	.99	.040
Scenario 3	88.55	38	<.05	2.33	.98	.99	.050

^aBoth partial and full mediation models were tested and the models presented were the best fit.

Scenario 3—Being Approached by a Snarling Coyote. For scenario 3, the fit indices for the model were acceptable ($\chi^2/df = 2.33$, NFI = .98, CFI = .99, RMSEA = .05) (Table 2). The data supported three of the five relationships hypothesized (Figure 3c). General attitude was statistically related to the acceptability of lethal control; as attitude toward coyotes became more positive, acceptance of lethal management decreased ($\beta = -.16$; $p < .05$, H1). As symbolic existence beliefs toward coyotes became more positive, acceptance of lethal management decreased ($\beta = -.50$; $p < .05$, H3). As anticipated emotional dispositions became more extreme (i.e., more nervous, tense, upset, scared), acceptance of lethal management increased ($\beta = .16$; $p < .05$, H5). The relationship between general attitude and anticipated emotional disposition was not significant ($\beta = -.04$, $p > .05$, H2), nor was the

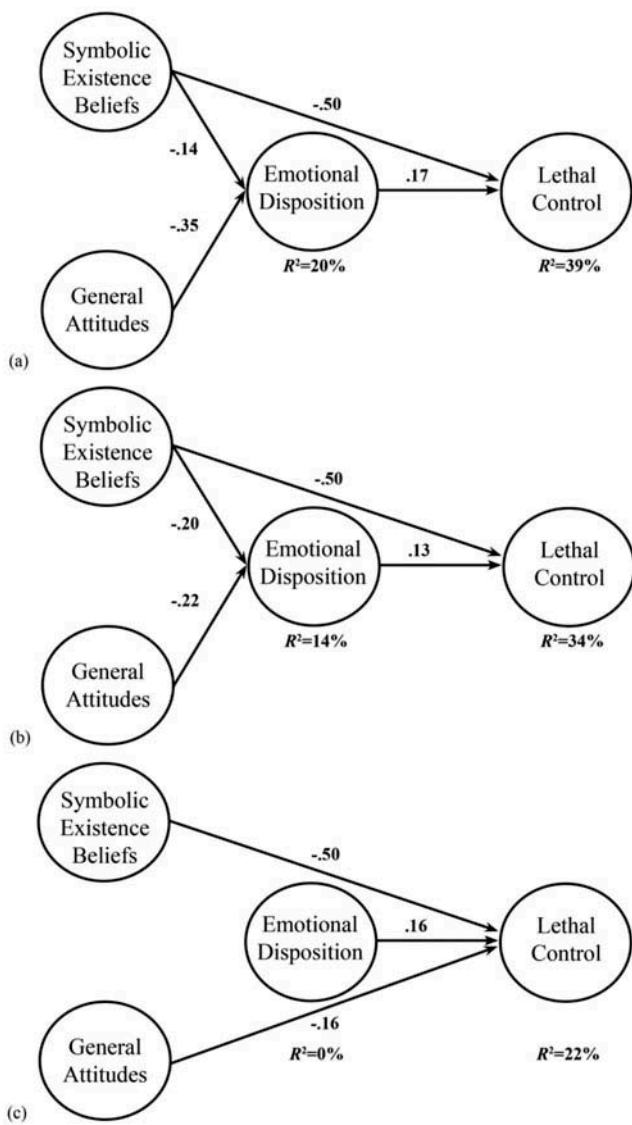


Figure 3. The Structural Equation Model for: (a) scenario 1: a coyote crosses the trail (b) scenario 2: a coyote approaches you, and (c) scenario 3: a coyote approaches you, snarling. Path coefficients are standardized regression coefficients. Only statistically significant coefficients ($p < .05$) are presented.

relationship between symbolic beliefs and emotional disposition ($\beta = -.04$, $p > .05$, H4). Symbolic existence beliefs were a stronger predictor of the acceptability of lethal control than anticipated emotional disposition and general attitudes. The amount of explained variance was 22% for the acceptability of lethal control. The amount of explained variance for emotional disposition and acceptability of lethal control decreased in scenario 3 in comparison to scenarios 1 and 2.

Emotional dispositions fully mediated the relationship between general attitudes and acceptability of lethal control in scenarios 1 and 2, but not scenario 3 (H6).

Emotional dispositions also partially mediated the relationship between existence beliefs and acceptability of lethal control in scenarios 1 and 2, but not scenario 3. Existence beliefs were significantly related to acceptability of lethal control in all three scenarios.

