

THESIS

THE EFFECTS OF EMOTIONAL AND FACTUAL MESSAGE FRAMING ON PUBLIC
ATTITUDES TOWARD WOLF REINTRODUCTION IN COLORADO

Submitted by

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ABSTRACT

THE EFFECTS OF EMOTIONAL AND FACTUAL MESSAGE FRAMING ON PUBLIC ATTITUDES TOWARD WOLF REINTRODUCTION IN COLORADO

Gray wolf reintroduction in Colorado is a highly visible and often emotional conservation issue, and the way messages about wolves are framed has significant influence on how the public responds. This study examined how emotional and factual message frames shape attitudes toward wolf reintroduction and how audience involvement, specifically motivation and prior knowledge, guided the route through which people process these messages.

Using the Elaboration Likelihood Model as a framework, this study employed a between-subjects experimental survey in which participants viewed a short emotional or factual video designed to resemble social media content about wolf reintroduction. The emotional frame emphasized affective cues and empathy, while the factual frame focused on ecological information and argument strength. After viewing the stimulus, participants responded to measures of attitudes, affective response, and message credibility.

Results indicated that factual framing significantly increased perceived informational strength compared to emotional framing. However, emotional framing did not produce significantly greater affective responses, and the interaction between message framing and audience involvement was not supported. Mediation analyses revealed that message credibility significantly predicted attitude change, although the direct effect of framing on attitudes was not significant.

Most notably, perceived message credibility emerged as a key pathway through which framing influenced attitude change, suggesting that how credible a message appears to audiences may matter more than its emotional or factual orientation alone. This study contributes to conservation communication by highlighting the role of message credibility and audience characteristics in wildlife-related persuasion, with practical implications for agencies seeking to build trust and design effective outreach strategies.

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CHAPTER 1: INTRODUCTION

1.1 Background

The gray wolf (*Canis lupus*) once roamed widely across North America, including the Rocky Mountains of Colorado. However, by 1940, wolves were extirpated from the state through systematic eradication campaigns driven by conflicts with livestock owners and fears of predation (Colorado State University, Center for Human-Carnivore Coexistence, 2020). The species' eradication was congruent with a broader pattern of predator removal across the American West at the time, reflecting tensions between agricultural livelihoods and predator conservation (Chapron et al., 2014). The passage of the Endangered Species Act of 1973 represented a turning point, mandating recovery efforts for endangered and threatened species, including the gray wolf (Colorado Parks and Wildlife, 2023).

In November 2020, Colorado voters approved Proposition 114, a ballot initiative requiring Colorado Parks and Wildlife (CPW) to reintroduce gray wolves west of the Continental Divide by the end of 2023 (Colorado Parks and Wildlife, 2023). The resulting Colorado Wolf Restoration and Management Plan outlines a strategy to restore a viable wolf population while minimizing conflicts with livestock, wildlife, and people. The plan emphasizes adaptive management, conflict mitigation, and public engagement, recognizing that ecological restoration alone cannot ensure success without social support. Under the plan, wolves are to be relocated primarily from Idaho, Montana, and Wyoming and fitted with GPS collars for monitoring and management (Colorado Parks and Wildlife, 2023).

The ecological rationale for wolf reintroduction is grounded in research showing that apex predators play a critical role in maintaining balanced ecosystems. Through regulation of ungulate populations, wolves contribute to healthier vegetation dynamics and more resilient ecosystems (Seddon, 1999; Chapron et al., 2014). Yet while these ecological benefits are well documented, public support for predator recovery efforts often remains polarized (Bruskotter & Wilson, 2014). The success of such programs depends as much on human attitudes, values, and trust as it does on ecological science (Watkins et al., 2021).

Public attitudes toward wolves are shaped by cultural identity, perceived risk, and trust in wildlife agencies, often creating divisions between rural residents—who may fear impacts on livestock and livelihoods—and urban residents, who more often view wolves as symbols of ecological restoration (Pate et al., 1996; Watkins et al., 2021). These attitudes influence conservation decision-making, risk tolerance, and support for reintroduction policies (Feinberg & Willer, 2013; Lachapelle & Toms, 2015). Because trust in agencies predicts acceptance of wolf policies, while perceived risk can heighten opposition, communication plays a critical role in shaping public responses (Watkins et al., 2021).

Research shows that message framing, or the way information is presented, affects how audiences interpret contentious environmental issues (Entman, 1993; Nelson et al., 1997). In the context of wolf reintroduction, frames highlighting shared values or ecological benefits can build support, whereas risk-focused frames may increase resistance (Niemic et al., 2020b). These dynamics are amplified on digital and social media platforms, where short-form videos and visual storytelling rely heavily on emotional appeals (Hart & Feldman, 2016; Lazard & Atkinson, 2015). Understanding how emotional versus factual message strategies shape audience

responses is therefore essential for effective conservation communication (Camilleri, 2022; MacDonald et al., 2016).

The Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986) helps explain why different message types influence people differently. Emotional messages often prompt peripheral, affect-driven processing (Nabi, 2015; Castillo-Huitrón et al., 2020), whereas factual messages encourage central, evidence-based elaboration (MacDonald et al., 2016), depending on an individual's motivation, prior knowledge, and personal relevance (Petty & Wegener, 1999).

The purpose of this study is to examine how emotional and factual message frames influence public attitudes toward wolf reintroduction in Colorado and how audience involvement affects message processing. To address this purpose, the study uses a between-subjects experimental survey in which participants are randomly assigned to view either an emotional or factual social media message about wolf reintroduction.

1.2 Rationale and Significance

Despite decades of public outreach around large carnivore recovery, controversy persists, suggesting that conventional approaches to communication have not fully bridged the gap between scientific reasoning and public perception (Bruskotter & Wilson, 2014).

This study addresses that gap by examining how different types of message framing – emotional versus factual – affect audience attitudes toward wolf reintroduction. Understanding these effects is critical because wildlife agencies and conservation organizations increasingly rely on digital media and short-form storytelling to engage the public. Such platforms often prioritize emotionally charged content, yet the long-term consequences of this communication

style remain unclear. Emotional appeals can capture attention and foster empathy (Castillo-Huitrón et al., 2020; Nabi, 2015), but they may also reduce perceived credibility if they are perceived as manipulative or biased (Appelman & Sundar, 2016; Metzger & Flanagin, 2013). In contrast, factual messages can enhance trust and perceived legitimacy but may fail to resonate with less motivated audiences who process information peripherally rather than analytically (Camilleri, 2022; MacDonald et al., 2016).

Theoretically, this extends understanding of how dual-process persuasion models operate in environmental communication, an area where emotion and cognition frequently intersect (Feinberg & Willer, 2013; Hart & Feldman, 2016). Practically, it offers guidance for communicators seeking to promote coexistence and reduce polarization in discussions about predator management.

1.3 Contributions

This research offers both theoretical and practical contributions to the fields of conservation communication, environmental psychology, and wildlife management. Theoretically, it extends the application of the ELM and framing theory to a conservation context that is highly emotive and politically charged. While both frameworks have been widely applied in health and marketing communication (Petty & Cacioppo, 1986; Lazard & Atkinson, 2015; Camilleri, 2022), fewer studies have examined how these models function in relation to wildlife conservation issues.

This project also contributes to growing interdisciplinary scholarship on human dimensions of wildlife management by bridging communication theory and behavioral science. By identifying which message strategies promote empathy, understanding, and credibility, this

study provides an evidence-based framework that can inform communication practices used by wildlife agencies, advocacy organizations, and educators.

From a practical standpoint, the findings can guide the design of public outreach campaigns that balance emotional resonance with factual accuracy. In digital environments where audiences often encounter conservation messages in short, visual formats, understanding how framing affects message processing is essential for improving engagement and reducing polarization. Insights from this research can help communicators craft social media and video content that fosters constructive dialogue rather than reinforcing existing divides (Hart & Feldman, 2016; Niemiec et al., 2020b).

1.4 Summary of Method

This study used a between-subjects experimental survey design. Participants (undergraduate students) were randomly assigned to view an emotional or factual 30-to 60-second video about wolf reintroduction, then complete a survey measuring attitudes, affective response, and message credibility. Analyses include ANOVA, ANCOVA, and mediation testing to examine relationships between message framing, elaboration, and attitudes.

1.5 Organization

This thesis is organized into five chapters.

1. The introduction outlines the background, problem, theoretical framework, research purpose, and significance of the study.
2. The literature review chapter synthesizes previous research on wolf reintroduction, public attitudes toward predator conservation, message framing, and the ELM.

3. The methods chapter explains details of the study's research design, data collection procedures, measurement instruments, and validity considerations.
4. The analysis and results chapter presents the statistical findings from the experimental survey, testing the study's hypotheses, and exploring relationships between message framing, elaboration, and attitudes.
5. The discussion and conclusion chapter interprets the results in relation to theory and practice, discusses implications for conservation communication, and provides recommendations for future research and outreach strategies.

Together, these chapters develop a comprehensive examination of how emotional and factual message framing influence public understanding and support for wolf reintroduction in Colorado, contributing both to scholarly theory and to practical conservation communication.

