THESIS

EFFECTIVENESS OF PROMOTION OR PREVENTION MESSAGE FRAMES ON FOOD STORAGE MESSAGES ABOUT BLACK BEARS

Submitted by

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ABSTRACT

EFFECTIVENESS OF PROMOTION OR PREVENTION MESSAGE FRAMES ON FOOD STORAGE MESSAGES ABOUT BLACK BEARS

As conflict between humans and black bears (*Ursus americanus*) increases, researchers and managers look for strategies to decrease this conflict. One main driver of conflict is the availability of anthropogenic food. Bears are attracted to these food sources, conditioning them to continue to seek anthropogenic food and more frequently visit areas where humans are present. When a bear becomes food-conditioned, bears and people are at higher risk.

When humans store food properly in bear-proof storage containers, this risk decreases. However, motivating people to comply with proper food storage can be difficult. We hypothesized that promotion- and prevention-framed messaging placed on storage containers would help motivate behavior change.

No statistically significant difference was found between message frames. However, we did find support for constructs from the theory of planned behavior: subjective norms and perceived behavioral control. Results also inform future research on message framing and field research in park settings to motivate behavior change in visitors.

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Chapter 1. INTRODUCTION

In Colorado and across the United States, conflict between humans and black bears (*Ursus americanus)* is on the rise, largely due to human population growth and human development near bear habitat (Baruch-Mordo, Breck, Wilson, & Theobald, 2008). Conflict often leads to the injury and death of bears, injury to humans, and damage to property (Woodroffe, Thirgood, & Rabinowitz, 2005). To keep bears and people safe, there is an increased need for management for both black bears and humans, especially in park areas. There are strategies park managers can employ to decrease human-wildlife conflict but determining the best approach can be difficult. The purpose of this research was to explore the role of promotion- and prevention-framed messages in human-wildlife communication specific to black bears and food storage through regulatory focus theory, and the role that may play in decreasing human-black bear conflict.

1.1 Overviews and Rationales

Human behavior plays a large role in decreasing conflict between humans and black bears. One of the main drivers of this conflict is human food. Bears are attracted to calorically-dense human, or anthropogenic, food sources, especially in years when natural food sources are scarce (Colorado Parks and Wildlife [CPW], 2015). When given the choice between meeting a day's worth of food needs with berries or Big Mac's, the more efficient choice is clear. When bears become used to human food, they often become food-conditioned and their behavior becomes more dangerous and unpredictable (CPW, 2015). When people camp in park areas in bear habitat, leaving out anthropogenic food sources in campgrounds can attract bears, thereby increasing the potential for conflict (Peine, 2001). A multi-faceted approach is needed to create

significant change. While focusing the research lens on bear ecology is crucial, focusing on the human side of the human-wildlife conflict equation has the potential to create more long-lasting change (Baruch-Mordo, Breck, Wilson, & Broderick, 2009).

When park visitors store their food and trash in bear-proof food storage containers and dumpsters, conflict between humans and black bears has been shown to decrease because properly stored food limits bears' access to these anthropogenic food sources (Mazur, 2008). Food storage containers, or bear boxes, are sometimes provided at campsites for visitors to park areas to store food securely during their visit. The presence of bear boxes may play a role in behavior change. When these food storage containers are placed conveniently in campgrounds, visitors may feel that they can be more successful in storing their food because this resource is available (Martin & McCurdy, 2009).

However, encouraging visitors to use bear boxes can be difficult due to inconvenience for the visitor and the visitors' underestimation of potential risk (Martin & McCurdy, 2009; Gore, Knuth, Curtis, & Shanahan, 2007). Visitors' risk perceptions, behavioral intentions, and previous experience with black bears all play a role in behavior change (Gore, Knuth, Curtis, & Shanahan, 2006; Hall, Ham, & Lackey, 2010; Martin & McCurdy, 2009). Messages placed on and near bear boxes can increase the likelihood that a visitor will use the bear box, thereby increasing human safety and bear safety and decreasing potential conflict.

Because interacting with black bears poses potential risks to people (human food being taken by bears, injury to one's self or to others, etc.), communicating with people about behaviors that could limit risk is key. In park areas, messages are often communicated through signs because they can reach visitors even when staff is not present (Hall et al., 2010). Message content and consistency are crucial in determining the effectiveness of a sign (Marion & Reid,

2007). The types of information placed on those signs and how they are constructed, or framed, can influence how likely visitors are to change their behavior to comply with the message.

This study assessed the effectiveness of different message frames on food storage messages about black bears. In risk communication, framing messages in terms of gains (promotion) and losses (prevention) has become standard practice. These message frames draw on prospect theory, a framework for how people evaluate and make decisions in risky situations (Kahneman & Tversky, 1979), and more recently, regulatory focus theory (Higgins, 1997). Regulatory focus theory identifies what motivates people to act. People tend to seek out pleasure and avoid pain (Higgins, 1997). However, the way people go about seeking out pleasure and avoiding pain depends on the individual, the situation, or which needs they are seeking out. People have different motivations and needs and respond to information accordingly based on their needs. This is referred to as their regulatory focus.

There are two main regulatory focuses; they drove the message frames used in this study. Cesario, Corker, and Jelinek (2013) outline the following ways a regulatory focus might play out. 1) A person may be more motivated by experiencing pleasure, seeking good outcomes, nurturing their needs, and making sure things go right when pursuing a goal. In this case, people would tend to be more motivated by a message that is framed in terms of promoting the pleasures of adhering to a certain behavior. 2) A person may also be motivated by avoiding pain, avoiding bad outcomes, focusing on their security needs, and making sure things do not go wrong when pursuing a goal. In this case, people would tend to be more motivated by a message that is framed in terms of preventing the pains of not adhering to a certain behavior. Which message frame will be most effective is driven by multiple factors, including risk perceptions (Lee & Aaker, 2004).

1.2 Goal and Research Question

The purpose of this study was to determine which message frames were most effective in changing food storage behavior of park visitors, and if the presence or absence of food storage containers played a role in that behavior.

Research Question: Will promotion- or prevention-framed messages be more effective at persuading visitors to store their food properly and will the presence of food storage containers impact compliance?

To examine this question, a field experiment was conducted to observe whether campers properly stored their food when messages were framed with a prevention focus or a promotion focus, as well as how they stored their food when no message or food storage container were present (control). We also examined the role food storage containers themselves had on food storage compliance. An online follow-up survey was conducted to better understand campers' risk perceptions, behavioral intentions, previous experience with black bears, and demographic information to compare to actual behavior.

1.3 Organization of Proposal

This thesis suggests a framework for how best to study promotion- and prevention-framed messages in a food storage context, and if using different message frames will decrease human-wildlife conflict. Chapter 2 contains a review of relevant literature and theory in human-bear conflict and message framing theory, namely regulatory focus theory, and discusses how these frameworks can help inform the effectiveness of message frames. Chapter 3 includes method, background, variables, and participants for this study. Chapter 4 details the results of the research study and chapter 5 includes relevant discussion, limitations, and areas for future research.

Chapter 2. LITERATURE REVIEW

This research study draws on literature about human-wildlife conflict and message framing to determine how best to persuade people to change their behavior to use proper food storage techniques. Human-wildlife research is used to define and understand the problem, while message framing through regulatory focus theory provides us with a theoretical model to apply to food storage messages. Hypotheses are made on which message frames are most effective in food storage messages.

2.1 Background and Context

Conflict between humans and black bears is on the rise, largely due to bears becoming conditioned to human food (Baruch-Mordo, Wilson, Lewis, Broderick, Mao, & Breck, 2014). When this happens, bears can become unhealthy, injured, or killed, and humans are put in danger. Encouraging people to store their food properly can help mitigate these risks. To provide more background on this problem, we review literature to illustrate the nature of the problem and past research examining behavioral motivators, barriers, and communication interventions.

2.1.1 Human-Black Bear Conflict

Black bears are present throughout the United States and are especially prevalent in Colorado due to the amount of native habitat that is protected at the federal, state, and local levels. Wildlife officials conservatively estimate the population of black bears in Colorado to be between 17,000 and 20,000 (CPW, 2015). In Larimer County, Colorado, over 50% of land is publicly owned, much of which is within Roosevelt National Forest, Rocky Mountain National Park, and areas conserved and managed by state and local organizations (Great Outdoors

Colorado [GOCO] & Larimer County Department of Natural Resources [LCDNR], 2012). See Figure 1 for a map of these areas.

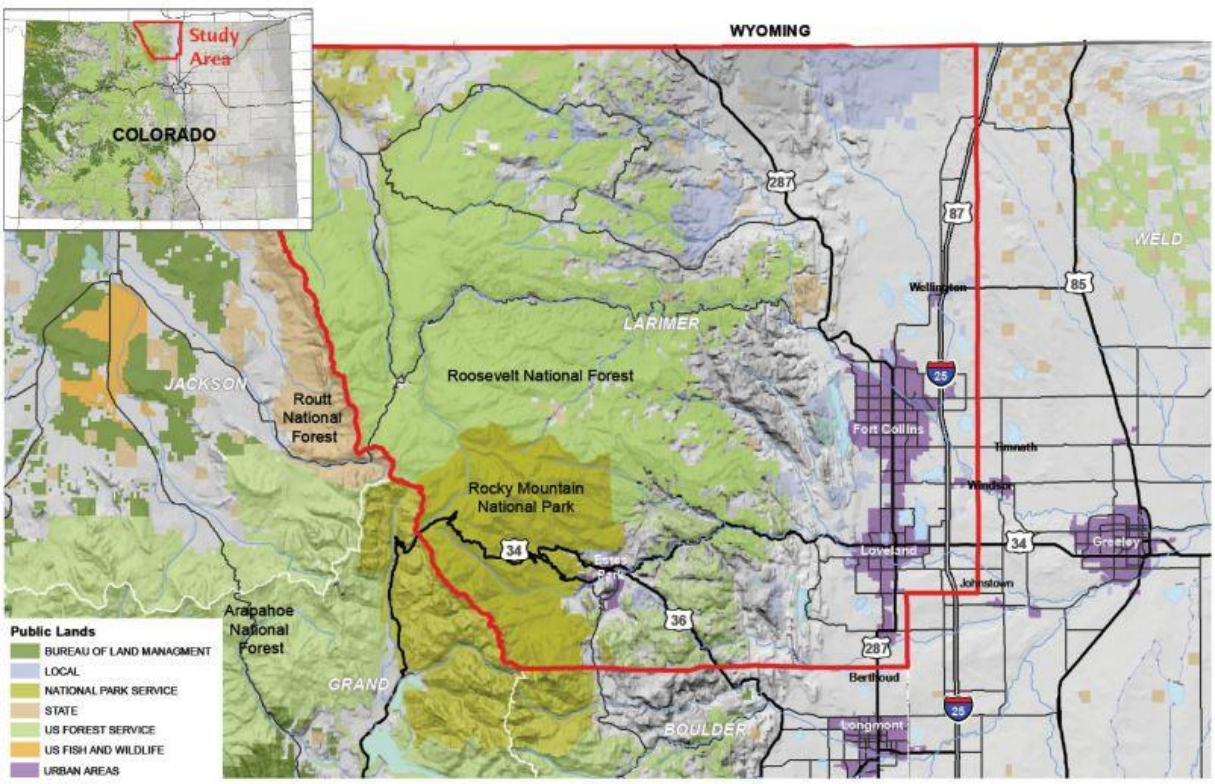


Figure 1. Map of Larimer County and land ownership (GOCO & LCDNR, 2012)

Public lands are often managed for multiple uses, including wildlife habitat and recreation. These areas offer prime habitat for black bears. As the population of Larimer County increases, so do opportunities for conflict between humans and black bears, especially in areas along the wildland-urban interface, places where public lands and urban areas come together. Campgrounds in areas more densely populated by humans are especially prone to human-bear conflicts because they are more accessible to humans due to proximity. Visitors spend more time recreating in these areas as well, usually staying overnight (Gore et al., 2007).

In Colorado, human-bear conflicts increase by about 4% each year, while human population increases by only 2% each year. Figure 2 shows Colorado population increase in blue and human-bear conflicts in red. Conflict varies widely based on availability of natural food sources for bears and is largely centered around "high-calorie human food sources" (CPW, 2015, p. 8).

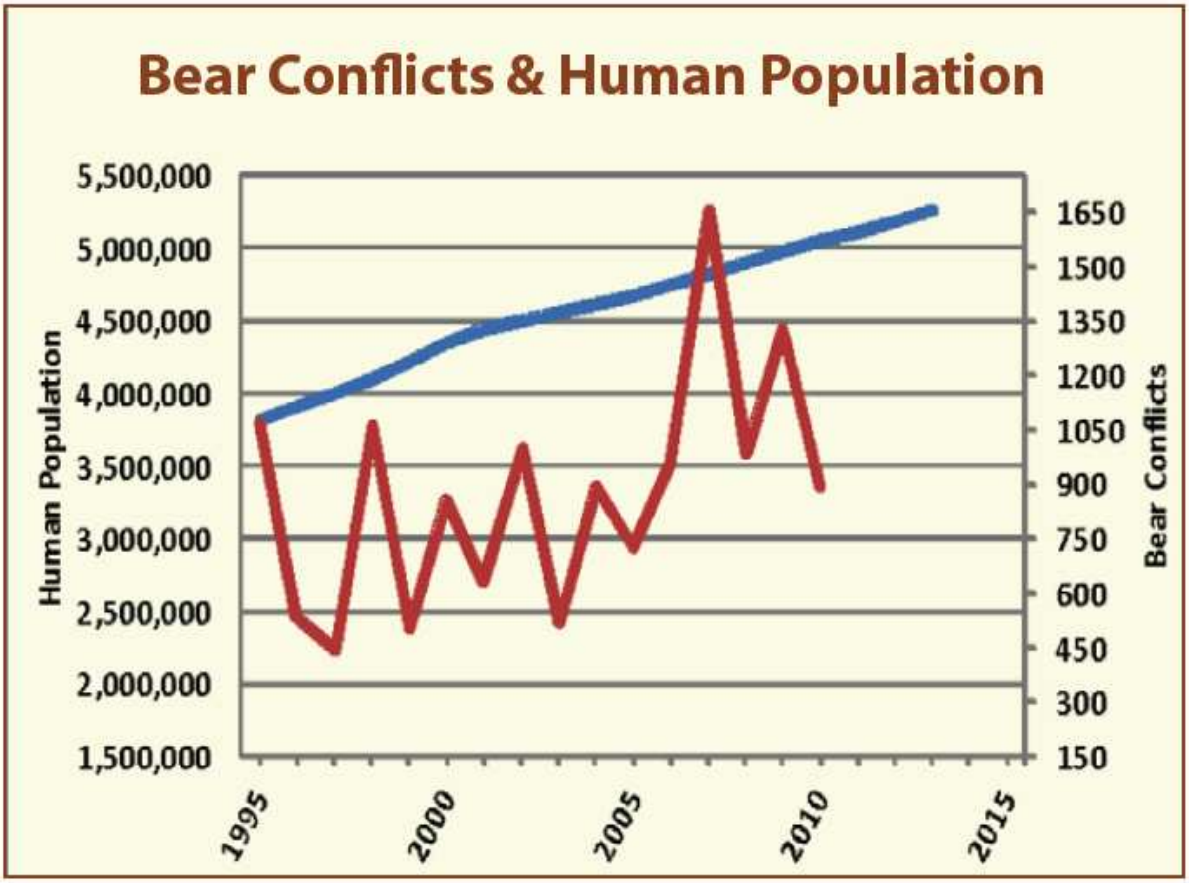


Figure 2. Bear conflicts and human population (CPW, 2015, p. 8)

2.1.2 Anthropogenic Food Attractants and Proper Food Storage

One of the main drivers of conflict between humans and black bears is the availability of anthropogenic, or human-caused, food sources, and attractants, such as food rations, trash, scented toiletries, and pet food (CPW, 2015; Peine, 2001). Anthropogenic food attracts black

bears to areas with a higher concentration of people and increases the risk of conflict. Oftentimes, black bears that consume human food become conditioned and must be relocated or euthanized. Humans can also be injured by black bears searching for food, and property can be damaged (Woodroffe et al., 2005).

Researchers have studied bears' foraging habits in urban areas to better understand what motivates bear behavior (Baruch-Mordo et al., 2014). Notably, bears change their foraging habits based on the natural food sources available to them in a given year. Even if bears have used urban areas for food in the past, these habits can be reversed in years where more natural food sources are available and less anthropogenic food is available (Baruch-Mordo et al., 2014). Therefore, even if bears have become conditioned to human food, they may change their behaviors if the availability of anthropogenic food decreases. As wildlife researchers continue to learn more about bears, they have called on social scientists to better understand factors that impact human behavior change. Focusing on changing human behavior has the potential for more long-term solutions because human behavior is often easier to influence than bear behavior (Baruch-Mordo et al., 2009).

2.1.3 Motivations and Barriers to Using Food Storage Containers

Using food storage containers in residential areas and campgrounds has been shown to effectively decrease conflict since anthropogenic food attractants drive human-black bear conflict (Martin & McCurdy, 2009; Mazur, 2008). Much of this research centers around food storage container use in settings where users are backpacking. They carried all their supplies, including food storage containers, with them in a backpack, and may or may not have used established campsites (Martin & McCurdy, 2009; Mazur, 2008).

When using food storage containers, people who complied cited several reasons for doing so. Participants used food storage containers to protect their food and themselves, and because they wanted to keep bears safe. They were also more likely to comply with using food storage containers when it was convenient and when they thought it was required (Mazur, 2008). However, not everyone uses designated food storage containers. Barriers to using containers include inconvenience of carrying and using containers, negligence, and lack of knowledge of how to properly procure, carry, and use a food storage container (Martin & McCurdy, 2009). In areas where people were camping at designated sites, they preferred sites that had containers installed on-site to avoid carrying their own containers. In fact, 43% of participants in Martin and McCurdy's study (2009) opted to use sites with food storage containers instead of carrying their own. Conveniently placed food storage containers increased visitors' perceived behavioral control, or their belief that they could successfully store their food (see section 2.2.1.1. Persuasion, Attitudes, and Behavior Change for more on this; Martin & McCurdy, 2009).

2.1.4 Black Bear Communication Strategies

With the promising impact of using food storage containers to decrease human-black bear conflict, how can researchers and park managers encourage the use of food storage containers? There are several strategies researchers and practitioners have employed, including education, messaging, and signage.

Education programs, such as "Bear Aware," are a popular option for park managers when working to increase knowledge about black bears and educating people on strategies to reduce conflict. However, education by itself is not effective at changing behavior. Programs must contain effective message strategies and be combined with enforcement to increase effectiveness (Baruch-Mordo, Breck, Wilson, & Broderick, 2011; CPW, 2015; Dietsch, Slagle, Baruch-

Mordo, Breck, & Ciarniello, 2017; Gore, Knuth, Scherer, & Curtis, 2008). How these messages are delivered can impact their efficacy.

Signs are an important means of communication in park areas because they can reach visitors even when staff is not present (Hall et al., 2010). They can also be placed at the location where a desired behavior should take place so visitors may interact with signs at the appropriate time (Marion & Reid, 2007). For example, signs could be placed on and near food storage containers at campgrounds so visitors would be exposed to the signs at the time when using the food storage containers is most crucial. Marion and Reid (2007) also note that being consistent with the way a sign is designed, limiting the overall number of messages on a sign, and making sure the information comes from a credible source are key to effectiveness. Figure 3 illustrates how these principles can be integrated on a sign.