Discussion

Overall, two of the six hypotheses were supported by the findings across all three scenarios. Symbolic existence beliefs were a strong predictor of the acceptability of lethal control (H3), a weak predictor of emotional disposition in scenarios 1 and 2, and not a predictor of emotional disposition in scenario 3 (H4). Emotional disposition was a weak, but statistically significant predictor of lethal management (H5). General attitude was related to anticipated emotional disposition in two of the three models (H2), and attitudes were significantly related to acceptability of lethal control in scenario 3 only (H1). Emotional dispositions mediated the relationships between lethal control and both symbolic existence beliefs and general attitude in scenarios 1 and 2, but not 3 (H6). In the three scenarios, attitude and symbolic existence beliefs toward coyotes explained 20%, 14%, and 0% of the variance in emotional disposition. General attitude, symbolic existence beliefs, and anticipated emotional disposition explained 39%, 34%, and 22%, respectively, of the variance in lethal management. Explained variance decreased as the severity of the scenario increased from seeing a coyote cross a trail to a coyote snarling when approaching.

Theoretical Implications

Relatively few human dimensions studies have incorporated emotions into research, especially studies using the cognitive hierarchy. This limited attention on emotional responses can be attributed to at least three reasons. First, the wildlife professional has traditionally emphasized biological research and excluded emotional considerations from the decision-making process (Manfredo et al., 2009). Second, many human dimensions researchers have their disciplinary roots in sociology and psychology that have largely ignored emotions and emphasized behavioral responses (Forgas, 2000). Third, some emotions research has focused on physiological measures that necessitate laboratory-based experiments (Manfredo, 2008), and these studies can have limited implications for an applied field such as human dimensions of wildlife.

Exploration of emotional reactions to wildlife, however, holds considerable promise for future investigations (Manfredo, 2008). Emotions reflect a primal reaction to objects such as animals, and the rudiments of emotion are inherited and interact with cognitions to influence human behavior (Izard, 2007). Emotions can produce uncontrolled reactions (e.g., fear, rage, anger), but are essential to sound decision-making (Cacioppo & Gardner, 1999). Enhancing understanding of human behavior will ultimately occur by exploring interrelationships of cognitive concepts (e.g., attitudes, norms) with affective concepts such as emotions.

Emotional dispositions offer a starting point for examining emotional reactions in human–wildlife relationships. Results indicate that: (a) emotions are related to the acceptability of wildlife management actions and (b) emotional dispositions can be incorporated into a hierarchical model including cognitive concepts. It is important to note, however, that participants reported their anticipated emotional dispositions based on hypothetical situations, not actual interactions. Self-reporting could be influenced by personal experience (or lack thereof), and their own imagination of the hypothesized scenario. The findings demonstrate that emotions play a role in shaping normative acceptability judgments and suggest

that further research is warranted to generalize findings to other contexts. Collecting data on physiological responses may also prove useful (Armfield, 2007) in understanding emotional reactions in human–wildlife interactions.

The influence of anticipated emotions decreased as the severity of the human–coyote interaction increased. As the scenarios became more severe, most respondents reported strong negative emotional dispositions (e.g., nervous, tense). By scenario 3, nearly all respondents reported extremely negative and elevated levels of emotional dispositions. As would be expected, the lack of variability in anticipated emotional disposition responses decreased the amount of explained variance (Johansson & Karlsson, 2011) in the acceptability judgement concerning lethal control. The role of emotions is at least partially masked by the lack of variability and the role of emotional dispositions may be difficult to decipher due to natural reactions to more dangerous situations. If a bear charged a hiker, for example, the person's beliefs (i.e., whether the hiker supports conservation or not) and attitudes (whether the hiker likes bears or not) would become less relevant. The hiker's attention, energy, and cognition would concentrate on living/escaping, and the emotions would be heightened to support survival.

The amount of explained variance measured by emotional disposition has not been extensively explored in human–wildlife relationships (Johansson et al., 2012). Vaske et al. (2013) examined the role of emotional dispositions in relation to the acceptability of non-lethal and lethal wolf management actions. The emotional reaction by respondents to the use of non-lethal management was minimal (1% and 8% explained variance), whereas in the case of using lethal management, the explained variance increased (41% and 49%). Emotions came into play when a severe management action was taken (i.e., lethal). Explained variance may have increased in the lethal management scenario because the wolf's life and right to live may have been influenced by a person's beliefs. In the models examined, explained variance of emotion was tied to a person's fear of personal injury (i.e., coyote attack) and not to the animal's overall health (i.e., lethal management of a wolf). The type of emotional disposition may be tied to the primal instinct of survival, a different type of emotional response than whether or not to use lethal management and thus partially masking the role of emotions. The context of the emotional disposition and for whom it is being projected onto (i.e., saving the animal or saving self) may shift the amount of explained variance. In examples where the person's safety or life was jeopardized, there is little variance in the emotional disposition reported. This argument is speculative as survival instinct was not measured. The role and placement of emotional dispositions in relation to other cognitions requires further inquiry.

Applied Implications

Coyotes are one of the only species to expand their home range post-European settlement (Gehrt, Riley, & Cypher, 2010). Humans and coyotes come into conflict over a variety of interaction types (e.g., livestock depredation, eating pet food, approaching people) and on different landscapes (e.g., rural vs. urban). This research is set within the context of a national park surrounded by rural communities where residents living around the park generally fear coyotes (Sponarski, 2014) and potential interactions, but still value the species' existence on the landscape. Residents' general attitudes, on average, were negative, but those with positive beliefs are interesting considering the human fatality and other less severe attacks that have occurred in their backyards. Research has shown that the level of fear decreases and attitudes become more positive given the extent of time people that have lived with coyotes (Wieczorek Hudenko, Decker, & Siemer, 2008).