CHAPTER 2: LITERATURE REVIEW

2.1 Background: Wolves in Colorado

In 1940, the gray wolf was extirpated from Colorado through human force. In the late 1800s to early 1900s, elk, deer, and bison populations were diminished by logging and hunting activities, which left wolves to prey on livestock as an alternative. Due to this conflict with livestock owners, wolves were eliminated through trapping, shooting, and poison by the 1940s (Colorado State University, Center for Human-Carnivore Coexistence, 2020). The gray wolf was listed as an endangered or threatened species in the lower 48 states under the Endangered Species Act of 1973, setting the stage for subsequent recovery efforts (Colorado Parks and Wildlife, 2023).

In November 2020, Colorado voters narrowly approved Proposition 114, which mandates the reintroduction of gray wolves west of the Continental Divide by the end of 2023, according to the Colorado Final Wolf Restoration and Management Plan. The plan aims to recover and sustain a viable wolf population while minimizing conflicts with livestock, wildlife, and people. It notably requires no land use restrictions on private property owners and guarantees compensation for livestock losses attributed to wolves (Colorado Parks and Wildlife, 2023).

The restoration strategy calls for releasing 30 to 50 wolves over three to five years, starting in 2023, primarily from Idaho, Montana, Wyoming, and possibly Oregon or Washington. Released wolves will be fitted with GPS collars for monitoring and will be introduced at least 60 miles from state borders and tribal lands to lessen chances of dispersal into nearby regions.

Adaptive, impact-based strategies are promoted, prioritizing non-lethal management methods such as fladry and scare devices, with lethal control allowed only under specific conditions like confirmed livestock predation or threats to human safety. The potential classification of wolves as a 10(j) experimental population under the Endangered Species Act could grant additional management trial and error (Colorado Parks and Wildlife, 2023).

To mitigate livestock conflicts, the plan offers 100% fair market value compensation, up to \$15,000 per animal, and provides producers with temporary deterrents and educational resources. Monitoring efforts include GPS tracking, trail cameras, winter track counts, and aerial surveys to assess wolf populations and their ecological effects. Effective outreach and two-way communication with the public are considered crucial for the project's success (Chapron et al., 2014). The initiative is a collaborative effort involving Colorado Parks and Wildlife, the U.S. Fish and Wildlife Service, the U.S. Department of Agriculture, Tribal Nations, state agencies, and Non-Governmental Organizations (Colorado Parks and Wildlife, 2023).

The reintroduction of wolves in Colorado can help achieve several goals, according to Colorado Parks and Wildlife Management. This includes helping control overpopulated ungulates (like deer or elk) so they don't overwhelm the habitat, moving ungulates around so vegetation doesn't become overgrazed, removing diseased animals from the population, improving herd health, and providing social and cultural benefits, like the value people place on knowing these animals exist or the enjoyment they may bring to current and future generations (Colorado Parks and Wildlife, 2023). While ecological goals motivate the reintroduction effort, public attitudes ultimately determine whether these plans succeed in practice, making it essential to understand how Coloradans perceive wolves and their return to the landscape.

2.2 Public Attitudes Toward Wolf Reintroduction

Wildlife reintroduction has become a widely used conservation tool designed to restore species to parts of their historic range where they have been extirpated. The primary goal is to establish a viable, self-sustained population that thrives without ongoing human intervention (Seddon, 2010). One major challenge to the success these efforts face is human-wildlife conflict (Seddon, 2010).

Attitudes are more than personal opinions; they are powerful predictors of behavioral intentions. According to the Theory of Reasoned Action Approach, attitudes consistently shape whether individuals intend to support or oppose policies, participate in civic processes, or engage in specific behaviors (Fishbein & Ajzen, 2010). Conservation psychology research reinforces this connection, showing that attitudes toward wildlife and environmental issues are closely tied to pro-environmental behaviors, support for conservation initiatives, and willingness to tolerate or coexist with wildlife (Clayton et al., 2013; Slagle et al., 2019; Watkins et al., 2021). In wolf-related contexts specifically, more positive attitudes predict greater support for recovery programs, higher trust in management agencies, and support of coexistence strategies (Slagle et al., 2019; Watkins et al., 2021). These relationships are not merely theoretical but were demonstrated in Colorado. Public attitudes directly shaped state-level policy through the passage of Proposition 114 - the proposal suggesting the reintroduction of gray wolves to Colorado - demonstrating the tangible influence attitudes can have on collective decision-making (Niemiec et al., 2020b).

Because attitudes are shaped not only by ecological knowledge but also by communication, it becomes increasingly important to understand how message framing

influences public support for wolf reintroduction. This connection underscores the need to examine communication strategies as a key part of conservation initiatives.

2.3 Theoretical Framework: Elaboration Likelihood Model

ELM, developed by Petty and Cacioppo (1986), conceptualizes persuasion through two routes: central and peripheral processing. Central processing entails scrutiny of message arguments and content, while peripheral relies on superficial cues. ELM proposes that motivation and ability determine which route is taken, and that central route processing leads to stronger, more lasting attitude change compared to the more temporary effects of peripheral route processing (Petty & Cacioppo, 1986).

According to Petty and Cacioppo, message recipients on the central route actively evaluate argument quality, drawing on cognitive resources to assess evidence (Petty & Cacioppo, 1986). In contrast, the peripheral route relies on heuristics such as credibility, aesthetics, or emotional appeal. The durability of attitude change varies dramatically. Central processing produces changes resistant to counterarguments, whereas peripheral-derived attitudes are more fragile (Petty & Cacioppo, 1986). To apply ELM in a conservation context, it is necessary to examine the factors that determine which processing route audiences take, particularly their motivation and ability to engage with message content.

2.4 Motivation and Ability: Personal Relevance & Knowledge

Personal relevance plays a pivotal role in ELM. Petty et al. (1983) demonstrated that participants engaged more deeply with ads when messages referenced issues directly affecting them - such as availability of a product being advertised in their local area - indicating that motivation to elaborate increases when individuals perceive personal stakes. MacDonald et al.

(2015) applied this principle in a zoo setting, showing that messages tailored to visitor interests highlight why conservation mattered personally, significantly enhancing recall and depth of cognitive engagement. The study confirmed that personal relevance was the strongest motivator for central processing in an environmental education context.

The ability to elaborate is also influenced by prior knowledge. Petty and Cacioppo explained that when recipients lack knowledge or cognitive capacity, they default to surface cues. Alternatively, if they have context and understanding, they engage with arguments directly (Petty & Cacioppo, 1986). Tarrant et al. (1997) incorporated this by surveying rural residents on ecosystem management - those with higher baseline knowledge displayed more favorable and informed attitudes, suggesting that knowledge increases ability to process central messages effectively.

One factor commonly used to capture motivation for knowledge is need for cognition (NFC); defined as a stable tendency to enjoy and engage in effortful thinking (Petty & Cacioppo, 1986). In the context of this study, NFC reflects participants' motivation to process information about wolf reintroduction more deeply rather than relying on surface-level cues. Individuals with a high need for cognition are more likely to process messages through the central route, whereas individuals with a low (NFC) are more likely to rely on peripheral cues such as emotional tone or message presentation.

Together, these two components - motivation and ability - form audience involvement. Audience involvement refers to how actively individuals engage with message content (Petty & Cacioppo, 1986). In this study, motivation is reflected through NFC, representing an individual's tendency to engage in effortful thinking, as well as the personal relevance of the issue. Ability is

reflected through prior knowledge about wolf reintroduction, which influences an individual's capacity to evaluate message arguments (Tarrant et al., 1997).

In conservation contexts, this includes both the motivation tied to the personal relevance of wildlife issues and the ability that comes from prior knowledge (Tarrant et al., 1997). When involvement is high, individuals are more likely to engage in a critical examination; when involvement is low, people tend to rely on peripheral or attention-grabbing cues rather than deeper message scrutiny. These differences in involvement are critical for understanding how audiences respond to message framing. Emotional and factual messages rely on different persuasive cues – affective versus informational – and are therefore likely to be processed differently depending on an individual's level of motivation and ability to elaborate. As a result, message framing serves as a key mechanism shaping how audiences interpret and evaluate conservation issues.

2.5 Message Framing

Message outcomes depend not only on audience involvement but also on how information is presented. One key mechanism that shapes interpretation is message framing, which refers to how communicators structure the content and tone of a message to influence how audiences evaluate an issue (Nelson et al., 1997). Since different frames emphasize different types of cues - or ways of initiating message processing - they align with the peripheral or central processing routes defined by ELM. Accordingly, it is important to define the characteristics of the emotional and factual frames used in this study as distinct persuasive strategies.

2.5.1 Emotional Framing

Emotional framing refers to the presentation of information using affective cues - such as imagery, tone, narrative, or appeals such as anthropomorphism - to evoke emotional responses that shape how audiences interpret an issue (Entman, 1993; Nabi, 2015). Emotional frames often rely on appeals to empathy, fear, moral concern, or shared identity, prompting audiences to engage through affective processing rather than deliberate evaluation of evidence (Nabi, 2015).