Figure 3. Example wildlife communication sign

While signs can be an effective way to share information with visitors, using a well-established message frame is imperative to the success of the sign as it can lead to behavior change. A message frame refers to how information is constructed and organized (Nabi & Moyer-Guse, 2012). Wildlife communication has found success with presenting messages as a social norm, that is, something everyone else is doing (Winter, 2006; Winter, Cialdini, Bator, Rhoads, & Sagarin, 1998). Researchers have also noted that aligning messages with values visitors hold towards wildlife can also be effective in motivating behavior change (Miller, Freimund, Metcalf, & Nickerson, 2017; Teel & Manfredo, 2009; Teel et al., 2010). While these approaches are valuable, we analyzed message framing theory from other areas of research to help determine which approach is most appropriate.

2.2 Theoretical Framework

The way a message is framed, or constructed, can persuade readers to change their behavior. Message framing theories and the theory of planned behavior provide insights into which messages may be effective in persuading park visitors to change their behavior.

2.2.1 Framing

The concept of framing refers to how a message is constructed and organized, and the immediate effect that the message has on the receiver (Shah, McLeod, Gotlieb, & Lee, 2009). Framing uses information that may be important to the receiver and, by calling out that information, increases the salience of the information (Entman, 1993). How a message is framed affects how it is interpreted by the receiver, or how persuasive a message is to the receiver. Message framing gives insights into how best to construct food storage messages to persuade visitors to store their food properly.

2.2.1.1. Persuasion, Attitudes, and Behavior Change

Within message framing literature, "persuasion is typically understood as a process whereby a message sender intends to influence an (uncoerced) message receiver's evaluative judgments regarding a particular object" (Nabi & Moyer-Guse, 2012, p. 2). The process of crafting messages is intentional. Unintentional persuasive impacts that messages may have are not categorized as framing. While several areas of research in persuasion exist (Eagly & Chaiken, 1993; Petty & Cacioppo, 1986), they share a similar premise that intentional messages are persuasive because they can influence a person's attitudes, behavioral intentions, and behavior (Nabi & Moyer-Guse, 2012).

The connection between attitudes and behaviors comes from the theory of reasoned action (Ajzen & Fishbein, 1980) and the theory of planned behavior (Ajzen, 1991, 2002). They identify three considerations – attitude toward a behavior, subjective norm, and perceived behavior control – that lead to intention to act, which in turn leads to the behavior. This relationship is shown in Figure 4 and is the reason message framing can be effective at affecting behavior. By addressing these factors in the message, communicators can more effectively manipulate messages to impact behavior.

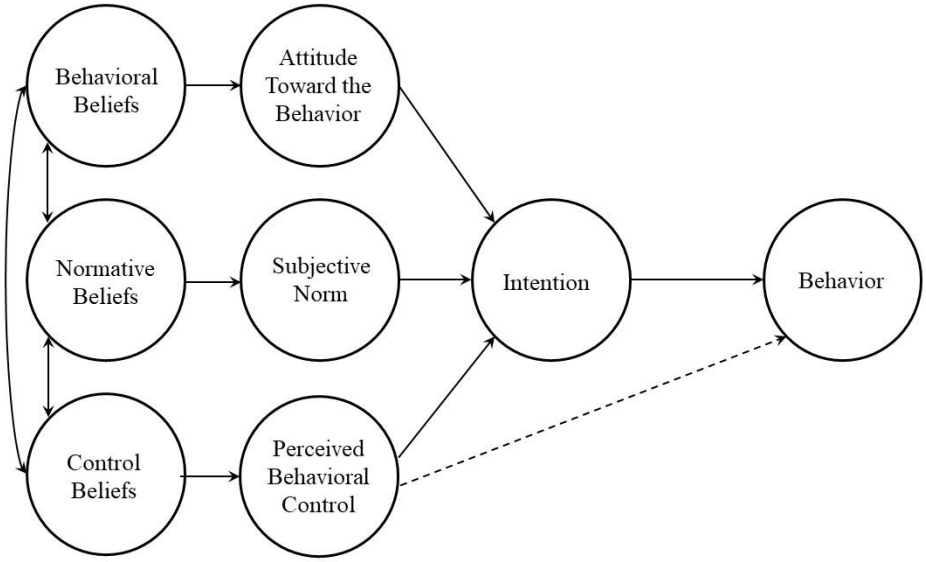


Figure 4. Theory of planned behavior (adapted from Ajzen, 2002)

Ajzen (1991, 2002) provides definitions for each factor in the theory of planned behavior, as well as the beliefs that inform each factor. Behavioral beliefs are views about the likely consequences of a behavior. These beliefs inform attitudes, which are defined as a person's favorable or unfavorable appraisal of a behavior or idea. Normative beliefs are views that inform expectations of others, while subjective norms are the perceived pressures a person feels to perform or not perform a behavior from others. Control beliefs are beliefs about factors that may further or hinder performance of a certain behavior. These beliefs inform perceived behavior control, which refers to a person's self-efficacy. If people believe they can perform an action, they are more likely to change their behavior. Each of these beliefs, or factors, lead to intention, which is defined as how willing someone is to engage in a behavior. In general, the stronger someone's intentions, the more likely they are to engage in a behavior.

The theory of planned behavior has been applied to human-wildlife research because it gives researchers and practitioners more insight into which management strategies may be most

effective in impacting behavior change (St. John, Keane, Jones, & Milner-Gulland, 2014). Research on food storage suggests that the presence of food storage containers may positively influence perceived behavioral control, thereby increasing the likelihood that visitors will store their food properly (Martin & McCurdy, 2009). That is, the presence of food storage containers may increase visitors' beliefs that they can store their food properly. As seen in Figure 4, perceived behavioral control may also directly influence behavior change. In addition, a person may have a favorable attitude toward black bears or food storage (perhaps influenced by a message on a sign) and feel pressured from fellow campers to utilize food storage containers. All of these factors can increase campers' intention to use a food storage container and, ultimately their actual behavior.

Self-efficacy, or the degree in which a person has confidence in their capabilities and how their belief in those capabilities exerts control over their behavior can also play a role in behavior change (Bandura, 1982). It can help regulate how people take in and respond to new information.

Message framing and the role it has on persuasion and behavior change are important because how a food storage message is framed may determine how that message is interpreted by receivers and how likely they are to change their attitudes and behaviors based on the message. The concept of framing has been studied for decades. From a historical standpoint, it is important to understand message framing so we can avoid some of the theoretical inconsistencies present in the literature.

2.2.1.2. Messaging Framing Background and Schemas

Message framing refers to how information is conceptualized by people and how meaning is attached to that information (Chong & Druckman, 2007; Gamson & Modigliani,

1987; Tuchman, 1978). Understanding the foundations of message framing can help us define how messages will be conceptualized in this study.

The mechanism by which framing operates is largely through activating a person's schemas, or knowledge structures, which they use to interpret information (Fiske & Taylor, 1991; Scheufele, 2000). Schema theory posits that people have limited cognitive resources. Because of these limited resources, they create general knowledge structures about certain objects or ideas to help save the time and cognitive energy needed to process information. These can also be thought of as mental shortcuts (Fiske & Taylor, 1991).

For example, when a person reads a message that mentions a chair, the reader may have an idea of a chair that comes to mind – perhaps a comfortable armchair in their living room or the chair at their desk. The message itself does not need to describe all the experiences a person has had with chairs. Past experiences and knowledge are activated and, perhaps, added to, when a message mentions a chair. Schemas help a reader organize and interpret information in a more efficient manner. By activating existing schemas, framing can have a greater effect on the audience by tapping into their existing knowledge structures and experiences.

Framing has been studied heavily in the communication field, especially when looking at how news content is structured. Scholars in this tradition conceptualize framing not only as manipulating the way the message is presented but the content of the message itself. This has been coined emphasis framing (Cacciatore, Scheufele, & Iyengar, 2016; Scheufele & Iyengar, 2017). Because emphasis framing often compares messages that are not logically equivalent, there has been more confusion than clarity in the way message frames are operationalized and compared, including confusion with other related concepts such as agenda setting and priming.

Framing effects apply to the immediate response that a message elicits and how applicable that information is to the receiver (Shah et al., 2009). This differs from agenda setting, which focuses more on how accessible information is to the receiver. Traditionally, agenda setting is defined as not telling viewers what to think, but what to think about (McCombs & Shaw, 1972). For example, if the topic of black bears has been in the news frequently and recently, audience members will be more likely to think black bears are an important issue than they will topics that have been covered less frequently and recently. Like framing, priming refers to the activation of schemas to make information more accessible for use by the audience. However, the effect of priming is driven by how recent and how often audiences are exposed to messages, and happens over a long period of time, not just immediately after a reader was exposed to a message.

Agenda setting, priming, and framing have been combined in the past for parsimony (Scheufele, 2000). However, this has led to varied results that do not provide a clear path forward for research. It is important to understand the theoretical foundations of framing to effectively advance theory. This study focused on prospect theory and regulatory focus theory because of their theoretical ties to equivalence framing and risk communication.

2.2.1.3. Message Framing in Prospect Theory and Regulatory Focus Theory

The field of psychology, namely prospect theory and regulatory focus theory, has taken a different approach to message framing. These approaches use equivalence framing, where information is logically equivalent and only the way it is presented (the frame) is manipulated (Cacciatore et al., 2016; Scheufele & Iyengar, 2017). This type of framing addresses much of the ambiguity surrounding emphasis framing. Equivalence framing in the context of psychology was the focus of this study as these frameworks have been tested and applied to risky situations, such

as health. Because human-bear interactions contain an element of risk, we suggest that results found in other studies are transferable to this context.

In the fields of psychology and behavioral economics, prospect theory introduced the concept of framing, which explains decision-making when a person's prospects are risky/uncertain (Kahneman & Tversky, 1979). Messages are framed in terms of what a person stands to gain from adopting a certain behavior or what a person stands to lose from adopting a certain behavior. Outcomes are expressed in terms of gain and losses, or "as positive or negative deviations from a neutral reference outcome" (Tversky & Kahneman, 1981, p. 484). That is, when information that is logically equivalent is presented, or framed, in terms of gains or losses, people make different decisions, especially when that information has to do with risk. This finding was key because it showed that people often make irrational choices. Previous theory, expected utility theory, assumed that people make rational choices in uncertain situations (Keeney & Raiffa, 1976).

In an experimental laboratory setting, the predominant findings of prospect theory were that, when risks were framed as losses instead of gains, people were more likely to act (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981). Additionally, people tend to be less likely to take risk, or are risk-averse, when gains are involved and more likely to take risks, or risk-taking, when losses are involved (Kahneman & Tversky, 1981). While many of Kahneman and Tversky's experiments focused on financial decisions, one experiment that has more of a social science application from their 1981 research is described here. Participants were given the following scenario, then asked to choose between the options presented below. We have bolded the preferred choice from participants in the example below for clarity. Problem 1 is framed in terms of gains and Problem 2 is framed in terms of losses.

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows.

- Problem 1:
  - **If program A is adopted, 200 people will be saved. [72% chose]**
  - If program B is adopted, there is a 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.
- Problem 2:
  - If program C is adopted, 400 people will die.
  - **If program D is adopted, there is a 1/3 probability that nobody will die, and 2/3 probability that 600 people will die. [78% chose]**

Even though programs A and C are equivalent and programs B and D are equivalent, people are less likely to take a risk in the gain-framed scenarios (Problem 1) and more likely to take a risk in the loss-framed scenarios (Problem 2).

As gain- and loss-framed messages have been applied in behavioral economics and the health field, mixed results have been found (Barberis, 2013; O'Keefe & Nan, 2012; Van 't Riet et al., 2016). One key hypothesis in the health field was that gain-framed messages would be more effective for prevention behavior (preventing a disease from occurring), while loss-framed messages would be more effective for detection behavior (detecting the presence of a disease), (Rothman, Bartels, Wlaschin, & Salovey, 2006). However, as researchers tested this hypothesis, along with a slew of moderators such as gender (Kim, 2012), point of reference (Lu, Seimer, Baumer, & Decker, 2018), and target behavior (Shen & Koller, 2015), they obtained inconsistent results. Reasons for this include wide variations in the way messages are framed and measured, how risk is conceptualized, and how gains and losses are operationalized (Van 't Reit et al., 2016). Another important factor is that an individual may perceive risk differently, causing a loss or gain frame to have a different impact on the individual (Rothman & Salovey, 1997).

These inconsistent findings are not cause for dismay. On the contrary, they provide an opportunity to look to other ways to frame messages associated with risk that can be manipulated in a more consistent way to build theory and provide reliable resources for practitioners.

2.2.2 Regulatory Focus Theory

Regulatory focus theory is a promising framework that also comes from psychology and resolves some of the issues of gain and loss framing under prospect theory, albeit tangentially. Especially in health communication, researchers have tackled some of the shortcomings of applying prospect theory by being more intentional with how messages are framed (Cesario et al., 2013).

Regulatory focus theory is built on the hedonic principle, which focuses on what motivates people to act. This principle suggests that people seek out pleasure (gains) and avoid pain (losses) (Freud, 1952; Higgins, 1997). However, the way people go about maximizing pleasure and minimizing pain depends on the individual and which needs they are seeking. People have different motivations and needs and respond to information accordingly based on their needs. This is referred to as their regulatory focus. There are two main regulatory focuses. 1) A person may have a more nurture-related regulation, in which case a focus on promotion would be more effective (gain); or 2) a person may have a security-related regulation, in which case a prevention focus (loss) would be more effective (Higgins, 1997). Kahneman and Tversky (1981) alluded to pleasure and pain, as well as a predisposition to a certain orientation, in their work on prospect theory as well, perhaps foreshadowing the need for the kinds of distinctions that regulatory focus theory provides:

> The common conception of rationality…requires that preferences or utilities for particular outcomes should be predictive of the experiences of satisfaction or displeasure associated with their occurrence. Thus, a man could be judged irrational either because his preferences are contradictory or because his desires and aversions do not reflect his

> pleasures and pains. The predictive criterion of rationality can be applied to resolve inconsistent preferences and to improve the quality of decisions. A predictive orientation encourages the decision-maker to focus on future experience and to ask "What will I feel then?" rather than "What do I want now?" The former question, when answered with care, can be the more useful guide in difficult decisions. In particular, predictive considerations may be applied to select the decision frame that best represents the hedonic experience of outcomes (p. 458).

2.2.2.1. Self-Regulatory Framework

The self-regulatory framework takes many concepts of regulatory focus and applies them to message framing. Using the self-regulatory framework allows researchers to explain different effects across a variety of topics using the same approach (Cesario et al., 2013). There are several ways to frame messages to align with a regulatory focus. These levels of framing should be conveyed differently if someone has a prevention focus or a promotion focus.

A person's hedonic consequences, outcome sensitivities, regulatory concerns, and strategy for pursuing goals must be considered. Each of these factors represents a different level of framing that is possible when crafting messages. When used together, these factors make up the self-regulatory framework, presented in Table 1 and outlined below (Cesario et al., 2013). Whereas emphasis framing deals more with activating a person's schemas, this self-regulatory framework directly addresses a person's motivations. When people are more motivated to engage with a message, they are subsequently more likely to change their attitudes, behavioral intentions, and behaviors (Ajzen, 1991; Eagly & Chaiken, 1993).

Table 1. Framing levels in a self-regulatory framework (Cesario et al., 2013, p. 240)

Level:	Question asked:	Framing is in terms of...	Abstract form of manipulation:
I. Hedonic consequences	What are the hedonic consequences of the behavior?	Pleasures of adherence	"If you follow the recommendation, you will experience pleasure."
		Pains of non-adherence	"If you don't follow the recommendation, you will experience pain."
II. Outcome sensitivities	What is pleasure and pain?	Pleasure: presence of positives (gains)	"If you follow the recommendation, you will get good outcomes."
		Pain: absence of positives (non-gains)	"If you don't follow, you will miss out on good outcomes."
		Pleasure: absence of negatives (non-loss)	"If you follow the recommendation, you will avoid negative outcomes."
		Pain: presence of negatives (loss)	"If you don't follow, you will experience bad outcomes."
III. Regulatory concerns	What *kinds* of outcomes do I care about?	Fulfilling growth & nurturance needs	"If you follow the recommendation, you will meet your nurturance needs."
		Meeting safety & security needs	"If you follow the recommendation, you will meet your safety needs."
IV. Goal-pursuit stategies	What means or strategies do I use to attain my goal?	Eager approach means	"Make sure everything goes right when attaining your goal."
		Vigilant avoidance means	"Avoid anything that could go wrong when attaining your goal."

Cesario et al. (2013) explain that hedonic consequences refer to a person's desired end-state. Everyone wants to attain a certain desired outcome and avoid undesired end-states or outcomes. People with a prevention focus are more motivated by pleasure, therefore messages that include the pleasures of adhering to a certain behavior will likely be more effective. For people with a promotion focus, pain is more motivating and the pains of non-adherence to a behavior should be emphasized (Cesario et al., 2013).

Outcome sensitivities refer to how pleasure and pain are defined for a person. People with a promotion focus define pleasure as the presence of a positive outcome (gain) and pain as the absence of a positive outcome (non-gain). People with a prevention focus define pleasure as the absence of negative outcomes (non-loss) and pain as the presence of negative outcomes (loss) (Cesario et al., 2013).

People tend to self-regulate towards certain regulatory concerns or attention towards certain needs. A promotion focus causes people to self-regulate towards advancing their growth and nurturance needs, while a prevention focus causes people to self-regulate towards fulfilling and maintaining their safety and security needs (Cesario et al., 2013).

People use different strategies for pursuing goals, called regulatory focus. When a promotion focus is predominant, people take an eager approach – they search for ways to advance and are open to possibilities. When a prevention focus is predominant, people use a strategy called vigilant avoidance – they are careful to avoid mistakes and pitfalls in achieving their goals (Cesario et al., 2013).

Regulatory fit is an area of research that refers to a person's goal pursuit strategy specifically. "When the preferred means of goal pursuit are used, people experience regulatory fit and the goal pursuit process feels right" (Cesario et al., 2013, p. 247; Higgins, 2000). However, this differs from regulatory focus because it deals more with how the message is delivered, rather than how the message is framed, and how people choose to seek out information to meet their goals. When their regulatory focus matches up with the message delivery, this is referred to as regulatory fit (Cesario et al., 2013). This is a separate area of research, as it refers to the delivery of information rather than the message frame itself and will not be discussed further in this study.

Cesario et al. (2013) contend that mixed results have been found with gain/loss framed messages due to a lack of attention by researchers to regulatory concerns and outcome sensitivities. First, if a message focuses on a nurturance need or a safety need, this focus may induce a regulatory focus and negate a gain or loss frame. "For example, exercise could be described as leading to growth-related outcomes (better development) or safety-related concerns (stronger immune system)" (Cesario et al., 2013, p. 240). In this case, a gain/promotion frame would be more persuasive for the "better development" message and a loss/prevention frame would be more persuasive for the "stronger immune system" frame, even though both messages are framed as gains.