Coyotes naturally dispersed into the province of Nova Scotia, Canada in the 1980s (Moore & Millar, 1986) and the people on this island have had roughly 30 years to adapt to the presence of coyotes. Human–coyote interactions have increased media attention in the last decade (Alexander & Quinn, 2011); it is roughly within the last decade that people have become aware of the possible negative interactions with coyotes. Currently, residents value coyote presence in the area, but possess slightly negative attitudes toward this species (Sponarski, 2014). It is important for wildlife managers to understand that these two cognitive concepts influence the type of management protocols that residents would support. Emotional dispositions also influence the acceptability of lethal control. For example, the anticipated emotional disposition increased (e.g., more nervous, tense, upset, scared) as the severity of the scenario increased. Residents' response to severe human–coyote interactions heightened the emotional response, which was related to greater acceptance of lethal management.

Acceptance of lethal management was also related to symbolic existence beliefs, which had the strongest relationship with the acceptability of lethal control of coyotes in all three scenarios ($\beta = -.50$ in all three scenarios). The amount of time that coyotes have been in Cape Breton could positively influence human attitudes and beliefs toward coyotes. Hudenko, Siemer, and Decker (2008) found that attitudes were more positive and risk perception concerning coyotes decreased with longer periods of coyote presence. Before the coyotes colonized Cape Breton, residents had lived without carnivores on the island. Currently, the average existence beliefs in this study suggest that, on average, residents do believe that coyotes should exist, but only to a slight degree. Given that existence beliefs had the strongest relationship with acceptability of lethal control, managers should try to increase people's positive beliefs about coyotes.

Future Research

The scenarios presented in this article were brief descriptions of specific human–coyote interactions, and these short descriptions focused on anticipated emotional dispositions. Given that the scenarios provided limited context of the potential interaction, respondents may have over or under estimated their anticipated emotional disposition. Future research should elaborate on the scenarios and detail specifics of the context. Alternatively, respondents could be shown images or videos of scenarios to provide a visual and potentially auditory experience. For example, respondents to the mailed questionnaire could be provided a link to an online video or asked to take the questionnaire online completely. Park visitors could watch a video on a tablet (e.g., iPad) and then complete a paper and pencil questionnaire or answer questions on the tablet. The portability of technology and access to the Internet could be used creatively in studies such as this one in the future.

The mean response in emotional dispositions to the most severe scenario, a coyote approaches snarling, ranged between 2.50 and 2.74 (maximum = 3). In this scenario, the majority of people reported a strong emotional response of fear. Other appraisal dimensions such as danger, unpredictability, and uncontrollability were not examined in terms of human–coyote interactions. It would be interesting to see whether the same two appraisal dimensions that contributed to fear of bears and wolves (i.e., danger, unpredictability) would be found in relation to coyotes (Johansson et al., 2012). Johansson et al. (2012) also suggested that other social factors, such as the degree of social trust in the managing authorities, might also influence fear. Social trust in the managing agency has been shown to influence wolf management preferences (Sponarski, Vaske, Bath, & Musiani, 2014) and influence perceptions of risk (Needham & Vaske, 2008; Vaske, Timmons, Beaman, &

Petchenik, 2004). Further research is required to understand the relationships and degrees of influence that both the appraisal dimension and social trust may have on emotions.

The coyote is a generalist and meso-carnivore (Gehrt et al., 2010). Human and coyote interactions include livestock depredation, interactions with domestic pets, coyote presence in people's backyards or schoolyards, and direct contact with people (i.e., coyote attacks on people). These different types and severity of interactions can influence cognitive and emotional responses to this species (Vaske & Needham, 2007). Understanding the different components that contribute to fear toward a species can provide further understanding of perceptions and relationships between humans and wildlife. A deeper understanding of the human–coyote relationship could help managers develop education programs targeting specific aspects of fear that might improve human–coyote relationships and decrease fear in people (Vaske & Needham, 2007).

Conclusions

Research on emotions in human dimensions of wildlife shows promise in understanding human–wildlife interactions. The role, influence, and relationships that emotions have with other cognitions require further study. Human–wildlife conflicts can be rooted in a variety of social systems; understanding and assessing conflict management strategies requires examination of the context in terms of cultural, social, and political factors (Røskoft et al., 2003). It is important to consider both the cognitive and affective components of human relationships with the wildlife species. Understanding the context and different components of relationships that people have with wildlife will support development of stronger policies and management (Vaske & Needham, 2007). Emotions are an expanding frontier in human dimensions of wildlife research (Jacobs et al., 2012; Manfredo, 2008) and require further study to understand their role in the formation of attitudes and opinions regarding management options.

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