Emotional communication is especially common in digital and environmental messaging, where short-form social media content frequently uses images, narrative stories, or emotionally charged language to capture attention and engagement (Hart & Feldman, 2016; Lazard & Atkinson, 2015). Research shows that emotional appeals can increase feelings of empathy and connection to wildlife or environmental causes, influencing support for conservation actions (Castillo-Huitrón et al., 2020; Nabi, 2015). In the context of wolf reintroduction, Niemiec et al. (2020a) demonstrate that emotionally toned messages, whether positive or negative, shape how audiences perceive stakeholder groups and the legitimacy of wolf management plans.

Within ELM, emotional framing typically functions as a peripheral cue, guiding judgment through affective impressions rather than a critical consideration of the argument (Petty & Cacioppo, 1986). Emotional frames may therefore have stronger effects on individuals with lower motivation or ability to elaborate, or on audiences already accustomed to affect-driven discourse around controversial wildlife issues. In this study, emotional frames include wolf-related messages emphasizing empathy, fear, conflict, or symbolic meaning, which are expected to influence attitudes through affect-based pathways.

Affective responses encompass emotional reactions such as empathy, concern, or fear that arise during message exposure. Emotional appeals tend to increase affective response by activating moral intuition and empathy toward wildlife (Nabi, 2015; Castillo-Huitrón et al., 2020).

In this study, the emotional frame is specifically an empathy-based frame that uses affective cues to help viewers feel concern, connection, or emotional closeness to wolves. This is conveyed in the stimulus video through imagery of wolf family groups, warmer tone in the narration, and subtle anthropomorphic language (e.g., referring to “wolf families” or “parents protecting pups”) to evoke empathy without misrepresenting scientific facts. These cues are intentionally designed to guide viewers toward affective, peripheral-route processing, consistent with ELM’s assumptions that emotional impressions shape judgments when motivation to elaborate is lower (Petty & Cacioppo, 1986). This clarification aligns the emotional condition with established conservation communication research showing that empathy-based appeals often increase emotional engagement and support for wildlife issues (Castillo-Huitrón et al., 2020; Hart & Feldman, 2016).

2.5.2 Factual Framing

Factual framing refers to the presentation of information using evidence-based content - such as data, statistics, expert claims, or logic - to encourage audiences to evaluate an issue more critically. Factual frames emphasize argument quality, accuracy, and informational strength, positioning the message as credible and evidence-driven (MacDonald et al., 2015; MacDonald et al., 2016). In conservation contexts, factual messages often include data, scientific descriptions, or clear explanations of plans intended to reduce uncertainty and build public understanding.

Research demonstrates that factual messages can increase cognitive elaboration, recall, and perceived informational value when audiences are motivated to process content deeply (MacDonald et al., 2015). In wolf-related communication, fact-based frames that acknowledge trade-offs, provide clear ecological explanations, or reference expert sources are shown to reduce polarization and support informed engagement (Niemic et al., 2020a). These frames operate by strengthening perceptions of argument quality and reinforcing the legitimacy of scientific perspectives.

Within ELM, factual framing primarily engages the central route, prompting recipients to assess the logic, evidence, and strength of the message (Petty & Cacioppo, 1986). Individuals with higher motivation or prior knowledge are especially likely to process factual content in this manner. In this study, factual frames consist of wolf reintroduction messages that emphasize data, conservation management procedures, and evidence-based claims, which are expected to influence attitudes through analytical pathways.

In this study, the factual frame is operationalized as a data-driven ecological frame designed to highlight why wolf reintroduction is beneficial for Colorado. The video communicates this frame through neutral narration paired with evidence-based claims, such as trophic cascade research, ungulate population data, and the effectiveness of non-lethal conflict mitigation programs. Trophic cascade research refers to scientific studies showing how changes in top predators - such as adding or removing wolves - trigger ecological effects that cascade through herbivores, vegetation, and other wildlife, ultimately influencing the structure and function of entire ecosystems (Ripple & Beschta, 2012). Visual elements include ecological maps, scientific graphics, and short explanatory captions to emphasize clarity and argument strength. This framing approach reflects the type of messaging commonly used by wildlife

agencies and conservation scientists, where factual accuracy and ecological reasoning take priority.

RQ1: How do emotional (empathy-based) and factual (ecological evidence) message frames influence public attitudes toward wolf reintroduction in Colorado?

H1: Emotional framing will increase affective response (empathy) more than factual framing.

H2: Factual framing will increase perceived informational strength more than emotional framing.

2.6 Audience Involvement and Message Framing Effects

While emotional and factual frames operate through different persuasive mechanisms, their effects ultimately depend on how audiences process the information presented, making ELM a useful framework for interpreting these dynamics. In a study examining conservation messaging in a zoo setting, MacDonald et al. (2015) found that visitors showed higher recall and engagement when staff delivered presentations that emphasized personal relevance, clear arguments, and visitor values, compared to less structured presentations. These findings suggest that message design influences how audiences process information and support the ELM claim that effective persuasion depends on both motivation and ability.

In parallel, Tarrant et al.'s (1997) work on rural attitudes toward ecosystem management aligns with the ELM. Messages structured to acknowledge community values, provide clear factual evidence, and connect to stakeholders' priorities were more likely to elicit public support. Although not explicitly framed as ELM research, the study illustrates the model's utility in real-world messaging. Knowing an audience and tailoring message content accordingly increases the likelihood of central processing.

Public familiarity with wolf reintroduction is likely to vary across individuals, particularly given that participants in this study were drawn from both Colorado and broader national samples. Prior research suggests that knowledge about wolves and predator management is not uniform and can influence attitudes toward reintroduction, with greater knowledge often associated with more informed and, in some cases, more favorable attitudes (Tarrant et al., 1997; Slagle et al., 2019; Watkins et al., 2021). Within the framework of the Elaboration Likelihood Model, this variation in knowledge reflects differences in ability, which can shape how individuals process and respond to conservation messages.

Applying ELM to wolf reintroduction helps explain why factual messaging (central cues) may be more effective among highly engaged audiences, while emotional appeals (peripheral cues) may influence less-involved publics. However, conservation studies rarely measure which routes people use when processing reintroduction messages; a gap this research seeks to fill.

H3: Emotional framing will produce greater immediate attitude change than factual framing for = participants with low NFC; factual framing will produce greater attitude change for participants with high NFC.

2.7 Message Credibility as a Mediator in Conservation Communication

Among the mechanisms through which message framing shapes persuasion, perceived credibility is particularly central. Message credibility refers to the extent to which audiences view a message as believable, accurate, and fair does not merely moderate message effects; it functions as a primary pathway through which framing influences attitude change (Metzger & Flanagin, 2013; Appelman & Sundar, 2016). Public responses to conservation messages are strongly shaped by whether the message is perceived as credible, and in the context of wolf

reintroduction, a topic thwarted by competing narratives and institutional skepticism, this is especially important.

Within persuasion research, credibility can function as a heuristic cue, particularly when individuals have low motivation or ability to process detailed information. However, credibility also interacts with message content, influencing whether audiences accept or reject the arguments presented (Petty & Cacioppo, 1986; Appelman & Sundar, 2016). Messages perceived as more credible are more likely to be trusted and integrated into existing attitudes, whereas messages perceived as less credible may be discounted or resisted.

In conservation contexts, credibility is particularly important due to the presence of competing narratives, public skepticism toward institutions, and differing value systems related to wildlife management (Slagle et al., 2019; Watkins et al., 2021). As a result, how a message is framed may influence not only how it is interpreted, but also how credible it is perceived to be. Building on this framework, message credibility is expected to serve as a mediating mechanism linking message framing to attitude change. Specifically, emotional and factual frames may differentially influence perceptions of credibility, which in turn shape participants' attitudes toward wolf reintroduction.

H4: Message credibility will mediate the effect of message framing on attitude change.

2.8 Research Gap

Although prior research has explored public attitudes toward wolf reintroduction and the effects of different message frames, little is known about how audiences cognitively and emotionally process these messages. Most studies focus on measuring attitudes or voting behavior rather than the psychological mechanisms that underlie persuasion in conservation contexts. ELM offers a framework to address this gap by explaining when individuals are likely

to engage with messages through thoughtful, central processing versus quick, peripheral processing based on emotional or credibility cues. Understanding these processes is critical for designing communication that fosters trust and sustains public support for predator recovery.

CHAPTER 3: METHODS

3.1 Research Objectives

The primary objective of this study was to examine how emotional versus factual message framing in social media posts about wolf reintroduction influences audience attitudes. Specific objectives included:

1. To determine whether emotional framing leads to stronger affective and attitudinal responses among individuals processing the message through the peripheral route, while factual framing leads to stronger responses among individuals processing the message through the central route, as predicted by the ELM (Petty & Cacioppo, 1986; Lazard & Atkinson, 2015; MacDonald et al., 2016).
2. To assess how message framing influences perceived risk and message credibility in the context of wolf reintroduction communication, and to examine the role of message credibility as a mediating mechanism through which framing influences attitude change (Niemic et al., 2020b; Watkins et al., 2021; Appelman & Sundar, 2016).