Second, in the case of outcome sensitivities, "researchers have not been sensitive to differences between the presence of positive outcomes and the absence of negative outcomes (gain vs. non-loss information) and between the absence of positive outcomes and presence of negative outcomes (non-gain vs. loss information)" (Cesario et al., 2013, p. 241). If messages were framed comparing the presence of a positive outcome and the absence of a negative outcome, they may be measuring the same thing, therefore no difference would be found.

When framing messages for different regulatory focuses, Cesario et al. (2013) recommend the following text as ways of manipulation to ensure messages are framed in an intentional way. We have added the corresponding framing level in parentheses (p. 240):

- Promotion focus:
    - "If you follow the recommendation, you will experience pleasure." (Hedonic consequences)
    - "If you follow the recommendation, you will get good outcomes." (Outcome sensitivities)
    - "If you don't follow, you will miss out on good outcomes." (Outcome sensitivities)
    - "If you follow the recommendation, you will meet your nurturance needs." (Regulatory concerns)

    - "Make sure everything goes right when attaining your goal." (Goal-pursuit strategies)
- Prevention focus:
    - "If you don't follow the recommendation, you will experience pain." (Hedonic consequences)
    - "If you follow the recommendation, you will avoid negative outcomes." (Outcome sensitivities)
    - "If you don't follow, you will experience bad outcomes." (Outcome sensitivities)
    - "If you follow the recommendation, you will meet your safety needs." (Regulatory concerns)
    - "Avoid anything that could go wrong when attaining your goal." (Goal-pursuit strategies)

2.2.2.2. Applying Regulatory Focus Theory

Researchers have found that using promotion- and prevention-framed messages leads to changes in attitudes and behavior because this approach is more persuasive. We know from the literature that a person's regulatory focus can be chronic or induced (Cesario, Grant, & Higgins, 2004; Förster, Grant, Idson, & Higgins, 2001; Freitas & Higgins, 2002; Higgins, Idson, Freitas, Spiegel, & Molden, 2003; Spiegel, Grant-Pillow, & Higgins, 2004). While people tend to have a chronic focus that they default to, a promotion or prevention focus can also be induced by calling someone's attention to that particular focus before the message is delivered. Focus can also depend on the topic and/or content of the message (Cesario et al., 2013).

How people perceive risk moderates which message focus will be more effective. If risk perceptions are high, a prevention focus is likely to be more effective. Similarly, if risk perceptions are low, a promotion focus should be more effective (Cesario et al., 2013; Lee & Aaker, 2004). Each person may have different risk perceptions that influence which type of focus may be more effective for a certain topic, regardless of their chronic focus (Lee & Aaker, 2004).

Promotion and prevention message frames have been used in fields such as health (see Cesario et al., 2013 for an overview) and politics (Bertolotti & Catellani, 2014; Mannetti, Brizi,

Ciacomantonio, & Higgins, 2013). Testing these message frames has shown that pairing gains and non-gains with a promotion focus and losses and non-losses with a prevention focus increases messages effectiveness (Cesario et al., 2004; Cesario & Higgins, 2008; Dijkstra, Rothman, & Pietersma, 2011; Lee & Aaker, 2004).

While promotion and prevention message frames have been studied and applied in other fields, they have not been studied much in the context of human-wildlife interactions. We applied these message frames to messages about proper food storage by emphasizing the pleasures of adhering to food storage recommendations in the promotion message, and the pains of not adhering to food storage recommendations in the prevention message.

2.3 Need for This Study

Conflict between humans and black bears is on the rise and is largely driven by the availability of anthropogenic food, particularly in parks and campgrounds (Peine, 2001; Townes, Laughlin, & Rubio-Derhammer, 2000). Bears have been injured and killed, humans have been injured, and property has been damaged (Woodroffe et al., 2005). By providing proper food storage containers for visitors to campground areas, managers can reduce the likelihood that humans will have negative interactions with black bears (Martin & McCurdy, 2009; Mazur, 2008). However, persuading visitors to use proper food storage techniques is difficult, which leads to persistence of the problem (Baruch-Mordo et al., 2011). Therefore, we looked to theoretical frameworks from message framing literature to inform how best to persuade park visitors to store their food properly, thereby increasing their safety and the safety of bears.

In past research, messages framed as gains and losses have garnered mixed reviews (Van ‘t Reit et al., 2016). We still do not have a clear understanding of how best to apply these messages in the framework of prospect theory. Gain- and loss-framed messages have even been

tested in a wildlife context in the past, with inconclusive results (Lu, Siemer, Baumer, Decker, & Gulde, 2016; Lu et al., 2018). As researchers search for possible explanations for these mixed results such as moderators and specific communication category areas, regulatory focus theory provides a promising theoretical framework to clarify and advance the literature and provide guidance to frame messages in a way that focuses on promotion (gains) or prevention (losses). This study aimed to advance the literature on regulatory focus by testing the self-regulatory framework by framing messages in an intentional way that accounted for regulatory focus.

Pairing gains and non-gains with a promotion focus and losses and non-losses with a prevention focus increases messages effectiveness (Cesario et al., 2004; Cesario & Higgins, 2008; Dijkstra et al., 2011; Lee & Aaker, 2004). Because research has shown this relationship repeatedly across multiple contexts, we did not test that relationship in this study. Instead, we determined whether promotion and prevention frames are applicable to communication about human-wildlife conflict. Because these message frames have been tested in multiple contexts, we suggest that findings in this study are transferrable to multiple human-wildlife applications.

For the purpose of this study, we focused on which frame is most appropriate to use in a field setting and examined message effects on campers' proper food storage behavior. As we have shown, interactions between humans and black bears are risky (Gore et al., 2006); therefore, how people perceive risk is a key indicator for which message focus will be more effective. High risk perceptions indicate a prevention focus is likely to be more effective and low risk perceptions indicate a promotion focus should be more effective (Lee & Aaker, 2004). In a campground setting, it is unrealistic to provide messages tailored to an individual based on their chronic regulatory focus. One consistent message should be applied to all communication (Marion & Reid, 2007). This gave us the opportunity to ensure all messages about food storage

utilized the same induced regulatory focus. Although an individual may have different risk perceptions that influence which type of focus may be more effective, we looked to literature on risk perceptions around human-black bear conflict.

Research shows that perceived risk associated with human-black bear conflict is generally low (Gore et al., 2006; Siemer, Hart, Decker, & Shanahan, 2009). Siemer et al. (2009) cite the news media's portrayal of low risk about black bears and people's generally positive interactions with black bears as factors that drive this low risk perception. Therefore, we hypothesized that a promotion-framed message would be more effective than a prevention-framed message in persuading campers to comply with food storage guidelines to reduce conflict with black bears.

Finally, the presence of food storage containers themselves could also have a potential impact on whether visitors store their food properly by impacting their subjective norms or perceived behavioral control (Ajzen, 1991). Visitors may feel more pressure to conform to normative behavior expected in campgrounds or feel they are more equipped to comply with storing food properly if food storage containers are present. Research suggests that visitors may be motivated to store their food properly when these containers are present, but this is not always the case (Mazur, 2008). Therefore, we tested messages in a setting where food storage containers were present, as well as when they were not present, to discern if this has an impact on compliance.

2.4 Research Question and Hypotheses

Research Question: Will promotion- or prevention-framed messages be more effective at persuading visitors to store their food properly to reduce conflict with black bears and will the presence of food storage containers impact compliance?

To examine this question, a field experiment was conducted to observe whether campers properly stored their food when messages were framed with a prevention focus or a promotion focus, as well as how they stored their food when no message was present (control). We also examined the role food storage containers themselves had on food storage compliance. Based on the literature review and theoretical framework, we explored the following hypotheses:

- **Hypothesis 1:** A promotion-framed message will be more effective than a prevention-framed message on campers' compliance with food storage guidelines.
- **Hypothesis 2:** Messages placed on or near food storage containers will be more effective than no message on campers' compliance with food storage guidelines.
- **Hypothesis 3:** The presence of food storage containers will increase campers' compliance with food storage guidelines.

An online follow-up survey was also conducted to better understand campers' risk perceptions, behavioral intentions, previous experience with black bears, and demographic information to compare to actual behavior. This part of the study addressed the following question:

- **RQ1:** How do risk perceptions, previous experience with black bears, and demographics moderate behavioral intentions and actual behavior across the different experimental conditions?

Chapter 3. METHODS

To test hypotheses 1 and 2 (promotion vs. prevention message frame; message presence vs. message absence), we conducted a field experiment in campgrounds at Hermit Park Open Space in Estes Park, Colorado, U.S. Messages were tested using a post-test only experimental design with control group. Participants in the field experiment were also sent a survey. To test hypothesis 3 (impact of food storage container) a survey was conducted to learn about respondents' behavioral intention when food storage containers were present and absent.

Research was conducted in three phases: 1) pilot survey, 2) field experiment, and 3) follow-up survey. A pilot survey was used to pretest messages and questions used in the follow-up survey. It also included questions about manipulation checks, a regulatory focus questionnaire designed to measure chronic regulatory focus, and behavioral intention questions. In the field experiment, participants were exposed to different message conditions and their behavior was observed. A follow-up survey was emailed to all campers who made reservations during the field experiment. The survey allowed for more information to be gathered to understand how previous experience with black bears, risk perceptions, attitudes, subjective norms, perceived behavioral control, behavioral intentions, motivations, barriers, self-efficacy, and demographic information influenced the behavioral data. The survey also provided self-reported data on actual food storage behavior. Survey respondents' data was paired with the observational data collected during the field experiment and information provided when campers made an online campsite reservation.

Message frames have been tested through experiments in previous work because they allow researchers to control for many other factors and to narrow down variations in results to

the stimulus. Surveys have been used to test messages in the past (Cesario et al., 2013; Lee & Aaker, 2004; Lu et al., 2018), but testing these messages in the field through direct observation can increase the reliability of previous results and help better predict their effect on actual behavior (Barberis, 2013; Baruch-Mordo et al., 2009). Using citizen science techniques allowed field staff to increase the length of time messages were tested (McKinley et al., 2017). Comparing direct observations with self-reported survey data from visitors can increase the validity of survey results and is a method that has been called for in the wildlife field (Baruch-Mordo et al., 2009). This study employed these methods to learn about visitor behavior.

3.1 Instruments and Variables

We hypothesized that visitor behavior to store food in provided food storage containers was dependent upon the frame of messages (prevention or promotion) used to encourage their use and presence or absence of food storage containers. Direct observation and survey results were used to measure whether visitors stored their food properly, and manipulation checks via survey were used to see if each message elicited the intended effect. Previous experience with black bears, risk perceptions, behavioral beliefs and attitudes, normative beliefs and subjective norms, control beliefs and perceived behavioral control, behavioral intentions, motivations, barriers, self-efficacy, and demographic information could also impact user's behaviors and were also measured via survey. Variables are outlined in Table 2, including whether they are dependent (D) or independent (I), data measurement instrument, and the theory or source from which variables are derived.

Table 2. Variables

Variables	Data Measurement Instrument	Theory/Source
Participant food storage behavior (D)	Direct observations, survey responses	Hall et al., 2010; Marion, Dvorak, & Manning, 2008; Winter, 2006
Prevention/promotion-framed message (I)	Pilot survey	Regulatory Focus Theory (Higgins, 1997); Cesario et al., 2013; Lee & Aaker, 2004
Presence/absence of bear boxes (I)	Direct observation	Theory of Planned Behavior (Ajzen, 1991); Martin & McCurdy, 2009
Previous experience with black bears (I)	Survey responses	Hall et al., 2010
Regulatory focus (I)	Pilot survey	Regulatory Focus Theory; Haws, Dholakia, & Bearden, 2010
Risk perceptions (I)	Survey responses	Gore et al., 2006; Lee & Aaker, 2004
Behavioral beliefs/attitudes (I)	Survey responses	Theory of Planned Behavior; Ajzen, 2002; Martin & McCurdy, 2009
Normative beliefs/subjective norms (I)	Survey responses	
Control beliefs/perceived behavioral control (I)	Survey responses	
Behavioral intentions (I)	Survey responses	
Motivations (I)	Survey responses	Martin & McCurdy, 2009; Mazur, 2008
Barriers (I)	Survey responses	
Self-efficacy (I)	Survey responses	Bandura, 1982
Demographic information (I)	Survey responses	

3.1.1 Dependent Variables

Whether or not visitors stored their food properly is the dependent variable in this study. Visitors were observed directly and unobtrusively during their visit to note their food storage behavior. After their stay, visitors were asked questions about their behavior in a follow-up survey.

3.1.1.1. Direct Observations

Direct, unobtrusive observation is a common method in park settings where researchers study the effectiveness of interventions such as signs (Hall et al., 2010; Marion, Dvorak, &

Manning, 2008; Winter, 2006). Patrol logs were used to note date, time range, weather, campsite number, if black bears were present in the area, and if food was stored properly at each campsite. Food was considered properly stored when all food and scented items (toiletries, trash, cookware, etc.) were put away in a food storage container or vehicle when campers were not present at the campsite. No food was left in a place where it would be accessible to wildlife. If food was not stored properly, staff noted if any management action taken (ticket, warning, etc.). From data collected when participants reserved their campsite, we also noted whether food storage containers were present at the campsite. An example patrol log used to observe behavior is available in Appendix A.

3.1.1.2. Follow-up Survey

Participants were also asked to self-report their food storage behavior while camping at Hermit Park. Questions that measured self-reported food storage behavior included 1) about how often do you remember leaving food unattended and out on a table either while you were away from your site for longer than 5 minutes or inside your camping dwelling (tent, RV, etc.), 2) about how often do you remember leaving food unattended and out at your site in a cooler, plastic or cardboard box, and/or bag(s) while you were away from your site for longer than 5 minutes or inside your camping dwelling (tent, RV, etc.), and 3) about how often do you remember keeping/storing food inside your tent or tent trailer while you were sleeping or were away from your site for longer than 5 minutes? Questions were measured on the following scale: 1 = Never, 2 = Once or twice, 3 = Sometimes, 4 = About half the time, 5 = Most of the time, and 6 = Every time.

3.1.1.3. Test for Study Objectives

In the follow-up survey, visitors were asked if they recalled seeing signage or hearing messages about proper food storage, if they had used a food storage container in the past, and were asked to self-report their behavior during their visit to discern whether they stored their food properly or not. Questions included: 1) During or immediately prior to your most recent camping experience at Hermit Park, do you recall noticing any signs or receiving or picking up any information about storing your food at your campsite, 2) did any Larimer County staff talk to you about storing your food during your most recent camping trip at Hermit Park, 3) did any other campers who weren't in your party talk to you about storing your food, and 4) in general, what is your experience using food storage containers/bear boxes while camping in areas where black bears also live? These questions were asked near the beginning of the survey so other questions do not influence responses.

3.1.2 Independent Variables

All independent variables were measured via pilot survey or using a follow-up survey that was emailed to visitors that stayed at Hermit Park during the field experiment. The complete follow-up survey is available in Appendix B and the pilot survey is available in Appendix C.

3.1.2.1. Manipulation Check to Test Message Frames

To examine the validity of promotion- and prevention-framed messages, messages were tested via pilot survey, adjusted, and rechecked via follow-up survey to check if the messages conveyed the appropriate regulatory focus. Questions were also asked about participants' regulatory focus to compare to their assessment of the message. Messages in the follow-up survey corresponded to the messages visitors encountered in the field experiment.

3.1.2.2. Regulatory Focus

Researchers often measure a participant's chronic regulatory focus when assessing promotion- and prevention-framed messages. One of the most commonly used ways to measure regulatory focus in the regulatory focus questionnaire (Higgins, Friedman, Harlow, Idson, Ayduk, & Taylor, 2001). This questionnaire was compared to similar questionnaires and expanded to the composite regulatory focus scale to increase validity, include questions about emotional content, and frame questions in terms of the present and future, not just the past (Haws et al., 2010). This is the scale we used during pilot testing to better understand chronic focus and if that impacted how readers react to promotion and prevention messages about food storage. All items are ranked on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree) and are listed in Table 3. Some items are reverse coded, indicated with an (R) next to each question.

Table 3. Composite regulatory focus scale (Haws et al., 2010, p. 979)

Promotion Focus (5 Measures)
When it comes to achieving things that are important to me, I find that I don't perform as well as I would ideally like to do (R).
I feel like I have made progress toward being successful in my life.
When I see an opportunity for something I like, I get excited right away.
I frequently imagine how I will achieve my hopes and aspirations.
I see myself as someone who is primarily striving to reach my "ideal self" to fulfill my hopes, wishes, and aspirations.
Prevention Focus (5 Measures)
I usually obeyed rules and regulations that were established by my parents.
Not being careful enough has gotten me into trouble at times (R).
I worry about making mistakes.
I frequently think about how I can prevent failures in my life.
I see myself as someone who is primarily striving to become the self I "ought" to be – fulfill my duties, responsibilities and obligations.

3.1.2.3. Previous Experience with Black Bears

Research indicates that previous experience with wildlife may decrease the likelihood that visitors will read and respond to messages (Hall et al., 2010). To measure previous

experience with black bears, participants were asked will be asked 1) if they have ever seen a black bear in the wild, 2) if yes, did they have a positive or negative interaction, 3) how often have they had an experience (Lu et al., 2016; Siemer et al., 2009)? Participants were also asked 1) if their property has ever been damaged by a black bear or 2) if they have ever been personally threatened by a black bear (Gore et al., 2005).

3.1.2.4. Risk Perceptions

Risk perceptions have been shown to be a key indicator in which message frame will be most effective (Lee & Aaker, 2004). How visitors perceive risk could influence message effectiveness. We have hypothesized that, in general, risk perceptions toward black bears are low (Gore et al., 2006).

We tested this assumption by using a 5-point Likert scale to measure risk perceptions toward black bears (1 = strongly disagree, 5 = strongly agree). This approach is modeled after scales used by Gore, Siemer, Shanahan, Scheufele, and Decker (2005). The first two questions dealt directly with cognitive risk perception, or the "perceived probability of being threatened or injured by a black bear" (Gore et al., 2005, p. 511) – please indicate the extent to which you agree or disagree with the following statements: 1) The risk of being threatened by a black bear is acceptable low at Hermit Park Open Space, 2) the risk of being injured by a black bear is acceptable low at Hermit Park Open Space, and 3) I worry about the problems that black bears may cause at Hermit Park Open Space (reverse coded).

3.1.2.5. Scales from the Theory of Planned Behavior

Measuring behavioral beliefs provides insights into a person's attitude towards a behavior. The same is true for the relationship between normative beliefs and subjective norms, and control beliefs and perceived behavioral control. These factors contribute to intention to

carry out a behavior, as well as the actual behavior (Ajzen, 2002). These constructs allowed us to measure factor that influenced behavior in several ways.

3.1.2.6. Behavioral Beliefs and Attitudes

We adapted the following items from Martin and McCurdy's study (2009) in which they applied the theory of planned behavior to wilderness food storage to measure attitudes toward food storage behavior. Respondents were asked to evaluate their experience storing food at Hermit Park on the following dimensions, where 1 corresponds to the first word in the pair and 5 corresponds to the second word in the pair: not fun or fun, difficult or easy, bad or good, worthless or valuable, unnecessary or necessary, ineffective or effective, undesirable or desirable, impractical or practical, dull or exciting, and unenjoyable or enjoyable.