This study used a quantitative experimental survey design, which allowed for causal inferences by isolating the effect of message framing while controlling for confounding factors (Slater, 2002).

3.2 Theoretical Framework of the Method

This study applied the Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986) and framing theory (Entman, 1993; Nelson et al., 1997) to examine how message framing affects audience responses to wolf reintroduction messages. The ELM posits that persuasive messages are processed through either the central route, characterized by thoughtful evaluation of argument quality, or the peripheral route, driven by affective or heuristic cues.

Emotional message framing was expected to evoke peripheral processing by appealing to emotion, empathy, or moral intuition (Nabi, 2015; Feinberg & Willer, 2013). In contrast, factual message framing was expected to engage in central processing by emphasizing logical argumentation and evidence (Camilleri, 2022; Lazard & Atkinson, 2015; MacDonald et al., 2016).

Framing theory supported this approach by explaining how the presentation and emphasis of specific message elements influence public interpretation and response (Entman, 1993; Nelson et al., 1997; Hart & Feldman, 2016). Experimental framing studies have shown that even subtle differences in emotional versus informational framing can alter public perceptions of environmental and wildlife issues (Niemic et al., 2020b; Tarrant et al., 1997).

This theoretical integration provided the foundation for the study's quantitative experimental survey design, which allowed for controlled comparisons between message types and the measurement of their effects on key psychological constructs (Slater, 2002).

3.3 Research Design

This study employed a between-subjects experimental survey design. Participants first completed a short pre-exposure survey measuring relevant baseline attitudes and individual difference variables. Participants were then randomly assigned to view a brief video stimulus that matched the assigned emotional or factual framing condition. A between-subjects design was crucial, because exposure to the first message can influence how participants process any subsequent message. Under ELM, prior exposure alters involvement, affect, and elaboration, creating carryover effects that would contaminate a within-subjects design (Petty & Cacioppo, 1986; Petty et al., 1981). Presenting each participant with only one frame preserved internal validity.

The sample consisted of a combination of undergraduate students from Colorado State University (CSU) and participants recruited through Amazon Mechanical Turk (MTurk). CSU participants were recruited through SONA Systems as well as in-person outreach on campus, while additional participants were recruited through MTurk to increase sample size and diversity. The use of MTurk is common in experimental communication research and has been shown to provide reliable and diverse samples beyond traditional student populations (Buhrmester et al., 2011; Hauser & Schwarz, 2016).

This mixed sampling approach allowed for the inclusion of both Colorado-based participants, who may be more directly exposed to wolf reintroduction discourse, and a broader national sample with varying levels of familiarity with the issue. Public attitudes toward wolf reintroduction play an important role in shaping policy implementation, human-wildlife conflict mitigation, and long-term conservation support (Bruskotter & Wilson, 2014). Including

participants with differing geographic and experiential backgrounds therefore enhances the external validity of the study while also introducing meaningful variation in prior knowledge and attitudes (Colorado Legislative Council, 2020).

From a theoretical perspective, this variation is particularly relevant within the framework of ELM, which predicts that individuals differ in their motivation and ability to process persuasive messages (Petty, Cacioppo, & Goldman, 1981; Petty & Cacioppo, 1986). Differences in familiarity with wolf reintroduction and exposure to related discourse may influence participants' level of involvement, thereby shaping how they process emotional versus factual message frames. As a result, the mixed sample provides an opportunity to examine how message framing operates across individuals with varying levels of engagement and cognitive motivation.

Following exposure, participants completed a short survey measuring attitudes toward wolf reintroduction, perceived risk, and message credibility. This design allowed for causal inference about the relationship between message framing and attitudes (Slater, 2002; Hart & Feldman, 2016; Lazard & Atkinson, 2015).

3.4 Operational Definitions of Variables

This study included one independent variable (message framing), two dependent variables (attitudes toward wolf reintroduction and perceived risk), and one control variable (message credibility). Each variable is operationalized below with its measurement instrument, example items, and supporting sources.

The following definitions align with the conceptual definitions outlined in Chapter 2. Each construct is measured using validated instruments commonly used in conservation and persuasion research.

3.4.1 Independent Variable: Message Framing

Message framing is manipulated through an experimental condition where participants were exposed to one of two 30- to 45-second video stimuli representing emotional or factual message content. Participants were randomly assigned to one of the two conditions. The emotional frame uses affective language, narrative tone, and imagery designed to evoke empathy or moral concern. The factual frame uses neutral narration, emphasizing ecological data, management procedures, and science-based explanations (Entman, 1993; Nelson et al., 1997; Niemiec et al., 2020b).

3.4.2 Dependent Variable: Attitudes Toward Wolf Reintroduction

Attitudes toward wolf reintroduction were measured using a multi-item 5-point Likert scale assessing general support, approval of policy action, and perceived ecological importance. The scale demonstrated acceptable internal consistency (Cronbach's $\alpha = .65$). While slightly below the conventional .70 threshold, this level of reliability is considered acceptable for exploratory research with a small number of items. Response anchors range from 1 = Strongly disagree to 5 = Strongly agree. Items included:

- “I support reintroducing wolves to their native habitats.”
- “Wolves play an important role in maintaining healthy ecosystems.”
- “Wolves pose a threat to human safety.” (reverse-coded)

Higher scores represent more favorable attitudes toward wolf reintroduction. These items are adapted from established conservation attitude measures (Pate et al., 1996; Slagle et al., 2019; Watkins et al., 2021).

3.4.3 Dependent Variable: Affective Response

Affective response was measured using two items assessing empathy and concern (1 = Strongly disagree, 5 = Strongly agree). The scale demonstrated acceptable internal consistency (Cronbach's $\alpha = .68$). Items included:

- “While watching the video, I felt empathy for wolves.”
- “While watching the video, I felt concern for the future of wolves.”

These items were significantly correlated, $r = .498$, $p < .001$, and were averaged to create a composite measure.

3.4.5 Message Credibility

Message credibility was assessed using a five-item semantic differential scale measuring perceived trustworthiness, accuracy, and believability of the video stimulus. Participants responded on a 5-point Likert scale ranging from 1 = Strongly disagree to 5 = Strongly agree.

- “This video was believable.”
- “This message seemed accurate.”

Higher scores indicate greater perceived credibility. This measure is adapted from Appelman & Sundar's (2016) validated credibility scale and extended by research from Metzger & Flanagin (2013).

3.4.6 Manipulation Check

A manipulation check was included to assess whether participants perceived the intended framing differences. Responses were measured on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree). Participants responded to the item:

- “This video emphasized emotions rather than facts.”

An independent-samples t-test was conducted to assess whether participants perceived differences in framing between conditions. Participants in the emotional condition reported slightly higher agreement that the video emphasized emotions rather than facts ($M = 3.93$, $SD = 0.98$) compared to those in the factual condition ($M = 3.70$, $SD = 1.23$); however, this difference was not statistically significant, $t(160) = -1.34$, $p = .182$.

This suggests that the framing manipulation was not strongly perceived by participants.

3.5 Descriptive Statistics for Study Variables

Descriptive statistics for all primary variables from the study shown below.

Variable	M	SD	N	Scale
Attitudes (pre)	4.28	0.59	162	1–5
Attitudes (post)	4.35	0.63	162	1–5
Affective Response	4.22	0.70	162	1–5
Message Credibility	4.42	0.62	162	1–5
Informational Strength	4.17	0.84	162	1–5
Need for Cognition	3.64	0.48	162	1–5

3.6 Stimulus Materials

Two 30-45 second video stimuli were created using SORA, an AI-based video generation tool, to serve as the experimental manipulation for this study. Each video presented information about wolf reintroduction in Colorado differed in message framing. The emotional frame video used affective language, evocative imagery, and emotional appeals (e.g., empathy or concern for wolves and ecosystems). The factual frame video used neutral narration and evidence-based information about wolf management, ecological impacts, and conservation planning.

Both versions featured similar pacing, structure, and visual tone to ensure differences in audience response were attributable to message framing rather than design. This approach follows framing and emotional persuasion methods used in prior experimental communication research (Nabi, 2015; Hart & Feldman, 2016; Lazard & Atkinson, 2015; Niemiec et al., 2020b).

A pretest was conducted with a small sample to ensure participants perceived the emotional and factual videos as distinct in frame but equivalent in quality, credibility, and production value. Pretesting methods mirrored those used in prior studies evaluating visual persuasion and message framing (Lazard & Atkinson, 2015; MacDonald et al., 2016; Xiang et al., 2019).

3.7 Sample

Participants were adults (18+) recruited through multiple sources, including the SONA Systems participant pool at CSU, in-person recruitment via QR code on the CSU campus, and MTurk. A total of 162 participants were included in the final sample, consisting of 41 undergraduate students recruited through SONA, 2 students recruited via QR code, and 119 participants recruited through MTurk. Participation for SONA students was voluntary and incentivized with extra credit, while MTurk participants received monetary compensation.

A convenience sampling approach is appropriate for experimental research where control and efficiency are prioritized over generalizability (Etikan et al., 2016). The achieved sample size falls within the target range of 150-200 participants, which is sufficient to detect medium effect sizes with adequate statistical power (Cohen, 1992). The unit of analysis is the individual participant.

This study includes both undergraduate students and MTurk participants because the research focuses on the psychological mechanisms of message processing rather than on predicting real-world policy attitudes for a single stakeholder group. Using a mixed sample allows for greater variability in demographic characteristics, prior knowledge, and levels of involvement, which is beneficial for testing theoretical predictions related to message elaboration and persuasion (Slater, 2002). Both groups represent digitally engaged audiences who are likely to encounter conservation messaging in online environments, making them appropriate for testing short-form video stimuli (Sponarski et al., 2014). Importantly, MTurk samples have been shown to produce reliable findings comparable to those from traditional student populations on experimental attitudinal tasks, supporting their combined use in a single study (Buhrmester et al., 2011; Hauser & Schwarz, 2016). While CSU students bring greater local familiarity with wolf reintroduction as a salient regional issue, MTurk participants contribute broader demographic diversity from the U.S. and a wider range of prior exposure levels, characteristics that are complementary rather than conflicting, and that together enhance the study's ability to detect variation in message processing across different levels of audience involvement.

From a theoretical standpoint, this sample allows the study to meaningfully test the Elaboration Likelihood Model. ELM predicts that individuals engage with messages differently depending on their motivation and prior knowledge (Petty & Cacioppo, 1986). Including

participants with varying levels of familiarity with wolf reintroduction – both within Colorado and beyond – supports the examination of differences in elaboration, involvement, and message processing (Niemiec et al., 2020b). This variability is necessary for assessing how audience characteristics influence responses to emotional and factual message frames. CSU participants may have had greater familiarity with wolf reintroduction due to their geographic proximity and exposure to the issue, whereas MTurk participants likely represented a broader range of familiarity and involvement. This variation in audience characteristics made the combined sample useful for examining responses across differing levels of prior knowledge and engagement.

Although ranchers and individuals directly involved in agriculture are key stakeholders in wolf management, they are not the focus of this study. The purpose is not to measure stakeholder-specific attitudes, but rather to understand general message processing mechanisms that apply across broader audiences. Stakeholders with highly entrenched attitudes may reduce variability and limit the ability to detect framing effects (Petty & Cacioppo, 1986; Slagle et al., 2019; Watkins et al., 2021). Therefore, this study focuses on a more general population where attitudes are more diverse and malleable.

3.8 Pilot Study

Prior to the main study, a pilot test (n=13) was conducted to evaluate the clarity, realism, and perceived differences between the emotional and factual message frames. The goal of the pilot was to ensure that the video stimuli were understandable, comparable in quality, and capable of eliciting the intended framing distinctions before full data collection.

The pilot was administered as an online survey using the same general structure as the main study. Participants were randomly assigned to view one of the two video conditions and then completed a series of closed-ended survey questions assessing message clarity, engagement, and overall perception.

In addition, pilot participants were asked whether they believed the video had been created using artificial intelligence. This question was included to assess whether the use of AI-generated or AI-assisted content might influence participants' perceptions of credibility or realism.

Results from the pilot indicated that both videos were generally perceived as clear and understandable, with no major issues related to comprehension or technical quality. Participants were able to engage with the content as intended, suggesting that the stimuli were appropriate for use in the main study. Responses to the artificial intelligence question indicated that while some participants suspected the videos may have been AI-generated, this perception did not appear to substantially interfere with their ability to interpret the message content.

Based on these findings, no major revisions were made to the video stimuli prior to the main study. The pilot results provided support for the use of the selected emotional and factual frames in the experimental design.

3.9 Validity and Reliability

3.9.1 Internal Validity

Internal validity was maintained through random assignment, consistent exposure conditions, and controlled message content. Both videos used similar voiceover pacing and duration (30-45 seconds) to ensure that differences in participant responses were attributable to message framing rather than production variation (Slater, 2002; Nelson et al., 1997).

3.9.2 Construct Validity

Construct validity was supported through the use of previously validated scales and conceptual frameworks for measuring message credibility, attitudes toward wildlife, and perceived risk. Message credibility was measured using two items assessing believability and accuracy, adapted from Appelman and Sundar (2016) and Metzger and Flanagin (2013). Although the full semantic differential scale includes additional dimensions such as fairness and trustworthiness, the selected items capture core components of perceived message credibility relevant to this study.

Attitudes toward wolf reintroduction were measured using items adapted from wildlife and conservation attitude research, including Watkins et al. (2021) and Slagle et al. (2019), which used Likert-scale items to assess support for predator management, perceptions of human-wildlife coexistence, and general conservation values. These studies demonstrated strong reliability in measuring conservation-related attitudes and beliefs across diverse participant groups.

The framing manipulations, emotional versus factual, were developed to align with the conceptual definitions established by Entman (1993), who defined framing as the process of selecting and emphasizing aspects of a perceived reality to promote a particular problem definition, moral evaluation, or treatment recommendation. This approach is consistent with the

operationalization of framing used in Niemiec et al. (2020b), who compared emotional and informational appeals in wildlife reintroduction communication. By grounding both the framing design and measurement instruments in validated frameworks, this study ensures that constructs are theoretically coherent, empirically sound, and capable of accurately representing the variables of interest.

3.9.3 Reliability

Reliability of multi-item constructs was assessed using Cronbach's alpha, a widely used measure of internal consistency (Cronbach, 1951). For constructs consisting of more than two items, Cronbach's alpha was used to evaluate the extent to which items measured the same underlying concept.

For the message credibility measure, which consisted of two items, reliability was assessed using Pearson's correlation. For two-item measures, Pearson's r is considered an appropriate and recommended alternative to Cronbach's alpha (Eisinga et al., 2013). The two credibility items (believability and accuracy) were significantly correlated, $r = .54$, $p < .001$, supporting their combination into a composite credibility score.

3.9.4 Ecological Validity

The use of short-form video content enhances ecological validity, as most audiences encounter environmental communication in dynamic, multimedia formats on social media (Hart & Feldman, 2016; MacDonald et al., 2016). The realistic design of these videos mirrors the type of wildlife-related media that users see on platforms such as Instagram or TikTok.

3.9.5 External Validity

External validity was enhanced by using a mixed sample consisting of undergraduate students and participants recruited via MTurk. This approach increased diversity in demographic characteristics and prior exposure to wildlife-related issues. However, differences between student and online samples may introduce variability in baseline attitudes and engagement, which should be considered when interpreting the results.

CHAPTER 4: RESULTS AND ANALYSIS

4.1 Data Analysis Overview

Table 1 provides an overview of the analytical framework used to test each hypothesis, including the independent and dependent variables, data sources, and statistical analyses used. This summary demonstrates how each hypothesis was operationalized and tested using the survey data collected in this study.

Table 1

Hypothesis	Data source	IV(s)	DV(s)	Analysis
H1: Emotional framing will increase affective response (empathy) more than factual framing.	Post survey (affective response items)	Message frame (Emotional vs Factual)	Affective response	One-way ANCOVA (frame as between-subject factor) controlling for baseline attitudes and prior exposure
H2: Factual framing will increase perceived informational strength/ argument quality more than emotional framing.	Post survey (perceived informational strength)	Message frame	Perceived argument quality	One-way ANCOVA, controlling for NFC, prior knowledge.
H3: Emotional framing will produce greater immediate attitude change than	Pre & post surveys (attitude items)	Message frame (between: Emotional vs	Attitude toward wolf reintroduction	Mixed-design ANOVA with Time (pre, post) x Frame

factual framing for participants with low NFC; factual framing will produce greater attitude change for participants with high NFC.		Factual). Moderator: NFC		(between) and NFC to test Frame x NFC interaction.
H4: Perceived message credibility mediates the effect of frame on attitude change.	Post survey (message credibility) + attitude change	Message frame. Mediator: Message credibility.	Attitude change	Mediation analysis using PROCESS Model 4

To test the hypotheses outlined above, I conducted a series of ANOVA and ANCOVA models examining how message framing (emotional vs. factual) and NFC influence attitudes toward wolf reintroduction and related perceptions. Each analysis is designed to assess whether emotional or factual framing differentially affects participants depending on their level of motivation and cognitive engagement, consistent with ELM (Petty & Cacioppo, 1986).

To verify that the experimental manipulation functioned as intended, preliminary analyses were conducted to assess whether participants responded differently to the emotional and factual message frames and whether sample source (MTurk vs. CSU) influenced key outcomes.

Because participants were recruited from two distinct sources (0 = MTurk, 1 = CSU), sample type was included as a covariate in all primary analyses. This approach accounts for potential differences in baseline responses, attention, or prior experience with survey research across groups.

Results indicate that while message framing did not significantly influence affective response, sample sources were a significant predictor. Specifically, MTurk participants reported higher affective responses than CSU participants, $F(1, 159) = 16.68, p < .001, \text{partial } \eta^2 = .095$.

This pattern suggests that participant pool differences influenced emotional engagement with the stimulus, independent of framing condition. As a result, all subsequent analyses control for sample type to isolate the effects of message framing.

4.2 Hypothesis 1

A one-way analysis of covariance (ANCOVA) was conducted to examine whether message framing (emotional vs. factual) influenced participants' affective responses toward wolves, controlling for sample source (participants recruited via MTurk vs. students recruited from CSU).