3.1.2.7. Normative Beliefs and Subjective Norms

Normative beliefs provide insights into a person's subjective norms about a behavior. They may indicate much how much social pressure campers feel to store their food properly. The following questions have been adapted from Martin and McCurdy (2009). They identified social groups that may influence a camper's decision to store food properly, including family/friends, other people camping nearby, and park staff. From there, normative belief items were formulated and adapted for this purpose: 1) During my visit to Hermit Park Open Space, the people most important to me made me feel as though I should store my food properly, 2) other people camped nearby made me feel as though I should store my food properly, and 3) Larimer County Natural Resources staff made it seem important for me to store my food properly. Responses were collected on a 5-point scale (1 = strongly disagree, 5 = strongly agree). Subjective norms were measured by asking participants how often friends and family of theirs store their food properly when camping (1 = never, 5 = always).

3.1.2.8. Control Beliefs and Perceived Behavioral Control

The following questions were adapted from Martin and McCurdy (2009) to assess control beliefs about food storage. The first set of questions pertained to the actual food storage container: 1) The food storage container at my campsite was large enough to store my food, 2) the food storage container at my campsite was easy to use, and 3) I knew how to use the food storage container at my campsite. The second set of questions pertained to behavior as it relates to food storage: 1) It was difficult to store my food properly (reverse coded), 2) it was convenient to store my food properly, and 3) I felt that storing my food properly (in a vehicle or food storage container) was my choice to make. Responses were measured on a 5-point scale (1 = strongly disagree, 5 = strongly agree).

3.1.2.9. Behavioral Intentions

Participants were asked about their likelihood of using food storage containers on their next visit based on a 5-point scale (1 = strongly disagree, 5 = strongly agree). Questions included the following: 1) Even in areas where it isn't required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space, and 2) in areas where it is required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.

3.1.2.10. Motivations

Understanding what motivates visitors to store their food properly can aid in the construction of future messages (Martin & McCurdy, 2009; Mazur, 2008). To better understand what motivates visitors to store their food properly, we asked how influential the following factors were in a visitor's decision to store their food properly while camping: 1) Keeping bears

wild, 2) protecting their food, 3) protecting their friends and family, and 4) avoiding a citation, where 1 = not at all influential and 5 = very influential.

3.1.2.11. Barriers

Similar to motivations, understanding what barriers exist when visitors are deciding whether to store their food properly can aid in the construction of future messages (Martin & McCurdy, 2009; Mazur, 2008). To better understand what barriers visitors face when storing their food properly, we asked how influential the following factors were in a visitor's decision to store their food properly while camping: 1) convenience, 2) time, and 3) protecting their friends and family, where 1= not at all influential and 5 = very influential.

3.1.2.12. Self-Efficacy

The extent that someone believes they are capable of exhibiting a behavior can influence whether they actually exhibit behavior (Ajzen, 1991; Bandura, 1982). To better understand the role that self-efficacy plays in visitors food storage behavior, we asked to what extent they agreed or disagreed with the following statements: 1) I believe I can make a difference in keeping myself and others safe if I store my food properly, and 2) my individual actions in storing my food properly can make a difference in keeping wildlife safe, where 1 = strongly disagree and 5 = strongly agree.

3.1.2.13. Gender and Additional Demographic Information

Gender has been shown to be a moderator for message framing effects (Kim, 2012). Additional information on age, education, race, income level, and state of residence was also collected to assess if any other factors had a moderating effect message frames. Demographic information was asked at the end of the survey.

3.2 Stimulus Materials

Stimulus material consisted of flyers and handouts with two message conditions, a promotion-framed message and a prevention-framed message. The image was also manipulated. Full messages are listed in Appendix D, and images are displayed in Figures 5-8. Hedonic consequences, outcome sensitivities, and goal-pursuit strategies have been manipulated for each to frame messages in terms of promotion or prevention.

Do Everything You Can to Store Your Food *PROPERLY* to have a *GREAT* Camping Experience

If you store your food properly, you are more likely to have an enjoyable camping experience – whether that be finding peace and quiet by connecting with nature or having fun with friends and family.

NEVER LEAVE FOOD OR TRASH UNATTENDED.

Any food, trash, or coolers left out will be confiscated.

STASH YOUR TRASH, FOOD, BEVERAGES, COOKWARE, TABLEWARE, AND TOILETRIES.

Store anything with a scent in your vehicle, or a bear-proof container.
Put trash in bear-proof dumpsters located at each campground.

KEEP A CLEAN TENT.

Don't bring anything with an odor in your tent. Don't sleep in clothes you cooked in. Store them in your vehicle.

NEVER INTENTIONALLY FEED WILDLIFE.

LARIMER COUNTY
COMMITTED TO EXCELLENCE
Natural Resources

COLORADO PARKS • WILDLIFE

Figure 5. Promotion flyer

AVOID Attracting Bears to Your Camp and *RUINING* Your Camping Experience

If you don't store your food properly, you are more likely to have an unenjoyable camping experience and put yourself and those with you, your property, and bears at risk.

NEVER LEAVE FOOD OR TRASH UNATTENDED.

Any food, trash, or coolers left out will be confiscated.

STASH YOUR TRASH, FOOD, BEVERAGES, COOKWARE, TABLEWARE, AND TOILETRIES.

Store anything with a scent in your vehicle, or a bear-proof container. Put trash in bear-proof dumpsters located at each campground.

KEEP A CLEAN TENT.

Don't bring anything with an odor in your tent. Don't sleep in clothes you cooked in. Store them in your vehicle.

NEVER INTENTIONALLY FEED WILDLIFE.

LARIMER COUNTY
COMMITTED TO EXCELLENCE
Natural Resources

COLORADO PARKS & WILDLIFE

Figure 6. Prevention flyer

Figure 7. Promotion handout

Figure 8. Prevention handout

The promotion message read: “Do everything you can to store your food properly to have a great camping experience – whether that be finding peace and quiet by connecting with nature or having fun with friends and family.” The prevention message read: “Avoid attracting bears to your camp and ruining your camping experience. If you don’t store your food properly, you are more likely to have an unenjoyable camping experience and put yourself and those with you, your property, and bears at risk.”

Each message was followed by procedural messages, adapted from CPW (n.d.):

- Never leave food or trash unattended. Any food, trash, or coolers left out will be confiscated.
- Stash your trash, food, beverages, cookware, tableware, and toiletries. Store anything with a scent in your vehicle or a bear-proof container. Put trash in bear-proof dumpsters located at each campground.
- Keep a clean tent. Don’t bring anything with an odor into your tent. Don’t sleep in the clothes you cooked in; store them in your vehicle.
- Never intentionally feed wildlife.

8.5” x 11” flyers were printed in color and laminated for the experiment. They were placed directly on restroom doors, at campground kiosks, at the front office where visitors checked in, and directly on food storage containers where applicable. A quarter-sheet, 4.5” x 5.75” color handout on cardstock was also produced with a shorter message and given to each visitor when they checked in to the campground.

The second stimulus was the presence or absence of the food storage container. Containers are made of metal, are painted brown, contain a lock that cannot be operated by wildlife, and are approximately 30” x 25” x 23” in size. Food storage containers were placed at several campsites. A photo is provided in Figure 9.

Figure 9. Food storage container with prevention message

3.2.1 Existing Messages

A few existing food storage messages were present at Hermit Park Open Space throughout the field experiment, presented in Appendix E. These messages were listed on the main kiosk at Hermit Park Open Space, and on metal signs provided by Colorado Parks and Wildlife. While messages were similar in content, their frame differed from the promotion- and prevention-framed messages that were provided throughout the campground.

3.3 Data Collection

To test messages, we conducted a field experiment with a straightforward manipulation. A post-test only control group design allowed for the testing of three conditions (control group,

promotion, and prevention). During the control observation period, no messages about food storage were present at the campground. During subsequent observation periods, messages were placed on food storage containers, on flyers at kiosks, and given out as a small handout at check-in. Pilot survey data was collected during a period of time when no food storage containers were present at the campground and compared to follow-up survey data where food storage containers were present.

3.3.1 Sample and Recruitment

The sample was a census sample of visitors that were camped at Hermit Park Open Space during each observation period. There are 81 campsites at Hermit Park Open Space. Figure 8 shows a map of the area and campgrounds. 510 groups of campers were observed during the field experiment at Hermit Park Open Space. 133 groups were in the control condition and received no message, 143 groups received the promotion message condition, and 234 groups received the prevention message condition.

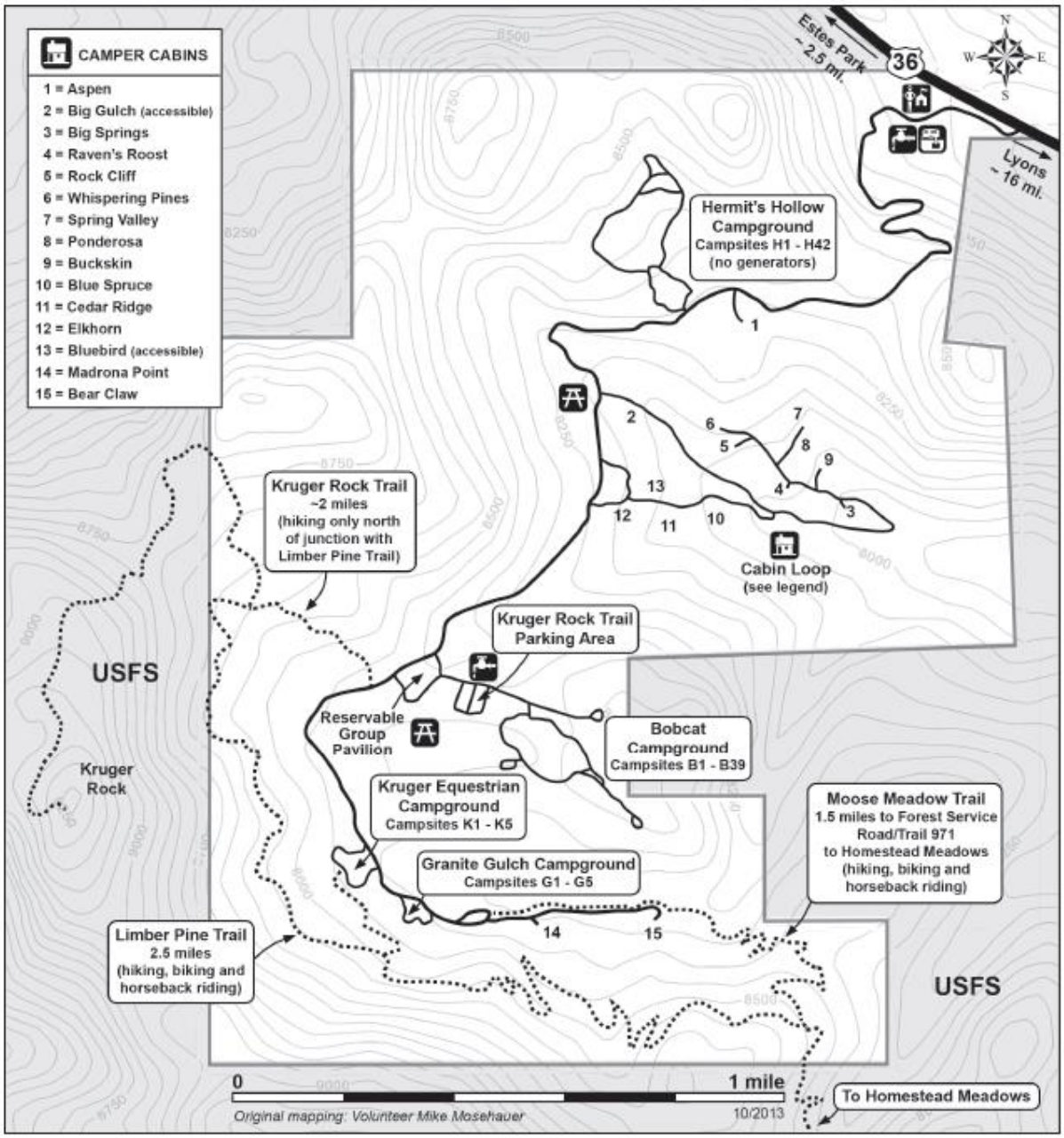


Figure 10. Map of campgrounds at Hermit Park Open Space

The survey was administered to a census sample of visitors that booked a campsite during the observation period. When visitors book a campsite, they do so through a website called Reserve America (www.reserveamerica.com) and provide an email address. Follow-up surveys were emailed to this email address (one person per campsite) to fill out the survey. One survey

was emailed to a contact from each campsite. Of the 510 camper groups observed during the field observation, 213 respondents participated in the follow-up survey. After incomplete responses were removed, 206 respondents participated for a response rate of 40.4%. 61 survey respondents were in the control group, 54 respondents received the promotion message, and 91 respondents received the prevention message.

3.3.2 Data Collection Procedures

Data collection varied for the field study and for the survey. Visitors were unobtrusively observed through roving observations by park ranger staff during the field study. Using park staff to collect data allowed for this project to be conducted at a larger scale with longer observation windows. Using trained assistance for research is supported by the citizen science literature. There has been a trend recently to utilize citizens to conduct scientific research to advance the field of conservation, a field which often suffers from lack of funding and capacity (Ellwood, Crimmins, & Miller-Rushing, 2017). When citizen science is used for certain types of data collection it is often "indistinguishable from conventional science led by paid scientists…citizen science is science…and should be treated as such in its design, implementation, and evaluation" (McKinley et al., 2017, p. 16). Projects where precise knowledge of plant species is needed, for example, are not well suited to citizen science (McKinley et al., 2017). Since this study did not require advanced scientific knowledge, we employed Hermit park field staff for data collection.

Hermit Park ranger staff routinely patrol campground areas in their patrol vehicles and observe and record visitor behavior as part of their regular duties. If they notice that food has not been stored properly at a campsite, rangers note the time, condition that food was left out, and what management action was taken. These patrol logs are outlined in section 3.1.1 and in

Appendix A. If food has been stored properly, they do not make an observation. We assumed that all campsites without a noted observation had stored food properly during the observation window.

Observation windows were seven days in length and were a week apart to avoid visitors being exposed to multiple conditions. There is a two-week maximum stay for visitors, with most visitors only staying two days, so the likelihood of visitors being exposed to multiple conditions was low. All treatments were applied during the peak summer season (End of May after Memorial Day weekend to the middle of August). School-aged students typically go back to school in the middle of August, so camping patterns and volume of visitors shift at this time. Table 4 indicates the experimental notation, experimental condition, and randomly assigned date each experimental condition was carried out. The control period was carried out first because the likelihood of bears being present at this time was lower. Field staff felt that messages should be displayed during periods where bear presence was more likely to decrease risk.

Table 4. Group, experimental condition, and date

Experimental Notation	Condition	Observation Period
R G1: O1	Control group, no message	5/30/18 – 6/5/18
R G2: X O2	Promotion-framed message	Random assignment: 6/13/18 – 6/19/18
R G3: X O3	Prevention-framed message	Random assignment: 6/27/18 – 7/3/18

A follow-up survey was emailed to all campers who made a reservation during the observation window. Not all visitors received a survey, just visitors who made the online reservation (likely one person per group). As an incentive, participants who complete the survey were entered into a drawing for one $100 REI gift card or one of five $20 REI gift cards. Funding for incentives was provided by Larimer County Department of Natural Resources.

The survey allowed for more information to be gathered to verify study objectives, gather self-reported behavior information, and learn about previous experience with black bears, risk

perceptions, attitudes, subjective norms, perceived behavioral control, behavioral intentions, motivations, barriers, self-efficacy, and demographic information. The survey was administered online using Qualtrics. Participants were recruited in the following manner: 1) email with survey link and information on incentive, 2) first reminder email, and 3) final reminder (Dillman, 2000). Recruitment email text is available in Appendix F.

3.3.3 Pilot Study

A pilot study survey was conducted to test message frames and if they interact with chronic regulatory focus. Participants received a control, promotion, or prevention message and were asked manipulation-check questions about that message. Then, they were asked questions from the composite regulatory focus questionnaire to see if their chronic regulatory focus had an impact on their responses to the manipulation check questions.

The pilot study was emailed to 1,588 campers that camped at Hermit Park Open Space between May 1 and August 31, 2017. After incomplete responses were removed, 638 respondents participated for a response rate of 40.2%. 213 survey respondents were in the control group, 211 respondents received the promotion message, and 211 respondents received the prevention message. A lottery incentive of one $100 REI gift card or one of five $20 REI gift cards was offered.

After the pilot survey was conducted, we changed a few questions for clarity and based on respondent feedback. One question asked: How many times have you seen a black bear in the wild? Original answers included daily, weekly, monthly, once every 6 months, once or twice in total, and never. We added an option for yearly to more accurately represent the time between once every 6 months and once or twice in total based on respondent feedback.

Next, we specifically defined the term food storage container in questions about behavioral intention by adding "bear-proof box or canister" to the following questions: 1) Even in areas where it isn't required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space; and 2) in areas where it required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.

We also added questions to capture self-reported food storage behavior outlined in section 3.1.1.2. Follow-up Survey. Behavioral intention questions in this survey asked about future behavior after the field experiment. We asked about self-reported behavior during the field experiment to better understand food storage behavior as it related to the constructs of the theory of planned behavior, which were also asked in the context of the field experiment.

Finally, in the pilot survey, the following questions were asked as manipulation checks to the promotion-framed message: 1) To what extent does the flyer focus on achieving good outcomes, and 2) to what extent does the flyer focus on making sure everything goes right when storing food? Manipulation check questions to test the prevention-framed message included: 1) To what extent does the flyer focus on having a painful experience, 2) to what extent does the flyer focus on avoiding negative outcomes, and 3) to what extent does the flyer focus on avoiding anything that could go wrong when storing food? For each question, 1 = not at all, 2 = a little, 3 = a moderate amount, 4 = a lot, and 5 = a great deal. Respondents were also given the option of does not apply, which was coded as -99. Because no statistically significant differences were found between message frames, we rewrote manipulation check questions to be more specific to the situation and equal in number (Lee & Aaker, 2004; Mannetti et al., 2013). The revised promotion-framed question was: To what extent does the flyer make you focus on having

a peaceful, enjoyable camping experience as a result of storing your food properly? The revised prevention framed question was: To what extent does the flyer make you focus on avoiding having an unenjoyable camping experience and putting yourself and bears at risk as a result of storing your food properly? Responses were code the same as pilot survey questions.

3.3.4 Institutional Review Board Approval

For this study, we received approval on April 10, 2018 from the Institutional Review Board (IRB) per Colorado State University and IRB requirements. Approval information is listed in Appendix G.

3.4 Validity and Reliability

While reliability and validity of individual scales and items have been discussed above, several factors of study design helped ensure reliability and validity of the overall study. To increase reliability, field staff received training on how reinforce message conditions with their interpersonal communication. They were not told about they study as to not influence their patrol schedule or reporting for the sake of data collection.