After adjusting for sample, there was no statistically significant effect of message framing on affective responses, $F(1, 159) = 0.125, p = .724, \text{partial } \eta^2 = .001$. Participants in the emotional framing condition (adjusted $M = 4.24, SE = 0.076$) reported similar levels of affective response as those in the factual framing condition (adjusted $M = 4.20, SE = 0.072$).

Additional analyses show that sample was a significant covariate, $F(1, 159) = 16.683, p < .001, \text{partial } \eta^2 = .095$, indicating that MTurk participants reported higher affective responses than CSU participants.

These results indicate that message framing did not significantly influence affective responses, and therefore Hypothesis 1 was not supported.

4.3 Hypothesis 2

A one-way analysis of covariance (ANCOVA) was conducted to determine whether message framing (emotional vs. factual) influenced perceived informational strength, controlling for prior knowledge, need for cognition, and perceived knowledge.

After adjusting for the covariates, there was a statistically significant effect of message framing on perceived informational strength, $F(1, 157) = 4.529, p = .035$, partial $\eta^2 = .028$. Participants in the factual framing condition ($M = 4.30, SD = 0.72$) reported higher perceived informational strength than those in the emotional framing condition ($M = 4.01, SD = 0.93$).

Additionally, perceived knowledge was a significant covariate, $F(1, 157) = 12.682, p < .001$, while need for cognition and prior knowledge were not statistically significant predictors.

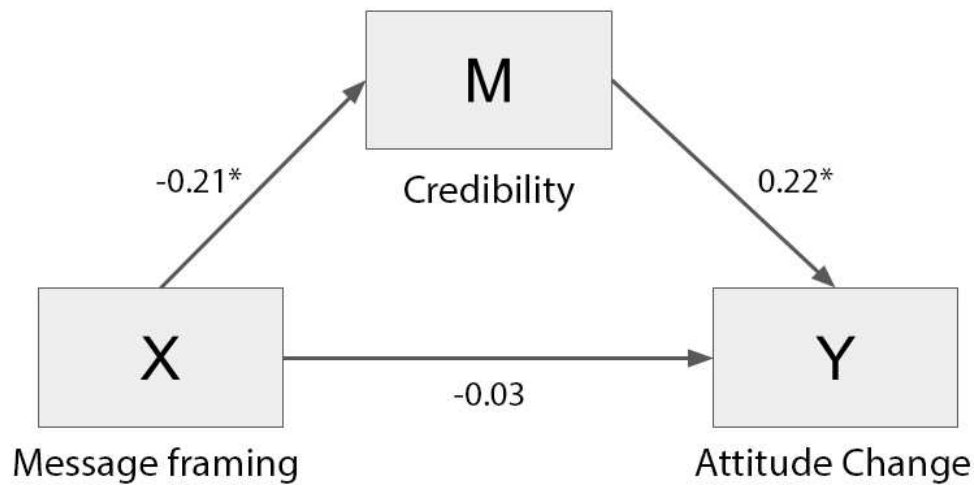
These findings suggest that factual framing enhances perceptions of argument strength, and therefore Hypothesis 2 was supported.

4.4 Hypothesis 3

A three-way mixed ANOVA was conducted to examine the effects of time (pre vs. post), message framing (emotional vs. factual), and need for cognition (low vs. high) on attitudes toward wolf reintroduction.

There was no statistically significant three-way interaction between time, message framing, and need for cognition, $F(1, 160) = 0.057, p = .812$, partial $\eta^2 = .000$. Therefore, Hypothesis 3 was not supported.

4.5 Hypothesis 4



Hayes' PROCESS Model 4 Mediation Analysis (Hayes et al., 2011).
 * = Statistically Significant

Figure 1. Simple Mediation Model 4 – Message Framing, Credibility and Attitude Change

A mediation analysis was conducted using PROCESS Model 4 (Hayes, 2017) to examine whether perceived message credibility mediated the relationship between message framing (0 = factual, 1 = emotional) and attitude change toward wolf reintroduction.

Message framing was a significant predictor of perceived message credibility, $b = -0.21$, $SE = 0.10$, $p = .036$, such that participants in the emotional framing condition perceived the message as less credible than those in the factual framing condition.

Perceived message credibility was, in turn, a significant predictor of attitude change, $b = 0.22$, $SE = 0.07$, $p = .003$, indicating that higher credibility was associated with more positive changes in attitudes toward wolf reintroduction.

However, the direct effect of message framing on attitude change was not statistically significant, $b = -0.03$, $SE = 0.09$, $p = .739$. Similarly, the total effect of message framing on attitude change was not significant, $b = -0.08$, $SE = 0.09$, $p = .410$.

The indirect effect of message framing on attitude change through perceived message credibility was tested using 5,000 bootstrapped samples. The indirect effect was significant, $b = -0.05$, with a 95% bootstrap confidence interval of $[-0.12, -0.001]$. Because the confidence interval did not include zero, this indicates a statistically significant indirect effect.

This result suggests that perceived message credibility serves as an indirect pathway, through which message framing influences attitudes, providing support for Hypothesis 4.

4.6 Post-Hoc Analysis

Given the significant interaction between time and need for cognition, post-hoc analyses were conducted to further examine differences in attitude change across levels of need for cognition. There was a statistically significant interaction between time and need for cognition, $F(1, 160) = 14.007$, $p < .001$, partial $\eta^2 = .080$.

Inspection of estimated marginal means indicated that individuals with higher need for cognition demonstrated greater changes in attitudes toward wolf reintroduction from pre-exposure to post-exposure compared to individuals with lower need for cognition. This pattern was consistent across both message framing conditions.

These findings suggest that individuals higher in elaboration were more responsive to the messaging overall, consistent with theoretical expectations from ELM.

CHAPTER 5: DISCUSSION

5.1 Overview and Rationale

This study examines how emotional versus factual message framing influences public attitudes toward wolf reintroduction in Colorado and how levels of audience involvement, defined by motivation and prior knowledge, affect message processing. Grounded in framing theory (Entman, 1993) and the ELM (Petty & Cacioppo, 1986), the project explores how people cognitively and emotionally respond to conservation communication. Human attitudes toward predator recovery are shaped by ecological understanding, moral values, trust, and perceived risk (Bruskotter & Wilson, 2014; Watkins et al., 2021), yet misinformation and emotional narratives often polarize public opinion (Feinberg & Willer, 2013; Niemiec et al., 2020a). By testing whether emotional messages activate peripheral processing and empathy, while factual messages encourage central, analytical evaluation, this study seeks to identify communication strategies that enhance trust, empathy, and engagement with wolf conservation while reducing polarization around wildlife management. The results provide partial support for the proposed theoretical relationships and offer new insight into how credibility functions as a mechanism of persuasion in conservation messaging.

5.2 Summary of Method

This study used a between-subjects experimental survey design with undergraduate participants recruited either through Colorado State University's SONA research platform, randomly throughout CSU's campus, or through MTurk. Participants were randomly assigned to view one of two short-form (30-45 second) video messages about wolf reintroduction - one framed emotionally and the other factually - and then complete a questionnaire measuring attitudes, affective response, perceived risk, and message credibility. Data was analyzed using ANOVA, ANCOVA, and mediation models to examine how message framing and elaboration interact to influence attitude change and emotional engagement, with validated instruments, random assignment, and pretesting used to control for confounding factors and ensure message equivalence (Appelman & Sundar, 2016; Slater, 2002).

5.3 Findings and Interpretation

The findings of this study provide partial support for the proposed hypotheses and offer important insights into how message framing and cognitive processing influence attitudes toward wolf reintroduction.

5.3.1 Limited Impact of Emotional Framing on Affective Response

Contrary to expectations, emotional framing did not significantly increase affective response compared to factual framing. Participants across both conditions reported similar levels of empathy and concern, suggesting that emotional appeals did not produce stronger emotional engagement in this context (Castillo-Huitrón et al., 2020; Nabi, 2015).

One possible explanation is that baseline levels of empathy toward wolves were already relatively high among participants, limiting the ability of emotional framing to produce

additional effects. When participants begin with elevated levels of empathy or concern, there is reduced variability in affective responses and less room for experimental manipulation to increase these responses further. As a result, both emotional and factual conditions may elicit similarly high levels of empathy, making it difficult to detect differences between message frames (Cuff et al., 2016; Eisenberg, 2000). Additionally, short-form video exposure may not have been sufficient to elicit strong emotional differentiation between conditions. Emotional responses are highly sensitive to situational cues and message intensity, and brief or low-immersion stimuli may not generate sustained affective engagement (Nezlek et al., 2007; Cuff et al., 2016). While emotional appeals can enhance attention and engagement, they may be less effective at producing measurable differences in affective response when exposure is limited or when messages lack narrative depth (Kwak et al., 2011; Teixeira et al., 2012).

5.3.2 Factual Messages Enhanced Perceptions of Informational Strength

As predicted, factual framing significantly increased perceived informational strength compared to emotional framing. Participants exposed to factual messages rated the content as more informative and evidence-based, suggesting that they were responsive to cues of argument quality rather than solely emotional appeal. In this context, higher perceived informational strength reflects not just the presence of information, but participants' judgments that the message was grounded in credible evidence and logical reasoning.

This finding is suggestive of central-route processing tendencies, in that participants appeared responsive to cues of argument quality and evidence-based information; however, because this study did not include direct measures of processing route, this interpretation should be treated as indicative rather than definitive (Petty & Cacioppo, 1986). Importantly, perceptions

of informational strength are closely tied to trust and legitimacy. In the context of conservation communication, factual messaging may therefore play a critical role in establishing trust and legitimacy.

5.3.3 Need for Cognition Predicted Attitude Change Independent of Framing

Hypothesis 3 was not supported. There was no significant interaction between message framing, time, and need for cognition, indicating that emotional and factual frames did not differentially influence attitude change based on elaboration level. One possible explanation for this is that the distinction between the emotional and factual frames may not have been strong enough to produce clearly different processing routes. According to ELM, differences between central and peripheral processing are most apparent when message cues are sufficiently distinct and when individuals rely on those cues to guide processing (Petty & Cacioppo, 1986). In this study, both message conditions contained relevant and coherent information about wolf reintroduction, which may have allowed participants across levels of need for cognition to process the content in similar ways. As a result, framing differences may not have been salient enough to produce the expected interaction effect.

However, a significant main effect of need for cognition on attitude change was observed. Individuals with higher elaboration tendencies showed greater overall attitude change regardless of framing condition. This suggests that cognitive engagement, rather than message type, may play a more important role.

5.3.4 Perceived Credibility Served as a Key Mechanism of Persuasion

The most substantive finding of this study is that perceived message credibility emerged as the primary mechanism linking message framing to attitude change, providing support for Hypothesis 4. Rather than framing producing attitude change directly, it did so indirectly: factual framing led to higher perceived credibility, and higher credibility in turn predicted more favorable attitudes toward wolf reintroduction. Participants in the emotional framing condition perceived the message as significantly less credible than those in the factual condition, and this credibility gap drove the downstream effect on attitudes.

Although message framing did not have a significant direct effect on attitude change, the indirect effect through credibility was statistically significant. This indicates that message framing influences attitudes indirectly by shaping how credible the message is perceived to be.

This finding highlights the importance of credibility as a key mechanism in conservation communication. Rather than directly influencing attitudes, message framing appears to operate through perceptions of trustworthiness and informational quality. This is consistent with prior research suggesting that message credibility plays a central role in persuasive outcomes (Appelman & Sundar, 2016; Slater, 2007). In the context of ELM, these results suggest that even when message content differs, audience evaluations of credibility may ultimately determine whether attitude change occurs.

5.3.5 Post-hoc Finding: Role of Elaboration

Follow-up analyses indicated that participants high in need for cognition exhibited greater shifts in attitudes from pre- to post-exposure compared to low-elaboration participants (Petty & Cacioppo, 1986). This reinforces the importance of audience characteristics in shaping message effectiveness and is broadly consistent with ELM's prediction that more involved

individuals tend to be more responsive to persuasive communication, though without direct measures of processing route, this pattern is best interpreted as suggestive of elaboration-driven engagement rather than confirmation of central-route processing.

A possible explanation for this is that individuals high in need for cognition are more motivated to engage in effortful, systematic processing of message content, making them more likely to evaluate arguments, integrate new information, and update their attitudes accordingly (Petty, Cacioppo, & Goldman, 1981; Petty & Cacioppo, 1986). In contrast, individuals lower in NFC are less likely to engage deeply with message content, resulting in smaller attitude changes overall.

In the context of this study, both emotional and factual messages communicated information about wolf reintroduction, which may have provided sufficient material for high NFC individuals to process and evaluate regardless of framing condition. As a result, these participants may have updated their attitudes based on the content itself rather than the specific framing of the message. This helps explain why elaboration was associated with greater overall attitude change, even in the absence of a significant interaction with message framing. In conservation communication contexts, this suggests that increasing audience engagement or involvement may be as important as message design in producing meaningful attitude change.

A related factor that may have further shaped how participants engaged with the messages is their baseline familiarity with wolf reintroduction prior to exposure. Participants in this study varied considerably in their prior knowledge of the issue, both objectively, as measured by the knowledge items in the pre-exposure survey, and subjectively, in terms of their self-reported familiarity. Within the ELM framework, prior knowledge functions as a component

of ability to elaborate. Individuals who enter a message encounter already familiar with the topic are better equipped to critically evaluate argument quality, regardless of how the message is framed (Petty & Cacioppo, 1986). This means that for participants with high baseline familiarity – particularly CSU students with greater likelihood of local exposure to the wolf reintroduction debate – the framing of the message may have mattered less than the content itself, since their existing knowledge scaffolded central-route processing independently of the stimulus condition. Conversely, participants with low prior familiarity may have relied more heavily on peripheral cues such as emotional tone or perceived credibility, which is consistent with the credibility mediation findings. Together, these patterns suggest that audience involvement in this study operates through both NFC and prior knowledge. (Petty & Cacioppo, 1986; Niemiec et al., 2020b).

5.4 Limitations and Justification

As with any experimental study, several limitations exist. The use of a student sample may limit generalizability to the broader Colorado population, particularly ranching or rural communities with direct experience of wolf reintroduction. In addition, the sample included participants recruited through Amazon Mechanical Turk, which may introduce differences in demographics, attention, and survey-taking behavior compared to undergraduate participants. Importantly, CSU students – living in Colorado – are more likely to be familiar with wolf reintroduction as a current and locally salient issue, whereas MTurk participants may reside in other states and have little to no prior exposure to the topic, potentially resulting in differences in familiarity and personal relevance. However, supplementary analyses indicated that controlling for sample type (CSU vs. MTurk) did not meaningfully change the pattern of results, suggesting

that the findings are relatively robust across these groups. Together, these samples are appropriate for initial testing because they provide variation in familiarity and exposure to the issue while allowing for examination of responses among digitally engaged audiences.

A key limitation of this study is that the manipulation check was not statistically significant, indicating that participants did not strongly distinguish between the emotional and factual framing conditions. Although the videos were designed to emphasize different types of message cues, the lack of a significant difference suggests that the framing manipulation may not have been sufficiently salient. This limitation is important because it reduces confidence that observed effects – or lack thereof – can be attributed solely to differences in message framing. In particular, the manipulation check may help explain why emotional framing did not produce stronger affective responses and why no interaction effects were observed with need for cognition. If participants did not clearly perceive one message as more emotional and the other as more factual, they may have processed both stimuli in similar ways, limiting the ability to detect differences across conditions. Future research should consider strengthening framing distinctions, such as increasing contrast in narrative tone, visual cues, or message structure, and pretesting these differences more extensively prior to full data collection.

Another limitation is the artificial nature of experimental stimuli. Although short-form videos simulate real-world digital communication, they cannot fully capture the complexity of social media discourse or interpersonal dialogue surrounding wildlife management. Despite this, experimental control allows for causal inference about message effects-a necessary step before scaling findings to applied settings (Slater, 2002).

Finally, the study focuses on self-reported attitudes, which may not directly translate to behavior. While this is an inherent limitation of many communication studies, attitudes remain a meaningful predictor of behavioral intentions under the theory of planned behavior (Ajzen, 1991). Understanding attitude formation is therefore a critical prerequisite to designing interventions that encourage coexistence behaviors, such as participation in non-lethal management or support for conservation policy.

Despite these limitations, this research is justified by its potential to fill an important gap in conservation communication scholarship. By examining the intersection of emotion, cognition, and trust in the context of predator recovery, this study provides actionable insights for both theory and practice.

5.5 Future Directions

Given that results partially supported the hypothesized effects, future studies could expand this framework by testing message framing across different platforms (e.g., Instagram, YouTube, or news media) and among distinct stakeholder groups such as ranchers, recreationists, or Indigenous communities. Longitudinal designs could also assess how emotional and factual framing affect attitude durability over time. In doing so, future work can move toward a more holistic understanding of how conservation communication fosters not only support but sustained coexistence between humans and wildlife.

Future research should also examine how an individual's characteristics such as political identity, environmental identity, and broader ideological orientation shape responses to conservation communication. Research on polarized environmental issues suggests that political

identity can function as a powerful filter through which audiences interpret conservation messages, with the same factual content being evaluated more or less credibly depending on whether it aligns with a recipient's worldview (Hart & Nisbet, 2012; Feinberg & Willer, 2013). Environmental identity, the degree to which individuals define themselves in relation to the natural world, may similarly moderate how emotionally resonant or personally relevant wolf reintroduction messaging feels, potentially amplifying or diminishing the framing effects examined. Future studies could incorporate measures of political affiliation, conservation values, and environmental identity to test whether these factors moderate the credibility and framing effects observed in this study, and to identify which audience segments are most and least responsive to different message strategies.