To increase face validity and content validity, messages were pretested through the pilot survey to ensure the message frame conveyed the correct content and we were measuring what we intended to measure. Our aim in this study was to maintain internal validity to ensure what we are studying are the theories and concepts outlined here. Artifacts that tend to arise in field experiments are outlined here, and how we addressed them:

- History: An event occurring in the middle of the study could impact results; therefore, we made note of these events (could be weather-related, bear-related, etc.).
- Sample selection: How a sample is selected and conditions are assigned can impact results, so care has been taken to randomly assign conditions and provide time in between each condition. Sample was driven by campers who have self-selected to camp at Hermit Park during observation windows.
- Experimenter bias: Since park staff collected data, we provided training and did not inform them that their patrol logs would be used for data collection.

Artifacts that we accounted for during the follow-up survey included testing (we asked questions on study objectives and risk perceptions first so as not to bias answers to these questions) and social desirability (we emphasized confidentiality). We also assessed survey questions for construct validity to ensure similar questions asked different ways produced similar results.

While external validity was not directly addressed in this study, because of results found previously by applying regulatory focus theory, we suggest that results may be generalizable to other campgrounds in this area and other human-wildlife issues involving risk.

3.5 Analysis

The goal of this study was to determine the differences between groups exposed to message frames and food storage container presence on food storage behavior and the associations of the independent variables outlined above on food storage behavior. We used the Statistical Package for the Social Sciences (SPSS) and used the following methods of analysis.

For this experiment, we have a between-subjects design where the differences between groups are being measured. Independent variables are message frames (nominal; promotion or prevention) and food storage (nominal; bear boxes present or absent). The dependent variable is food storage behavior (ordinal; frequency of proper food storage). A one-way univariate analysis of variance (ANOVA) test was used to determine the if message frames had an interaction effect on food storage behavior. An independent-samples *t*-test was used to determine if the presence of food storage containers influenced food storage behavior.

We also assessed if several independent variables (previous experience with black bears, risk perceptions, attitudes, subjective norms, perceived behavioral control, behavioral intention, motivations, barriers, self-efficacy, and demographics) predicted food storage behavior. A

binomial logistic regression was used to determine if independent variables predicted food storage behavior.

Lastly, manipulation check questions were test using a one-way multivariate analysis of variance (MANOVA) to determine if message condition influenced survey responses.

Chapter 4. RESULTS

4.1 Participants

Follow-up survey respondents tended to be female (60.0%, $n = 120$) more than male (39.5%, $n = 79$), and one respondent chose "other" as their gender (0.5%). The mean age of participants was 45.4 years old. The oldest participant was 82 years old and the youngest was 18 years old, with a standard deviation of 13.30. Most participants listed Colorado as their state of residence (78.2%, $n = 161$) as opposed to a variety of other states (21.8%, $n = 45$). Most respondents are regular campers, with only 1.4% ($n = 7$) camping less than once each year. 40.5% camp 1-3 times each year ($n = 83$), 36.1% ($n = 74$) camp 4-6 times each year, and 20.0% ($n = 41$) camp more than 7 times each year.

4.2 Manipulation Checks

Manipulation check questions were included on the follow-up survey and tested using a one-way MANOVA to determine the effect of message condition (control, promotion, and prevention) on question responses to learn if messages had the intended impact. Participants were asked about the extent the flyer had more of a promotion focus or a prevention focus. Some tests for assumptions were violated: outliers were present, data was not normally distributed based on Shapiro-Wilk's test ($p > .05$), there was no linear relationship among the dependent variables as assessed by scatter plot, and there was no homogeneity of variances, as assessed by Levene's test of homogeneity of variance ($p < .05$). Some assumptions were met: there were no multivariate outliers, as assessed by Mahalanobis distance ($p > .001$) and there was no multicollinearity, as assessed by Pearson correlation ($r = -.643$, $p > .001$). Because the one-way MANOVA is a fairly robust statistical test (Laerd Statistics, 2018a), we decided to move forward

with analysis. There was a statistically significant difference between treatment groups on the combined dependent variables, $F(4, 320) = 24.883$, $p < .0005$; Wilks' $\Lambda = .608$; partial $\eta^2 = .220$. Mean, standard deviation, and sample size are outlined by condition and manipulation check question in Table 5.

Table 5. One-way MANOVA descriptive statistics

Manipulation Check Question	Condition	Mean	Std. Deviation	N
To what extent does the flyer make you focus on having a peaceful, enjoyable camping experience as a result of storing your food properly?	Control	2.08	1.442	24
	Promotion	4.02	.888	53
	Prevention	3.99	1.115	87
	Total	3.72	1.290	164
To what extent does the flyer make you focus on avoiding having an unenjoyable camping experience and putting yourself and bears at risk as a result of storing your food properly?	Control	1.96	1.429	24
	Promotion	3.83	1.122	53
	Prevention	4.25	.967	87
	Total	3.78	1.339	164

Note. Scale 1 = Not at All and 5 = A Great Deal

Because statistically significant differences were found using the one-way MANOVA, follow-up ANOVA tests were run to determine significance between groups. There was a statistically significant difference in responses to the promotion-framed question, $F(2, 161) = 30.956$, $p < .001$; partial $\eta^2 = .278$ and to the prevention-framed question, $F(2, 161) = 41.418$, $p < .001$; partial $\eta^2 = .340$, using a Bonferroni adjusted α level of .025. Tukey post-hoc tests showed that for the promotion-framed question, respondents in the control condition had a statistically significant lower mean score than respondents in the promotion ($p < .001$) or prevention ($p < .001$) conditions. However, respondents in the promotion and prevention conditions were not statistically different from each other ($p = .986$). For the prevention-framed question, respondents in the control condition had a statistically significant lower mean score than respondents in the promotion ($p < .001$) or prevention ($p < .001$) conditions. However, respondents in the promotion and prevention conditions were not statistically different from each other ($p = .071$). In sum, the manipulation checks suggest the messages were not overtly shifting

participants' focus on different outcomes, as theory would suggest. Because differences were not found between messages, analyses were not run using the regulatory focus questionnaire.

4.3 Scale Construction and Reliabilities

Several scales were created based on survey questions. Reliabilities and items in each scale are outlined in this section.

4.3.1 Risk Perceptions

A reliability test was run on 3 items that made up the risk perceptions scale. The third item, "I worry about problems that black bears may cause at Hermit Park Open Space," was removed because it had a lower reliability than the other two statements. Removing this item increased the Cronbach's Alpha coefficient from .131 to .914 (Table 6).

Table 6. Risk perceptions scale inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
The risk of being threatened by a black bear is acceptably low at Hermit Park Open Space.	4.06	.893	.327	-.552
The risk of being injured by a black bear is acceptably low at Hermit Park Open Space.	4.17	.921	.391	-.783
I worry about problems that black bears may cause at Hermit Park Open Space (R).	2.49	1.176	.087	.914
Grand Mean	3.57	.997		

Note. Scale 1 = Strongly disagree/high risk and 5 = Strongly agree/low risk

4.3.2 Attitudes

A reliability test was run on 10 items that make up the attitudes scale, with a Cronbach's alpha coefficient of .874 (Table 7).

Table 7. Attitude scale inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
How would you describe your experience storing food at Hermit Park Open Space on the following dimensions? - Not fun:Fun	3.41	.897	.509	.870
How would you describe your experience storing food at Hermit Park Open Space on the following dimensions? - Difficult:Easy	4.41	.890	.609	.861
How would you describe your experience storing food at Hermit Park Open Space on the following dimensions? - Bad:Good	4.38	.838	.735	.851
How would you describe your experience storing food at Hermit Park Open Space on the following dimensions? - Worthless:Valuable	4.61	.695	.693	.856
How would you describe your experience storing food at Hermit Park Open Space on the following dimensions? - Unnecessary:Necessary	4.66	.692	.474	.871
How would you describe your experience storing food at Hermit Park Open Space on the following dimensions? - Ineffective:Effective	4.61	.695	.554	.866
How would you describe your experience storing food at Hermit Park Open Space on the following dimensions? - Undesirable:Desirable	4.41	.879	.702	.853
How would you describe your experience storing food at Hermit Park Open Space on the following dimensions? - Impractical:Practical	4.53	.761	.665	.857
How would you describe your experience storing food at Hermit	3.23	.901	.498	.870

Park Open Space on the following dimensions? - Dull:Exciting				
How would you describe your experience storing food at Hermit	3.50	.947	.571	.865
Park Open Space on the following dimensions? - Unenjoyable:Enjoyable				
Grand Mean	4.18	.820		

4.3.3 Subjective Norms

A reliability test was run on 3 items that describe subjective norms. A scale was not created for these items because the Cronbach's alpha coefficient was .556. Results are presented in Table 8.

Table 8. Subjective norms inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
To what extent do you agree or disagree with the following statements? - During my visit to Hermit Park Open Space, the people most important to me made me feel as though I should store my food properly.	4.15	1.051	.364	.458
To what extent do you agree or disagree with the following statements? - During my visit to Hermit Park Open Space, other people camped nearby made me feel as though I should store my food properly.	3.16	.998	.367	.456
To what extent do you agree or disagree with the following statements? - During my visit to Hermit Park Open Space, Larimer County Natural Resources staff made it seem important for me to store my food properly.	4.29	1.136	.371	.451

Grand Mean	3.87	1.062

Note. Scale 1 = Strongly disagree/weak subjective norm and 5 = Strongly agree/strong subjective norm

4.3.4 Perceived Behavioral Control – Food Storage Container

A reliability test was run on 3 items that make up the perceived behavioral control – food storage container scale, with a Cronbach's alpha coefficient of .901 (Table 9). This scale describes a person's perceived behavioral control as it relates to using a food storage container.

Table 9. Perceived behavioral control – food storage container scale inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
Please indicate the extent to which you agree or disagree with the following statements in reference to your camping experience at Hermit Park Open Space: - The food storage container at my campsite was large enough to store my food.	4.73	.806	.758	.903
Please indicate the extent to which you agree or disagree with the following statements in reference to your camping experience at Hermit Park Open Space: - The food storage container at my campsite was easy to use.	4.71	.746	.836	.830
Please indicate the extent to which you agree or disagree with the following statements in reference to your camping experience at Hermit Park Open Space: - I knew how to use the food storage container at my campsite.	4.80	.700	.825	.844
Grand Mean	4.75	.751		

Note. Scale 1 = Strongly disagree/weak perceived behavioral control and 5 = Strongly agree/strong perceived behavioral control

4.3.5 Perceived Behavioral Control – Behavior

A reliability test was run on 3 items that made up the perceived behavioral control – behavior scale. The third item, "I felt that storing my food properly (in a vehicle or food storage container) was my choice to make." was removed because it had a lower reliability than the other two statements. Removing this item increased the Cronbach's Alpha coefficient from .534 to .827 (Table 10). This scale describes a person's perceived behavioral control as it relates to ease and convenience.

Table 10. Perceived behavioral control – behavior scale inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
Please indicate the extent to which you agree or disagree with the following statements in reference to your camping experience at Hermit Park Open Space: - It was difficult to store my food properly.*	4.29	1.047	.494	.224
Please indicate the extent to which you agree or disagree with the following statements in reference to your camping experience at Hermit Park Open Space: - It was convenient to store my food properly (R).**	4.04	1.175	.523	.127
Please indicate the extent to which you agree or disagree with the following statements in reference to your camping experience at Hermit Park Open Space: - I felt that storing my food properly (in a vehicle or food storage container) was my choice to make (R).**	3.79	1.322	.108	.827
Grand Mean	4.04	1.181		

*Note. Scale 1 = Strongly agree/weak perceived behavioral control and 5 = Strongly disagree/strong perceived behavioral control

** Note. Scale 1 = Strongly disagree/weak perceived behavioral control and 5 = Strongly agree/strong perceived behavioral control

4.3.6 Behavioral Intention

A reliability test was run on the 2 items that made up the behavioral intention scale, with a Cronbach's Alpha coefficient of .786 (Table 11).

Table 11. Behavioral intention scale inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
Even in areas where it isn't required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.	4.74	.633	.678	-
In areas where it is required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.	4.88	.465	.678	-
Grand Mean	4.81	0549		

Note. Scale 1 = Strongly disagree/weak intent and 5 = Strongly agree/strong intent

4.3.7 Behavioral Intention – 2017 and 2018 control groups

Behavioral intention data was collected during the pilot survey (2017 campers) as well as during the follow-up survey (2018 campers). These survey results were combined to compare campers in the 2017 control group where food storage containers were not present to campers in the 2018 control group were food storage containers were present. A reliability test was run on the 2 items that made up the behavioral intention scale, with a Cronbach's Alpha coefficient of .904 (Table 12).

Table 12. Behavioral intention scale inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
Even in areas where it isn't required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.	4.84	.498	.834	-

In areas where it is required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.	4.93	.430	.834	-
Grand Mean	4.89	.464		

Note. Scale 1 = Strongly disagree/weak intent and 5 = Strongly agree/strong intent

4.3.8 Motivations

A reliability test was run on 4 items that describe motivations that people may have for storing their food properly. A scale was not created for these items because the Cronbach's alpha coefficient was .532 (Table 13).

Table 13. Motivations scale inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
In general, how influential are the following factors in your decision to store your food properly while camping? - Keeping bears wild	4.53	.804	.279	.494
In general, how influential are the following factors in your decision to store your food properly while camping? - Protecting my food	3.94	1.117	.470	.301
In general, how influential are the following factors in your decision to store your food properly while camping? - Protecting my friends and family	4.89	.400	.269	.533
In general, how influential are the following factors in your decision to store your food properly while camping? - Avoiding a citation	3.68	1.247	.365	.438
Grand Mean	4.26	.892		

Note. Scale 1 = Not at all influential/weak motivator and 5 = Extremely influential/strong motivator

4.3.9 Barriers

A reliability test was run on 3 items that make up the barriers scale, with a Cronbach's alpha coefficient of .768 (Table 14).

Table 14. Barriers scale inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
In general, how influential are the following factors in your decision to store your food properly while camping? - Convenience	3.54	1.273	.751	.501
In general, how influential are the following factors in your decision to store your food properly while camping? - Time	3.39	1.245	.813	.419
In general, how influential are the following factors in your decision to store your food properly while camping? - Knowledge of how to properly store food	4.13	1.018	.314	.946
Grand Mean	3.69	1.18		

Note. Scale 1 = Not at all influential/weak potential barrier and 5 = Extremely influential/strong potential barrier

4.3.10 Self-Efficacy

A reliability test was run on 2 items that make up the Self-Efficacy scale, with a Cronbach's alpha coefficient of .904 (Table 15).

Table 15. Self-efficacy scale inter-item consistency statistics

	Mean	Std. Deviation	Corrected Item-Total Correlation	Alpha if Item Deleted
Please indicate to what extent you agree or disagree with the following statements. - I believe I can make a difference in keeping myself and others safe if I store my food properly.	4.86	.401	.825	-
Please indicate to what extent you agree or disagree with the following	4.85	.389	.825	-

statements. - My individual actions in storing my food properly can make a difference in keeping wildlife safe.		
Grand Mean	4.86	.400

Note. Scale 1 = Strongly disagree and 5 = Strongly agree

4.4 Hypothesis Testing

4.4.1 Dependent Variables – Food Storage Behavior

Statistical analyses were not run on actual food storage behavior measured by patrol logs because so few instances of non-compliance were found (1.4%, $n = 7$) for all camper groups and 1.5% ($n = 3$) for survey respondents. Three survey questions were used to measure self-reported actual behavior. In comparison to patrol log instances of non-compliance, 35.4% ($n = 69$) of survey respondents self-reported leaving food out unattended (on a table, in a cooler, or in a tent) at some point during their visit.

4.4.1.1. Unattended Food on Table

The first question that measured self-reported behavior stated, "About how often do you remember leaving food unattended and out on a table either while you were away from your site for longer than 5 minutes or inside your camping dwelling (tent, RV, etc.)?", where 1 = never, 2 = once or twice, 3 = sometimes, 4 = about half the time, 5 = most of the time, and 6 = every time. The marginal means for the control condition, promotion condition, and prevention condition were 1.26 ($SE = .690$), 1.38 ($SE = .993$), and 1.39 ($SE = 1.070$), respectively. Overall, 19.9% ($n = 33$) remembered leaving their food unattended on a table at least once, and 83.1% ($n = 162$) reported they never left their food unattended on a table.

4.4.1.2. Unattended Food in Cooler

The second question that measured self-reported behavior was, "About how often do you remember leaving food unattended and out at your site in a cooler, plastic or cardboard box,

and/or bag(s) while you were away from your site for longer than 5 minutes or inside your camping dwelling (tent, RV, etc.)?", where 1 = never, 2 = once or twice, 3 = sometimes, 4 = about half the time, 5 = most of the time, and 6 = every time. The marginal means for the control condition, promotion condition, and prevention condition were 1.48 (*SE* = .863), 1.69 (*SE* = 1.197), and 1.46 (*SE* = .933), respectively. Overall, 30.3% (*n* = 59) remembered leaving their food unattended at least once, and 69.7% (*n* = 136) reported they never left their food unattended.

4.4.1.3. Unattended Food in Tent

The third question that measured self-reported behavior was "About how often do you remember keeping/storing food inside your tent or tent trailer while you were sleeping or were away from your site for longer than 5 minutes?", where 1 = never, 2 = once or twice, 3 = sometimes, 4 = about half the time, 5 = most of the time, and 6 = every time. The marginal means for the control condition, promotion condition, and prevention condition were 1.50 (*SE* = 1.308), 1.20 (*SE* = .664), and 1.20 (*SE* = .943), respectively. Overall, 9.8% (*n* = 12) remembered leaving their food unattended at least once, and 90.2% (*n* = 111) reported they never left their food unattended.

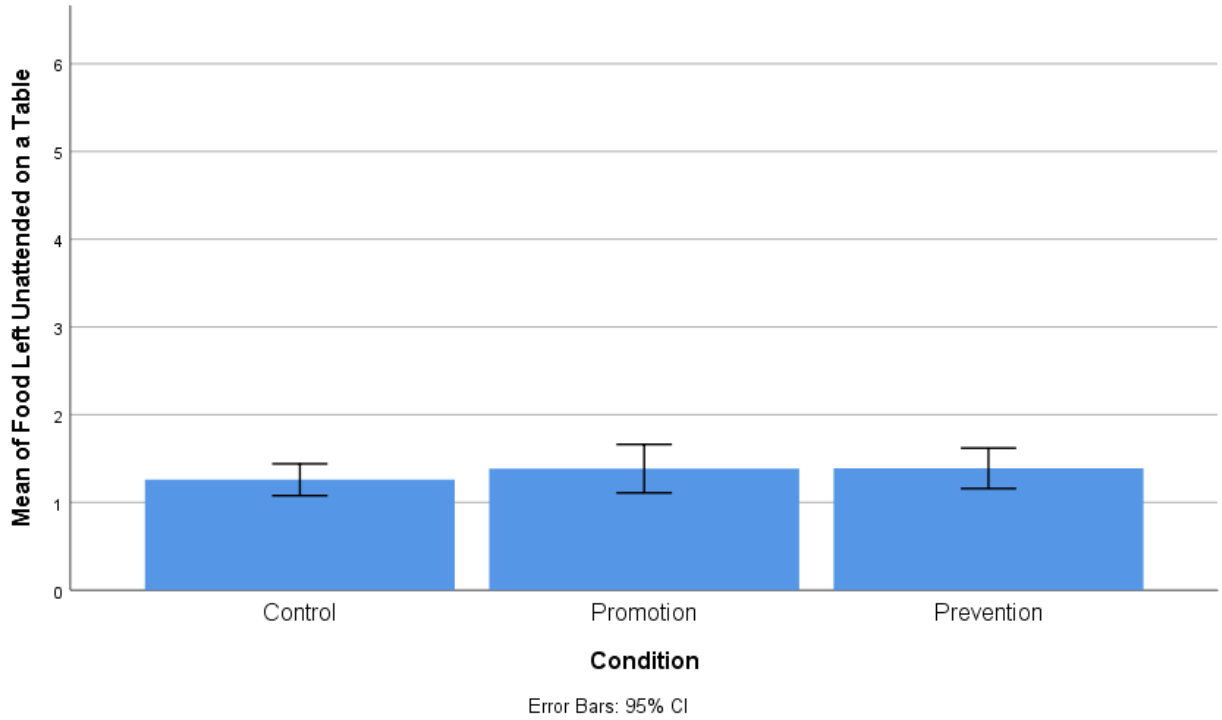
4.4.2 Hypothesis 1

Hypothesis 1 states that a promotion-framed message will be more effective than a prevention-framed message on campers' compliance with food storage guidelines. To test this hypothesis, one-way ANOVAs were conducted using each of the dependent variables outlined above.

4.4.2.1. H1a – Unattended Food on Table

The first one-way ANOVA was run with unattended food on a table as the dependent variable and condition as the independent variable. Some assumptions were not met: there were some outliers in the data, as assessed by inspection of a boxplot and data was not normally distributed for each condition as assessed by Shapiro-Wilk's test ($p < .001$). One assumption was met: there was homogeneity of variances, as assessed by Levene's test for equality of variances ($p = .224$). Because the one-way ANOVA is a fairly robust statistical test (Laerd Statistics, 2018b), we decided to continue with analysis.

How often people left their food unattended varied slightly in control ($n = 58$, $M = 1.3$, $SD = .7$), promotion ($n = 52$, $M = 1.4$, $SD = 1.0$), and prevention ($n = 85$, $M = 1.4$, $SD = .9$) groups. These means are presented in Figure 11. There were no statistically significant differences in food storage behavior between conditions, $F(2, 192) = .371$, $p = .691$. Because the difference in group means were not statistically significant, we cannot accept H1a. Message condition had no effect on respondents' self-reported food storage behavior when food was left on a table.



Note. Scale 1 = Never, 2 = Once or twice, 3 = Sometimes, 4 = About half the time, 5 = Most of the time, and 6 = Every time

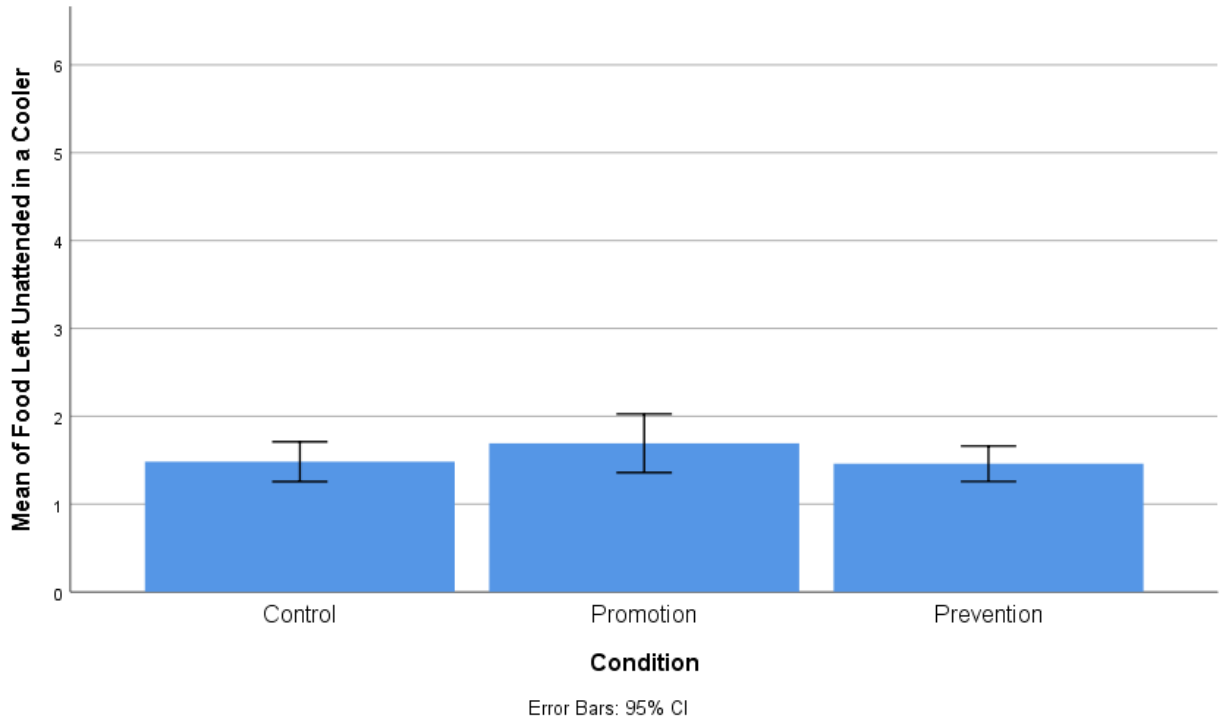
Figure 11. Means of food left unattended on a table by condition

4.4.2.2. H1b – Unattended Food in Cooler

The second one-way ANOVA was run with unattended food in a cooler as the dependent variable and condition as the independent variable. Some assumptions were not met: there were some outliers in the data, as assessed by inspection of a boxplot and data was not normally distributed for each condition as assessed by Shapiro-Wilk's test ($p < .001$). One assumption was met: there was homogeneity of variances, as assessed by Levene's test for equality of variances ($p = .081$). Because the one-way ANOVA is a fairly robust statistical test (Laerd Statistics, 2018b), we decided to continue with analysis.

How often people left their food unattended varied slightly in control ($n = 58$, $M = 1.5$, $SD = .7$), promotion ($n = 52$, $M = 1.7$, $SD = 1.2$), and prevention ($n = 85$, $M = 1.5$, $SD = .9$) groups. These means are presented in Figure 12. There were no statistically significant

differences in food storage behavior between conditions, $F(2, 192) = .982$, $p = .377$. Because the difference in group means were not statistically significant, we cannot accept H1b. Message condition had no effect on respondents' self-reported food storage behavior when food was left in a cooler.



Note. Scale 1 = Never, 2 = Once or twice, 3 = Sometimes, 4 = About half the time, 5 = Most of the time, and 6 = Every time

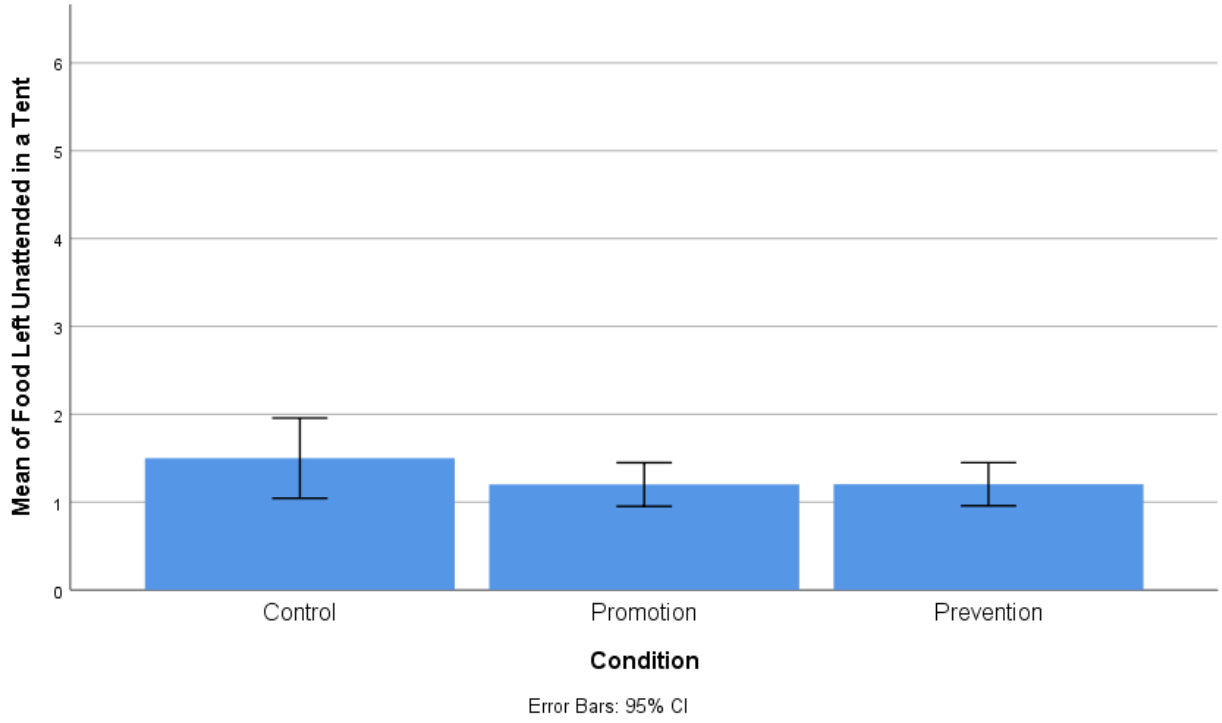
Figure 12. Means of food left unattended in a cooler by condition

4.4.2.3. H1c – Unattended Food in Tent

The third one-way ANOVA was run with unattended food in a tent as the dependent variable and condition as the independent variable. Assumptions were not met: there were some outliers in the data, as assess by inspection of a boxplot, data was not normally distributed for each condition as assessed by Shapiro-Wilk's test ($p < .001$), and there was not homogeneity of variances, as assessed by Levene's test for equality of variances ($p = .035$). Because the one-way

ANOVA is a fairly robust statistical test (Laerd Statistics, 2018b), we decided to continue with analysis.

How often people left their food unattended varied slightly in control (n = 34, M = 1.5, SD = 1.3), promotion (n = 30, M = 1.2, SD = .7), and prevention (n = 59, M = 1.2, SD = .9) groups. These means are presented in Figure 13. There were no statistically significant differences in food storage behavior between conditions, $F(2, 120) = 1.083$, $p = .342$. Because the difference in group means were not statistically significant, we cannot accept H1c. Message condition had no effect on respondents' self-reported food storage behavior when food was left in a tent.



Note. Scale 1 = Never, 2 = Once or twice, 3 = Sometimes, 4 = About half the time, 5 = Most of the time, and 6 = Every time

Figure 13. Means of food left unattended in a tent by condition

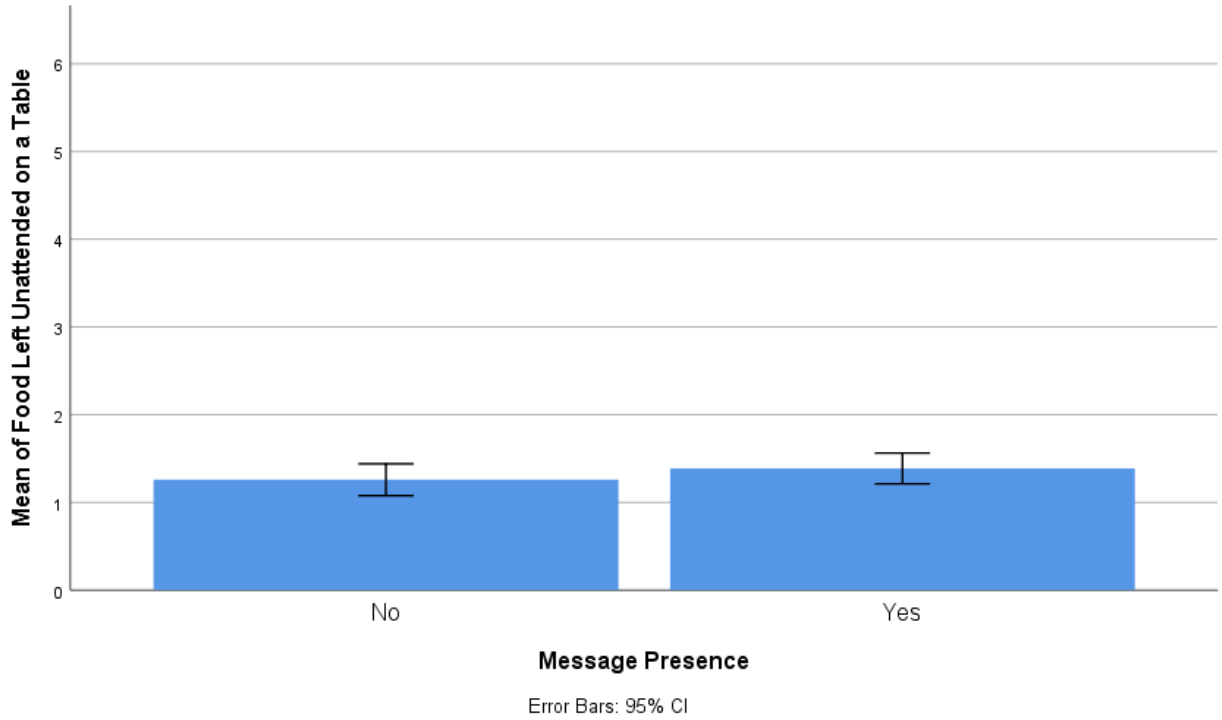
4.4.3 Hypothesis 2

Hypothesis 2 states that message placed on or near food storage containers will be more effective than no message on campers' compliance with food storage guidelines. To test this hypothesis, one-way ANOVAs were conducted using each of the dependent variables outlined above.

4.4.3.1. H2a – Unattended Food on Table

The first one-way ANOVA was run with unattended food on a table as the dependent variable and message presence (yes or no) as the independent variable. Some assumptions were not met: there were some outliers in the data, as assessed by inspection of a boxplot and data was not normally distributed for each condition as assessed by Shapiro-Wilk's test ($p < .001$). One assumption was met: there was homogeneity of variances, as assessed by Levene's test for equality of variances ($p = .086$). Because the one-way ANOVA is a fairly robust statistical test (Laerd Statistics, 2018b), we decided to continue with analysis.

How often people left their food unattended varied slightly based on whether messages were present ($n = 137$, $M = 1.4$, $SD = 1.0$) or not ($n = 58$, $M = 1.3$, $SD = .7$). These means are presented in Figure 14. There were no statistically significant differences in food storage behavior between conditions, $F(1, 193) = .745$, $p = .389$. Because the difference in group means were not statistically significant, we cannot accept H2a. In other words, messaging about food storage had no effect on respondents' self-reported food storage when food was left on a table.



Note. Scale 1 = Never, 2 = Once or twice, 3 = Sometimes, 4 = About half the time, 5 = Most of the time, and 6 = Every time

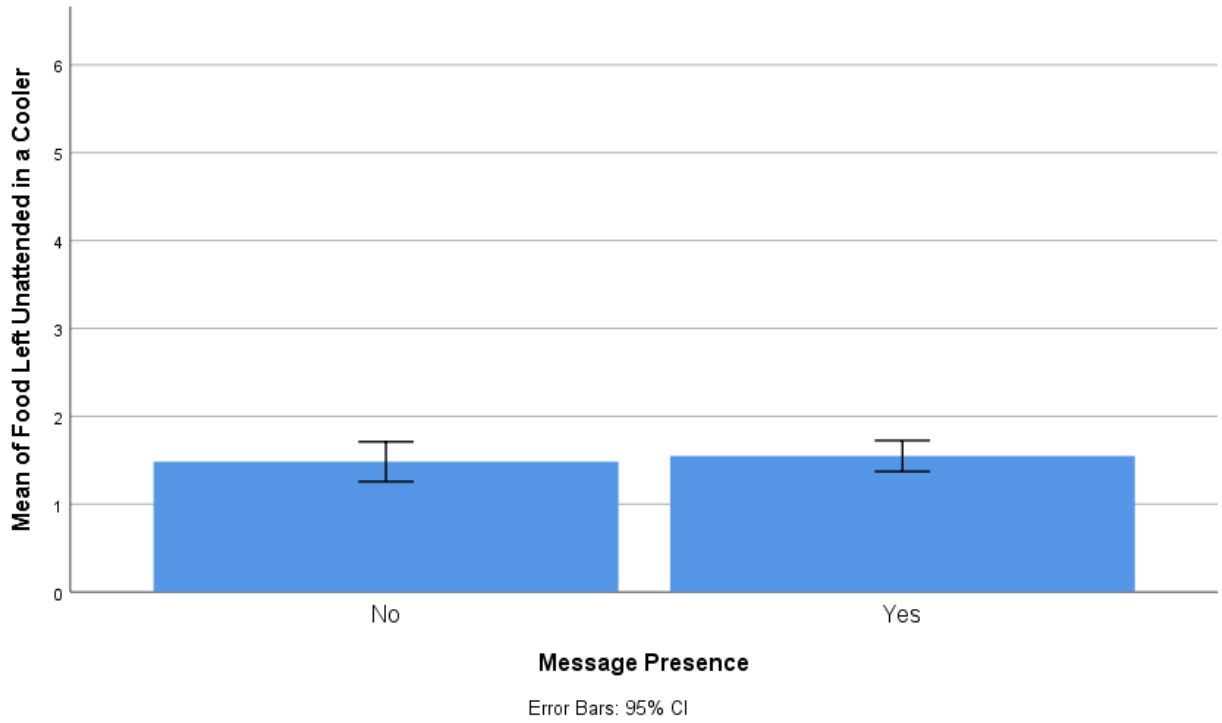
Figure 14. Means of food left unattended on a table by message presence

4.4.3.2. H2b – Unattended Food in Cooler

The second one-way ANOVA was run with unattended food on in a cooler as the dependent variable and message presence (yes or no) as the independent variable. Some assumptions were not met: there were some outliers in the data, as assessed by inspection of a boxplot and data was not normally distributed for each condition as assessed by Shapiro-Wilk's test ($p < .001$). One assumption was met: there was homogeneity of variances, as assessed by Levene's test for equality of variances ($p = .223$). Because the one-way ANOVA is a fairly robust statistical test (Laerd Statistics, 2018b), we decided to continue with analysis.

How often people left their food unattended did not vary based on whether messages were present ($n = 137$, $M = 1.6$, $SD = 1.0$) or not ($n = 58$, $M = 1.5$, $SD = .9$). These means are presented in Figure 15. There were no statistically significant differences in food storage

behavior between conditions, $F(1, 193) = .173$, $p = .678$. Because the difference in group means were not statistically significant, we cannot accept H2b. Messaging about food storage had no effect on respondents' self-reported food storage when food was left in a cooler.