The role of message credibility warrants particular attention in future work. This study found that credibility mediated the effect of framing on attitude change, but several questions remain. Future research could explore how message source, institutional affiliation, and platform influence credibility perceptions, whether credibility functions differently for audiences with high versus low prior trust in wildlife agencies, and how repeated exposure to conservation messaging affects credibility over time. Addressing these questions would substantially advance understanding of how credibility-based persuasion operates in contested conservation spaces.

CHAPTER 6: CONCLUSIONS

This study examined how emotional and factual message framing influences public attitudes toward wolf reintroduction in Colorado, with a focus on the role of message credibility as a persuasive mechanism. Grounded in ELM and using a between-subjects experimental survey design, the study sought to understand not just whether framing affects attitudes, but how and the answer points to credibility. The findings position perceived message credibility as the study's primary contribution: a mechanism that explains when and why conservation messages succeed in shifting attitudes.

The findings provide partial support for the proposed hypotheses. While emotional framing did not significantly increase affective response and no interaction between framing and elaboration was observed, factual framing enhanced perceptions of informational strength. Most notably, perceived message credibility emerged as a significant mechanism of persuasion, mediating the relationship between message framing and attitude change. Additionally, individuals higher in need for cognition exhibited greater attitude change overall, regardless of framing condition.

Together, these results suggest that the effectiveness of conservation communication may depend less on whether messages are emotional or factual, and more on how credible they are perceived to be by the audience. By highlighting credibility as a central pathway of influence, this study contributes to a more nuanced understanding of how communication strategies can support public engagement with wildlife conservation and promote more informed, trust-based attitudes toward predator reintroduction.

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CHAPTER 8: APPENDICES

8.1 Data Collection Procedures

Data Collection Procedures:

1. Obtain IRB approval.
2. Upload stimuli and survey to Qualtrics.
3. Recruit participants via SONA, MTurk, and via QR code
4. Randomly assign participants to one of the two framing conditions.
5. Administer pre-exposure survey measuring
6. Present the stimulus post.
7. Administer post-exposure survey measuring dependent variables.
8. Collect demographic data and debrief participants.
9. Export and securely store anonymized data for analysis in SPSS.

8.2 Pre-Exposure Survey

Item(s)	Response Scale
“Imagine a nearby state is considering bringing back a predator species to restore ecosystem health. How much do you agree with this general approach?” “Large carnivores such as wolves are important contributors to biodiversity.” (1 = Strongly disagree - 5 = Strongly agree)	5-point Likert
"How important is the issue of the wolf reintroduction to you?" (1 = Not at all - 5 = Extremely important)	5-point Likert

“I enjoy reading articles that explain how ecosystems work in detail.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert
“Which of the following is true about wolf ecology? (Select one)” A. Wolves live in tightly knit family groups B. Wolves migrate like songbirds C. Wolves eat only plants D. I don’t know	Multiple Choice (Correct answer = A)
“Right now, I can concentrate fully on this study (I am not distracted).” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert
“How much do you know about wolf ecology and management?” (1 = Nothing - 5 = A great deal)	5-point Likert
“I think government agencies do a good job managing common wildlife species (e.g., deer, rabbits)” (1 = Very poor - 5 = very good)	5-point Likert
“In the last 6 months, how often have you seen news stories about wolves or wolf recovery?” (1 = Never - 5 = Very often)	5-point Likert

8.3 Post-Exposure Survey

Item(s)	Response Scale
“I support reintroducing wolves to their native habitats.” “Wolves play an important role in maintaining healthy ecosystems.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert
“This video was believable.” “This message seemed accurate.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert
“This video emphasized emotions rather than facts.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert

“While watching the video, I felt empathy for wolves.” “While watching the video, I felt concern for the future of wolves.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert
“This video provided strong, convincing arguments.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert
“I paid close attention to the video.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert
“Which of the following best describes where you grew up?” Urban / Suburban / Small town / Rural)	Multiple Choice
“What best describes your political affiliation?” Democrat / Republican / Independent / Other / Prefer not to say	Multiple Choice

8.4 Pretest Pre-Exposure Survey

Construct	Item	Response Scale	Purpose / Notes	Source(s)
Attitudes Toward Wolf Reintroduction	1. “Imagine a nearby state is considering bringing back a predator species to restore ecosystem health. How much do you agree with this general approach?” 2. “Large carnivores such as wolves are important contributors to biodiversity.” (1 = Strongly disagree - 5 = Strongly agree)	5-point Likert	Gauges baseline attitudes without revealing focus on wolves; reduces priming and demand effects.	Pate et al., 1996; Watkins et al., 2021; Slagle et al., 2019
Perceived Risk	3. “If a small park near my town reported	5-point Likert	Baseline perceptions of	Slagle et al., 2019;

	occasional wolf sightings, I would still visit the park.” (1 = Strongly Disagree - 5 = Strongly Agree)		risk and comfort with wolves, framed behaviorally to disguise intent.	Watkins et al., 2021
Issue Involvement	4. "How important is the issue of the wolf reintroduction to you?" (1 = Not at all - 5 = Extremely important)	5-point Likert	Personal relevance; predicts motivation for central-route processing	Petty & Cacioppo, 1986; Lazard & Atkinson, 2015
Motivation: Need for Cognition	5. “I enjoy reading articles that explain how ecosystems work in detail.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert	Motivation for elaboration; higher scores indicate preference for thoughtful information processing.	Petty & Cacioppo, 1986; Camilleri, 2022
Ability: Objective Knowledge	6. “Which of the following is true about wolf ecology? (Select one)” A. Few wolves live in tightly knit family groups B. Wolves migrate like songbirds C. Wolves eat only plants D. I don’t know	Multiple Choice (Correct answer = A)	Objective test of basic wolf knowledge; adds validity to self-reported ability	Adapted from Colorado Parks & Wildlife, 2023; CSU Center for Human-Carnivore Coexistence, 2020
Ability: Situational	7. “Right now, I can concentrate fully on this study (I am not distracted).”	5-point Likert	Situational ability	Petty & Cacioppo, 1986

	(1 = Strongly Disagree - 5 = Strongly Agree)			
Ability: Prior Knowledge	8. “How much do you know about wolf ecology and management?” (1 = Nothing - 5 = A great deal)	5-point Likert	Classifies central-route elaborators	Lazard & Atkinson, 2015; MacDonald et al., 2016
Filler / General Beliefs	9. “I think government agencies do a good job managing common wildlife species (e.g., deer, rabbits)” (1 = Very poor - 5 = very good)	5-point Likert	Neutral filler to present more obscurely	
Prior Exposure to Issue	10. “In the last 6 months, how often have you seen news stories about wolves or wolf recovery?” (1 = Never - 5 = Very often)	5-point Likert	Familiarity with topic	Niemiec et al., 2020a; Colorado Parks & Wildlife, 2023

8.5 Pretest Post-Exposure Survey

Construct	Item(s)	Response Scale	Purpose / Notes	Source(s)
Attitudes toward wolf reintroduction	1. “I support reintroducing wolves to their native habitats.” 2. “Wolves play an important role in maintaining healthy ecosystems.”	5-point Likert	Repeated from pre-test to measure post-attitude and change.	Pate et al., 1996; Watkins et al., 2021; Slagle et al., 2019

	(1 = Strongly Disagree - 5 = Strongly Agree)			
AI Attribution	3. "I believe this video was created using artificial intelligence." (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert	Manipulation check to assess whether AI attribution influences perceived credibility/ or framing effects	Sundar et al., 2015; Metzger & Flanagin, 2013
Perceived risk	4. "Wolves pose a threat to human safety." (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert	Repeated from pre-test to assess post-risk perception.	Slagle et al., 2019; Watkins et al., 2021
Message credibility	5. "This video was believable." 6. "This message seemed accurate." (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert	Evaluates perceived trustworthiness and accuracy; potential mediator.	Appelman & Sundar, 2016; Metzger & Flanagin, 2013
Manipulation check: framing perception	7. "This video emphasized emotions rather than facts." (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert	Confirms emotional vs. factual framing distinction.	Lazard & Atkinson, 2015; Niemiec et al., 2020b
Affective response / emotional intensity	8. "While watching the video, I felt empathy for wolves."	5-point Likert	Tests whether emotional frame elicits stronger affect.	Nabi, 2015; Feinberg & Willer, 2013

	9. “While watching the video, I felt concern for the future of wolves.” (1 = Strongly Disagree - 5 = Strongly Agree)			
Perceived informational strength	10. “This video provided strong, convincing arguments.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert	Measures perceived argument quality (central-route cue).	Petty & Cacioppo, 1986; Camilleri, 2022
Attention / engagement validation	11. “I paid close attention to the video.” (1 = Strongly Disagree - 5 = Strongly Agree)	5-point Likert	Checks attention and ability to elaborate.	Petty & Cacioppo, 1986; Hart & Feldman, 2016
Demographic	13. “Which of the following best describes where you grew up?” Urban / Suburban / Small town / Rural)	Multiple Choice	Control	Bruskotter & Wilson, 2014; Watkins et al., 2021
Political Affiliation	14. What best describes your political affiliation? Democrat / Republican / Independent / Other / Prefer not to say	Multiple Choice	Control	Hart & Nisbet, 2012; Feldman & Hart, 2016