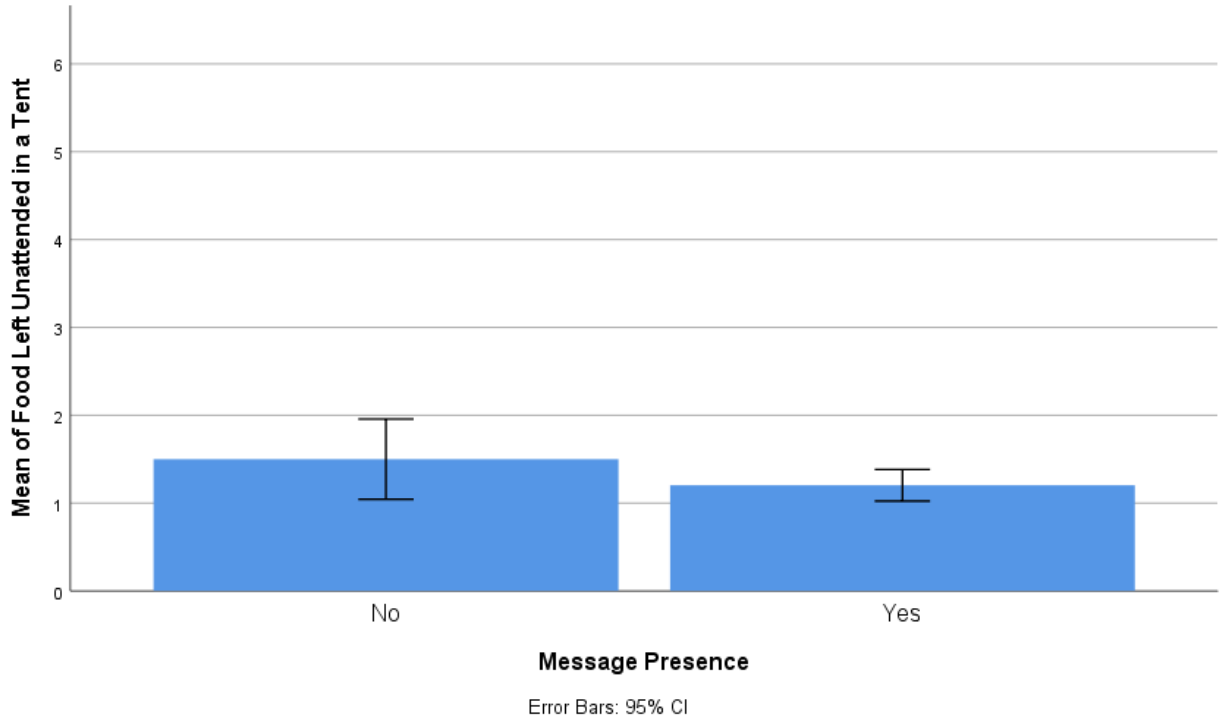
Note. Scale 1 = Never, 2 = Once or twice, 3 = Sometimes, 4 = About half the time, 5 = Most of the time, and 6 = Every time

Figure 15. Means of food left unattended in a cooler by message presence

4.4.3.3. H2c – Unattended Food in Tent

The third one-way ANOVA was run with unattended food in a tent as the dependent variable and message presence (yes or no) as the independent variable. Assumptions were not met: there were some outliers in the data, as assessed by inspection of a boxplot, data was not normally distributed for each condition as assessed by Shapiro-Wilk's test ($p < .001$), and there was not homogeneity of variances, as assessed by Levene's test for equality of variances ($p = .009$). Because the one-way ANOVA is a fairly robust statistical test (Laerd Statistics, 2018b), we decided to continue with analysis.

How often people left their food unattended varied slightly based on whether messages were present (n = 89, M = 1.2, SD = .9) or not (n = 34, M = 1.5, SD = 1.3). These means are presented in Figure 16. There were no statistically significant differences in food storage behavior between conditions, $F(1, 121) = 1.184$, $p = .142$. Because the difference in group means were not statistically significant, we cannot accept H2c. Messaging about food storage had no effect on respondents' self-reported food storage when food was left in a tent.



Note. Scale 1 = Never, 2 = Once or twice, 3 = Sometimes, 4 = About half the time, 5 = Most of the time, and 6 = Every time

Figure 16. Means of food left unattended in a tent by message presence

4.4.4 Hypothesis 3

Hypothesis 3 states that the presence of food storage containers will increase campers' compliance with food storage guidelines. To test this hypothesis, an independent-samples t-test was run with data from two surveys: 1) pilot survey data from 2017 campers in the control group

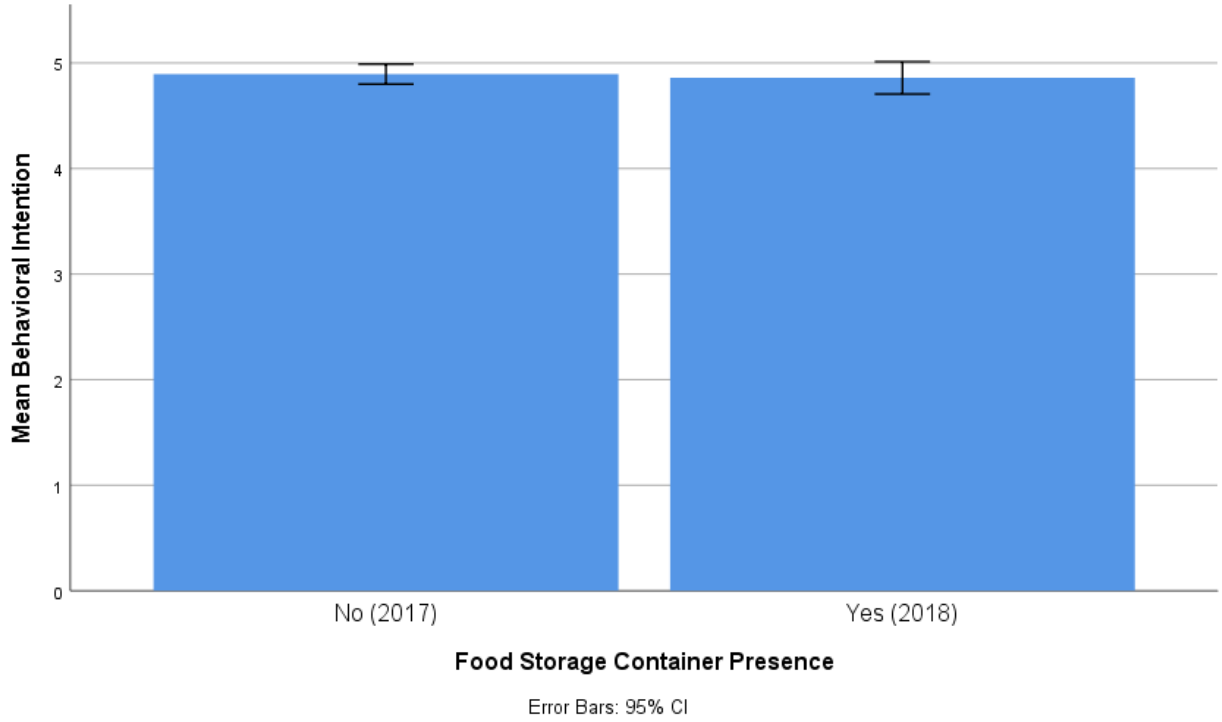
camped at Hermit's Hollow campground, and 2) survey data from the follow-up survey from 2018 campers in the control group camped at Hermit's Hollow campground.

The dependent variable is the behavioral intention scale for H3. The independent variable is presence or absence of food storage containers. In 2017, no food storage containers were present at Hermit Park Open Space. In 2018, food storage containers had been installed at Hermit Park at Hermit's Hollow campground. Comparing two years of survey data allowed us to control for many variables and ensure that we were comparing more similar campgrounds and conditions.

Some assumptions of the independent-samples *t*-test were not met: there were outliers in the data, as assessed by inspection of a boxplot, data was not normally distributed, as assessed by Shapiro-Wilk's test ($p < .001$). There was homogeneity of variances, as assessed by Levene's test for equality of variances ($p = .457$). We decided to proceed with analysis because sample sizes were sufficient (Laerd Statistics, 2018c).

There were 90 participants in the 2017 control group without food storage containers and 32 participants in the 2018 control group with food storage containers. Behavioral intention for the 2017 group without food storage containers ($M = 4.89$, $SD = .45$) was similar to behavioral intention for the 2018 group with food storage containers ($M = 4.86$, $SD = .43$), as outlined in Figure 17. Behavioral intention for the group without food storage containers was higher than behavioral intention for the group with food storage containers. There was not a statistically significant difference in behavioral intention scores between the group with and without food storage containers, $M = .04$, 95% CI [-0.15 to 0.22], $t(120) = .382$, $p = .703$. Because the difference in group means were not statistically significant, we cannot accept H3.

Presence of food storage containers had no effect on respondents' behavioral intention to store their food properly in the future.



Note. Scale 1 = Strongly disagree and 5 = Strongly agree

Figure 17. Mean behavioral intention by food storage container presence

4.5 Exploratory Analysis

Four multiple regressions were run to predict how independent variables may influence four different dependent variables: 1) how people self-reported their actual behavior of leaving food out on a table unattended, 2) how people self-reported their actual behavior of leaving food out in a cooler unattended, 3) how people self-reported their actual behavior of leaving food out in a tent unattended, and 4) behavioral intention. Because there was no variance between conditions in H1-3, these regressions were also used to better understand research question 1:

- **RQ1:** How do risk perceptions, previous experience with black bears, and demographics moderate behavioral intention and actual behavior across the different experimental conditions?

Independent variables included in these multiple regressions include promotion and prevention condition, campground, valence of bear experience, risk perceptions (scale), attitudes (scale), subjective norms – the people most important to me made me feel as though I should store my food properly, subjective norms – other people camped nearby me made me feel as though I should store my food properly, subjective norms – Larimer County Natural Resources staff made it seem important for me store my food properly, subjective norms – how often friends and family store food properly, perceived behavioral control – food storage container (scale), perceived behavioral control – behavior (scale), behavioral intention (scale), motivations – keeping bears wild, motivations – protecting my food, motivations – protecting my friends and family, motivations – avoiding a citation, barriers (scale), self-efficacy (scale), gender, and state of residence. The control condition, actual bear box presence, Granite Gulch Campground, and Hermit's Hollow Campground were excluded from the model due to violations in assumptions in correlations. Whether black bears were present during a camper's visit was also excluded because no reports of black bear sightings were made during observation periods.

4.5.1 Exploratory Analysis – Unattended Food on Table

The first multiple regression was run to predict how independent variables may influence food storage behavior of leaving food out on a table. This multiple regression model predicted the dependent variable at a statistically significant level, $F(22, 73) = 1.765$, $p = .037$; adj. $R^2 = .151$. In this model, respondents' perceived behavioral control as it relates to using a food storage container ($p = .035$) and motivations – protecting my friends and family ($p = .008$) predicted food storage behavior of leaving food out on a table at a statistically significant level. Regression coefficients and standard errors for each variable are listed in Table 16.

Table 16. Summary of multiple regression analysis for predictors of unattended food on table

Variable	Unstandardized Regression Coefficient (B)	Std. Error (SE_B)	Standardized Coefficient (β)	Sig.
Promotion Condition	.050	.263	.024	.848
Prevention Condition	-.032	.219	-.018	.886
Bobcat Campground	-.220	.355	-.070	.538
Kruger Equestrian Campground	-.097	.377	-.027	.798
Valence of bear experience	.276	.201	.150	.175
Risk perceptions (scale)	-.003	.116	-.002	.982
Attitudes (scale)	-.351	.251	-.188	.167
Subjective norms – the people most important to me made me feel as though I should store my food properly	-.142	.103	-.161	.170
Subjective norms – other people camped nearby me made me feel as though I should store my food properly	.088	.111	.093	.431
Subjective norms – Larimer County Natural Resources staff made it seem important for me store my food properly	.073	.098	.091	.459
Subjective norms – how often friends and family store food properly	-.040	.128	-.034	.756
Perceived behavioral control – food storage container (scale)	.389	.180	.308	.035
Perceived behavioral control – behavior (scale)	-.390	.203	-.302	.058
Behavioral intention (scale)	-.100	.335	-.042	.767
Motivations – keeping bears wild	-.218	.117	-.194	.066
Motivations – protecting my food	-.103	.089	-.139	.252
Motivations – protecting my friends and family	-.655	.238	-.298	.008
Motivations – avoiding a citation	.059	.095	.084	.539
Barriers (scale)	.216	.110	.247	.054
Self-efficacy (scale)	.697	.387	.227	.076
Gender	.069	.193	.037	.719

State of Residence	.257	.226	.125	.259

4.5.2 Exploratory Analysis – Unattended Food in Cooler

The next multiple regression was run to predict how independent variables may influence food storage behavior of leaving food out in a cooler. This multiple regression model predicted the dependent variable at a statistically significant level, $F(22, 73) = 1.918$, $p = .020$; adj. $R^2 = .175$. In this model, respondents' subjective norms as they related to staff ($p = .049$), as well as barriers ($p = .013$) predicted food storage behavior of leaving food out in a cooler at a statistically significant level. Regression coefficients and standard errors for each variable are listed in Table 17.

Table 17. Summary of multiple regression analysis for predictors of unattended food in cooler

Variable	Unstandardized Regression Coefficient (*B*)	Std. Error (SE_B)	Standardized Coefficient (β)	Sig.
Promotion Condition	-.295	.272	-.136	.281
Prevention Condition	-.364	.226	-.199	.112
Bobcat Campground	-.350	.368	-.106	.344
Kruger Equestrian Campground	.045	.390	.012	.908
Valence of bear experience	.090	.208	.047	.665
Risk perceptions (scale)	-.082	.120	-.075	.496
Attitudes (scale)	-.298	.260	-.152	.254
Subjective norms – the people most important to me made me feel as though I should store my food properly	-.208	.106	-.224	.054
Subjective norms – other people camped nearby me made me feel as though I should store my food properly	-.060	.115	-.060	.604
Subjective norms – Larimer County Natural Resources staff made it seem important for me store my food properly	.203	.101	.242	.049
Subjective norms – how often friends and family store food properly	-.138	.133	-.114	.300

Perceived behavioral control – food storage container (scale)	.336	.187	.254	.075
Perceived behavioral control – behavior (scale)	-.198	.210	-.146	.349
Behavioral intention (scale)	-.410	.347	-.165	.241
Motivations – keeping bears wild	-.181	.121	-.153	.140
Motivations – protecting my food	-.117	.092	-.150	.210
Motivations – protecting my friends and family	.021	.247	.009	.934
Motivations – avoiding a citation	.023	.099	.031	.820
Barriers (scale)	.290	.114	.315	.013
Self-efficacy (scale)	.395	.400	.122	.327
Gender	.092	.199	.047	.646
State of Residence	.340	.234	.157	.150

4.5.3 Exploratory Analysis – Unattended Food in Tent

The third multiple regression was run to predict how independent variables may influence food storage behavior of leaving food out in a tent. This multiple regression model did not predict the dependent variable at a statistically significant level, $F(22, 48) = 1.136$, $p = .346$; adj. $R^2 = .041$.

4.5.4 Exploratory Analysis – Behavioral Intention

The final multiple regression was run to predict how independent variables may influence behavioral intention, as opposed to including behavioral intention as a predictor in previous models. The multiple regression model predicted behavioral intention at a statistically significant level, $F(21, 74) = 4.344$, $p < .001$; adj. $R^2 = .425$. In this model, subjective norms as they relate to people camped near a person ($p = .025$) and staff ($p = .015$), and respondents' perceived behavioral control ($p = .002$) were significant predictors of behavioral intention. Regression coefficients and standard errors for each variable are listed in Table 18.

Table 18. Summary of multiple regression analysis for predictors of behavioral intention

Variable	Unstandardized Regression Coefficient (B)	Std. Error (SE_B)	Standardized Coefficient (β)	Sig.
Promotion Condition	.048	.091	.055	.598
Prevention Condition	.035	.076	.048	.643
Bobcat Campground	-.145	.122	-.110	.238
Kruger Equestrian Campground	.073	.131	.048	.581
Valence of bear experience	.004	.070	.005	.960
Risk perceptions (scale)	-.034	.040	-.078	.397
Attitudes (scale)	.067	.087	.085	.441
Subjective norms – the people most important to me made me feel as though I should store my food properly	.055	.035	.149	.118
Subjective norms – other people camped nearby me made me feel as though I should store my food properly	.085	.037	.214	.025
Subjective norms – Larimer County Natural Resources staff made it seem important for me store my food properly	-.081	.033	-.240	.015
Subjective norms – how often friends and family store food properly	.077	.044	.157	.082
Perceived behavioral control – food storage container (scale)	.073	.062	.137	.244
Perceived behavioral control – behavior (scale)	.208	.066	.382	.002
Motivations – keeping bears wild	.004	.041	.008	.922
Motivations – protecting my food	-.028	.031	-.089	.370
Motivations – protecting my friends and family	.083	.082	.089	.318
Motivations – avoiding a citation	.007	.033	.024	.831
Barriers (scale)	-.004	.038	-.012	.910
Self-efficacy (scale)	.250	.131	.193	.060
Gender	-.015	.067	-.020	.818
State of Residence	.142	.077	.163	.069

4.5.5 Research Question 1

Research question 1 explored how risk perceptions, previous experience with black bears, and demographics moderate behavioral intention and actual behavior across the different experimental conditions. These regressions provide no support for RQ1, as risk perceptions, valence of bear experience, gender, and state of residence did not predict any of the dependent variables at a statistically significant level.

Chapter 5. DISCUSSION

Results show that message frame, presence of messages, and presence of food storage containers did not have a statistically significant impact on food storage behavior, contrary to finding from previous research. We discuss these results, possible explanations for the findings in this study, practical implications for managers, limitations of this study, and areas for future research.

5.1 Discussion

5.1.1 Message Framing in Regulatory Focus Theory (H1)

The results from this study showed that there were no statistically significant differences in self-reported behavior or behavioral intention between groups that were exposed to different message conditions (control, promotion, or prevention). Based on these findings, framing messages in terms of gains (promotion-focus) and losses (prevention-focus) may not be as straightforward as previously thought. We look to the literature to explore the underlying assumptions of loss aversion as a theory and which moderators may have an influence on message framing, including where someone stands in reference to the decision they are making; their past experiences and exposure to messages; and their hedonic or emotional focus and how that relates to schema activation.

A recent discussion in the literature calls into question the weight that loss aversion, one of the main underlying assumptions of prospect theory and regulatory focus theory, has been given as a psychology theory. Gal and Rucker (2018a) assert that, while the psychology literature has assumed that losses always loom larger than gains based on Kahneman and Tversky's work

(1979), this is not always the case. Whether losses loom larger than gains depends largely on the context of the message.

Reference points are one way to define the context in which messages are framed, and where Higgins and Liberman (2018) direct researchers to focus. Where someone stands in reference to the decision they are being asked to make influences whether losses will be more effective than gains. For example, where someone stands in reference to the status quo impacts which message frame will be more effective. They may be more likely to respond to losses if they are below the status quo than if they are above the status quo. In our context, if someone has not stored their food properly in the past they would be below the status quo; if they had stored their food properly in the past they would be above the status quo. Where people fall in relation to this reference point may influence their decision more so than chronic regulatory focus or moderators (Higgins & Liberman, 2018). When messages are framed quantitatively, as in Kahneman and Tversky's original work (1979), it is easier to give the reader a clear, objective reference point to work from. However, when messages are framed qualitatively, as our messages are framed in this study, it is more difficult to give people a clear reference point to work from; the reference point becomes more subjective (Abrams, 2015). The fact that messages in this study were framed qualitatively and did not take reference points into consideration may help explain our results.

Reference points are also influenced by past experiences and situations. Message frames do not operate in isolation. Instead, they operate in combination with past experiences and change over time (Fu, Yu, Ni, & Li, 2018; Higgins & Liberman, 2018; Sparks & Ledgerwood, 2017). New or unfamiliar experiences can lend themselves to promotion frames and existing or long-term experiences can lend themselves to prevention frames (Gal & Rucker, 2018b; Sparks

& Ledgerwood, 2017). One explanation for this is that strong social norms may factor in to existing experiences (Gal & Rucker, 2018b). In the case of black bear messaging, people who are repeat campers were likely aware of the social norms that exist around food storage and were exposed to loss-framed messaging over time since this type of messaging is more common in human-wildlife conflict contexts. Because of the effects of sequential framing, these messages likely stuck with people, making the messages used in this study less effective.

Because risk and safety are often involved in messages about black bears, the hedonic focus or emotions of a message can also be a strong moderator. If a message frame does not match the same emotions that a receiver is experiencing (hedonic mismatch), the message may not be effective (Malaviya & Brendl. 2014). This is one of the main reasons Cesario et al. (2013) emphasize framing messages in terms of pleasure of adhering to a behavior and pain of not adhering to a behavior.

Exposure to past messages and experiences also help shape a person's schemas (Fiske & Taylor, 1991). The message frames used in this study were designed to activate visitors' enjoyable or unenjoyable camping experiences. However, if schemas related to black bears and emotions about black bears were stronger, as survey results suggest, those schemas may have been activated instead, leading to message frames that were less effective. In the future, messages that align with these schemas about black bears should be examined for effectiveness.

While this study did not support regulatory focus theory and the self-regulatory framework that Cesario et al. (2013) suggest, it does support the current direction of research and provide an opportunity to better understand the complexities of regulatory focus theory, namely incorporating reference points into message frames. "Rather than asserting a universal difference between negative versus positive outcomes in their psychological impact, we need to know more

about how self-regulation in relation to reference points works" (Higgins & Liberman, 2018, p. 531). Clearly, from past and current work, self-regulation is still an important factor to consider in message framing. Messages framed with both self-regulation and reference points in mind, similar to the work of Lu et al. (2018), may help to advance this area of literature. For example, a future promotion-framed message in food storage messaging may read: Do everything you can to store your food properly to have a great camping experience – if you story your food properly, your friends and family are more likely to have an enjoyable camping experience. This message changes the reference point from the individual to family and friends.

5.1.2 Sign Effectiveness (H2)

The results showed that there was also no statistically significant difference in self-reported food storage behavior or behavioral intention for groups that received a message (promotion and prevention groups) and groups that did not receive a message (control group). How much information people are exposed to, as well as the demographics of the group, may play a role in how effective signage is in park settings.

Because people process many types of information at once, they are selective in the information that they process to conserve cognitive resources (Fiske & Taylor, 1991). Therefore, the holding power of signs is often not as effective as interpersonal communication (Hall et al., 2010) because signs are easier to ignore when visitors are asked to process multiple types of information at once, such as navigating a new campground, finding a campsite, reading additional signage, understanding rules and regulations, and planning their recreational activities.

When people are repeatedly exposed to similar messages, they are often more resistant to that message and can become inoculated to its effects (McGuire, 1961). Davis and Thompson (2011) also found that repeat visitors to an area are less likely to read signs. Given that 99.6% of

respondents in this study camp at least once a year and that a few food storage messages were already present at Hermit Park, it is likely they have been exposed to messages about food storage in the past and may not have taken the time to read or notice signs.

5.1.3 Food Storage Containers (H3)

When behavioral intention to store food properly was compared in 2017 (no food storage containers present) and 2018 (food storage containers present), no statistically significant difference was found. We surmise that the lack of food storage containers may have been less of a barrier to storing food properly, especially when people were camping in or near a vehicle. The timing of survey administration may have also played a role in the reliability of results.

Martin and McCurdy (2009) cite inconvenience as a barrier to using food storage containers, but we found the opposite in our survey results –the convenience of having food storage containers at sites made no difference in their intent to store food properly. This discrepancy could be because food storage containers were provided for people at each campsite; therefore, campers did not have to take extra measure to purchase and carry a food storage container. Also, because people camp in or near a vehicle at Hermit Park Open Space, perhaps they felt they had the tools they needed to store their food properly with or without a food storage container being provided; therefore, there was not a significant change in perceived behavioral control.

The pilot survey that measured 2017 behavioral intention to store food properly was administered up to a year after visitors' initial camping experience, as opposed to directly following a visitors' camping experience for the 2018 survey. Behavioral intention measured closer to the actual behavior is often more representative of actual behavior (Sutton, 2006). Respondents' reports of their behavioral intentions in the 2017 survey may not have been

representative of actual behavior because of delay in survey administration, and visitors may have been motivated by social desirability bias to provide the "correct" answer that they did intend to store their food properly in the future.

5.1.4 Predicting Food Storage Behavior

Since no differences were found between groups for message condition, message presence, or food storage container presence, we looked to the other independent variables in this study, informed by the literature, to better understand which factors may predict someone's food storage behavior. The most compelling results were support for two variables from the theory of planned behavior, perceived behavioral control and subjective norms, that predicted people's food storage behavior. Some motivations and barriers also predicted food storage behavior at a statistically significant level. We also explored the role of risk perceptions and previous experience with black bears, as well as the differences between dependent variables on how food storage behavior was reported.

Factors from the theory of planned behavior were supported, namely subjective norms and perceived behavioral control. Subjective norms predicted food storage behavior at a statistically significant level when food was left in a cooler and when predicting behavioral intentions, a finding similar to Martin and McCurdy's work (2009). Perceived behavioral control also predicted food storage behavior at a statistically significant level when food was left on a table and when predicting behavioral intentions. The theory of planned behavior provides a framework that has been tested and applied in the conservation field (St. John et al., 2014), so it makes sense that these constructs predicted both behavioral intentions and behavior.

Motivations to protect friends and family predicted food storage behavior when food was left out on a table, and barriers of convenience, time, and knowledge of how to store food

predicted food storage behavior when food was left in a cooler. Regulatory focus theory supports that campers would want to protect friends and family, as they are a closer reference point (Lu et al., 2018). Martin and McCurdy's work (2009) also supports how influential barriers can be in regards to decision-making.

We also found differences among each dependent variable: food storage on a table, food storage in a cooler, food storage in a tent, and behavioral intention. One explanation for this is that subjective norms vary depending on visibility of where food is stored. For example, keeping food stored in a cooler may be seen as more socially acceptable than leaving food out on a table.

The theory of planned behavior draws a strong connection between behavioral intentions and actual behavior, but they are not the same, which is one reason for differences between self-reported behavior and behavioral intention. While behavioral intentions often predict actual behavior, sometimes they do not because intentions may change, time may pass between intention and behavior, or the intention may not be strong enough to lead to actual behavior (Sutton, 2006).

Based on our research question, we explored the role of risk perceptions and previous experience with black bears. These factors were not shown to influence food storage behavior or behavioral intention, especially since there was no difference between groups. Perhaps some of the moderators of regulatory focus discussed earlier, reference points and hedonic focus, had a stronger influence on behavior.

5.1.5 How Behavior Was Reported

How behavior was reported in this study provides us with some interesting insights on how social science data is collected in a park setting. Originally, we intended to use patrol log data to measure food storage behavior. However, because the number of people storing their

food incorrectly was so low, we used self-reported food storage data. The large discrepancy between patrol log behavior data and self-reported behavior data could have to do the collection method. While social desirability bias certainly plays a role in how people report their behavior, they are more likely to under report than over report their behavior, especially in an anonymous, low risk survey. Because park rangers perform roving patrols, they are not present at all times, especially early in the morning and late in the evening when food storage incidents are more likely to occur.

Law enforcement culture may also play a role in the data collected on patrol logs. Several factors influence how likely law enforcement officials are to report an incident, including the desire to support organizational policies and practices, an individual's attitudes and beliefs, professional self-preservation, and work-related difficulties (Nolan & Akiyama, 1999). In this case, organizational policies and practices may outline certain expectations for rangers to respond to more severe incidents (such as injuries or traffic violations) as opposed to food storage violations. A ranger may also have an attitude or belief that places more weight on helping with a law enforcement task that will further their career, with noting food storage violations being low on this list.

5.2 Practical Implications

Framing messages in a field setting requires an understanding of the complex factors that can influence a visitor's behavior. Taking into consideration reference points, sequential messaging effects, and hedonic focus can improve message effectiveness. How to incorporate the results of this study, namely incorporating predictors of food storage behavior into message framing, increasing the effectiveness of signage and food storage containers, and collecting data in an effective way are also discussed here.

One of the challenges of framing messages in a park setting is applying the same messaging to a large group of visitors while also understanding the role that individual characteristics play on how people process messages. Managers often have little control over targeting messages to specific person. Therefore, understanding more about user groups and which message frames may be relevant to a group at a larger scale would be useful. Understanding and acknowledging a visitor's reference points in regard to previous experience with food storage may help to improve message effectiveness, as well as tying in existing food storage messaging (Higgins & Liberman, 2018; Sparks & Ledgerwood, 2017). The impact of sequential message framing on how people process messages provides an opportunity to consider existing human-black bear conflict messaging and put new messages in the context of that information. A community-wide or state-wide strategic communication campaign with consistent messaging on food storage messaging may provide more control over this sequential framing effect, as well as reinforce messages (Norton & Grecu, 2015). Because messages are so far reaching and cannot be targeted to the individual, incorporating multiple message frames with a consistent overarching message may allow managers to accommodate reference point, previous experience, and hedonic focus in the same communication campaign.

Incorporating predictors of food storage behaviors into message frames can also increase effectiveness (Hockett & Hall, 2007). Subjective norms, perceived behavioral, keeping bears wild, protecting friends and family, as well as convenience, time, and knowledge of how to use food storage containers predict visitors' food storage behavior. Using language that specifically references these predictors in message frames and interpersonal communication may increase proper food storage behavior.

Although this study indicated that the use of messages and food storage containers did not have an impact on behavior, there are some strategies managers can employ to increase the effectiveness of these tools. Placing messages in multiple locations, especially at front desk spaces and kiosks where visitors expect to receive information and pay attention, can increase effectiveness (Hall et al., 2010). While placing messages at the location of the intended behavior is also critical, visitors may be more distracted by other activities and the holding power of the sign can decrease (Hall et al., 2010). Banas and Rains (2010) also recommend decreasing levels of perceived threat and using novel arguments to help counteract the effects of inoculation.

Because food storage containers have the ability to increase a visitors' perceived behavioral control, and perceived behavioral control was shown to be a predictor of food storage behavior, we suggest that these containers are still an effective means of increasing proper food storage behavior.

Lastly, the difference between patrol log data and self-reported behavior provides us with insights on how to effectively evaluate communication efforts. The substantial increase in self-reported incorrect food storage behavior leads us to believe that patrol log data is not a good method for measuring behavior. Developing dedicated data collection methods that field staff could employ may help remedy this discrepancy (Gray & Kalpers, 2004). Staff were not informed they were helping with data collection in this study to decrease experimenter bias, but training staff on data collection methods may help increase validity of results.

Collecting more survey data may also prove useful, especially if managers have access to email addresses. For example, using the Reserve America system that many campground providers employ for reservations provides the opportunity to send campers an automated survey

at the end of their trip. Asking a few targeted questions over longer periods of time may give managers more accurate data to help inform decisions.

5.3 Limitations

Limitations to this study include small sample size, manipulation checks not working as intended, and potential response bias. The sample size in this study was relatively small for a message framing study, which makes it difficult to find statistically significant results (O'Keefe & Nan, 2012). Increasing the number of campers in each message condition by increasing the time each message was in the field or increasing the number of campgrounds the study was conducted at may help increase sample size.

The manipulation checks also did not work as intended. While there was a difference between control messages and the prevention- and promotion-framed messages constructed for this study, there was no difference between the prevention- and promotion-framed messages. However, "a distinguishing feature of goal framing manipulations is that both framing conditions promote the same act. The question in goal framing is which frame, positive or negative, will have the greater persuasive impact on achieving the same result" (Levin, Schneider, & Gaeth, 1998). People understand the intended behavior in both message conditions. Asking questions on the nuance of how different message frames are constructed can be confusing because the end goal of proper food storage is still the same.

In this case, storing food properly will result in "having a peaceful, enjoyable camping experience" and "avoiding having an unenjoyable camping experience and putting yourself and bears at risk." We posit that it was difficult for participants to distinguish between the two because, even if a message emphasized one frame over the other, both statements are ultimately true. When you combine this with the effects of sequential framing – that visitors may have

already been exposed to food storage messages over time – we can begin to understand why the message manipulations appeared to participants to have more similarities than differences.

Response bias may have also played a role in the results of this study. Respondents in the follow-up survey often felt very strongly about proper food storage and keeping wildlife safe. Respondents in this study may be more likely care more deeply about wildlife and proper food storage and may camp more regularly than non-respondents. In general, people with a strong belief that wildlife should be kept safe are more likely to have a mutualistic wildlife value orientation, as opposed to a domination wildlife value orientation. That is, they view wildlife as more living side-by-side with humans as opposed to humans dominating wildlife (Manfredo, Teel, & Henry, 2009).

5.4 Areas for Future Research

Opportunities for future research are abundant in how we frame messages and how data is collected and used in a field setting. Given the new research discussion on loss aversion, we recommend that future research be conducted to better understand how different message frames influence behavior and the role message delivery plays, especially in a field setting. Different/multiple message frames that take into account the future of loss aversion theory including reference points, sequential framing effect, and hedonic factors, as well as emotional appeals, could tell us more about how frames influence complex human behavior. Studying multiple framing effects in a single study may help to isolate the influence of each frame.

Testing messages in a community-wide messaging campaign may also be beneficial. This would allow for repeat exposure to messages via website, social media, and across various locations. When wildlife management issues reach across various locations and organizations, a strategic, targeted communication approach can increase the effectiveness of each organization's

efforts. It would also allow for messages to be tested in the field with larger sample sizes and longer observation periods.

Lastly, utilizing existing tools to collect data can help decrease the burden on staff and give managers information to make more informed, data-driven decisions. Modifying patrol logs, training staff to more consistently observe behavioral data, and adding surveys to reservation sites can help provide a strong foundation for these decisions. To effectively manage behavior, seeking feedback and input from visitors must be integrated into regular operations.

5.5 Conclusion

The aim of this study was to understand how message frames, messages, and food storage containers influenced behavior change in a human-wildlife context when risk is involved. Regulatory focus theory was used to frame messages, while the theory of planned behavior was used to better understand influences that motivated visitors to change their behavior.

While no statistically significant difference was found among groups exposed to different messages or food storage containers, we did find support for the theory of planned behavior, as well as a path forward for research. Understanding what influences a visitor's behavior can help managers when they are constructing messages and communicating with visitors. Future research on how message frames interact with the complexities of human behavior, as well as how managers can integrate messages at a larger scale and throughout the work they do provides opportunities for better, more effective message strategies moving forward to change behavior and decrease human-wildlife conflict.

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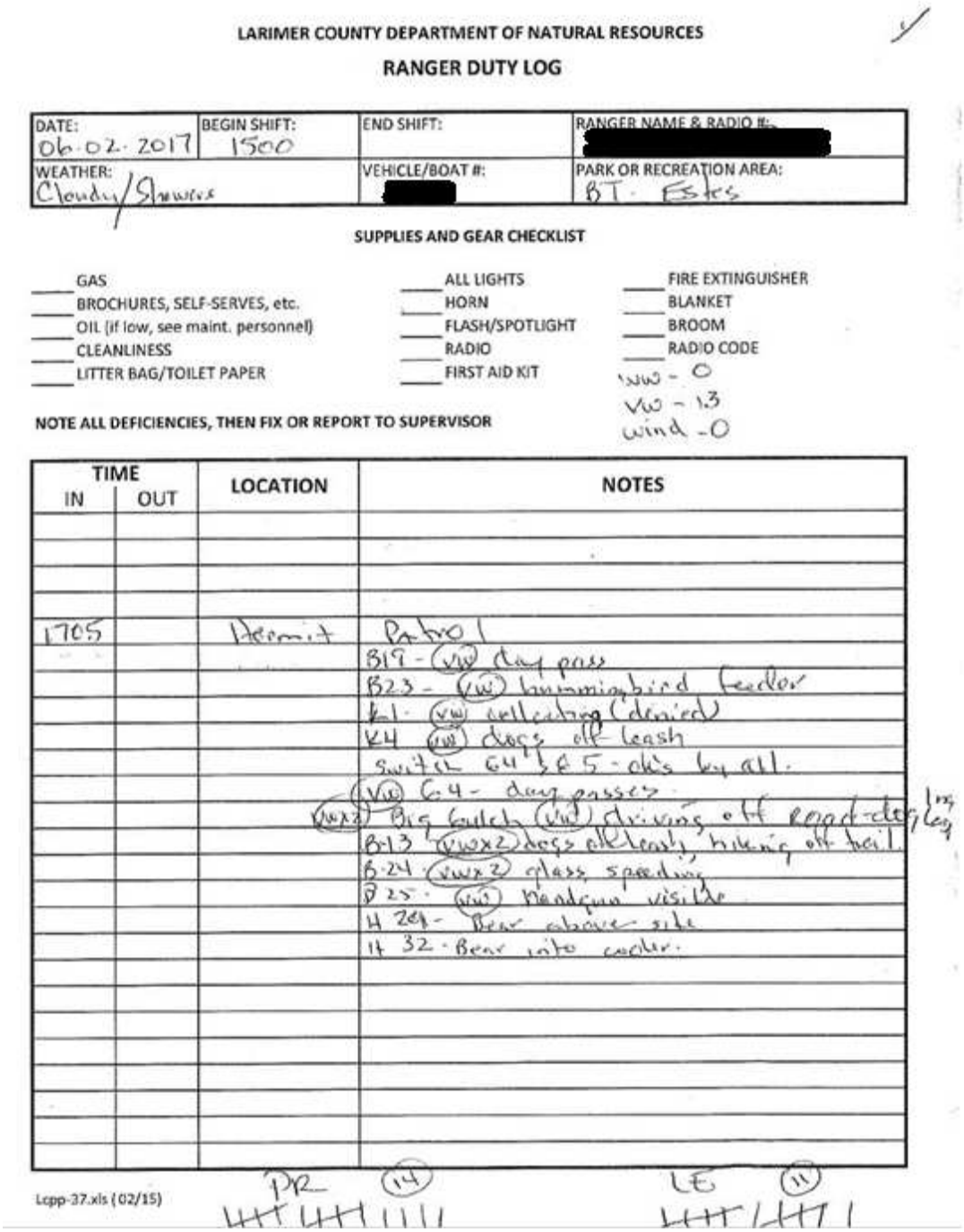
Appendix A: Patrol Log Sample



LARIMER COUNTY DEPARTMENT OF NATURAL RESOURCES

RANGER DUTY LOG

DATE: 06-02-2017	BEGIN SHIFT: 1500	END SHIFT:	RANGER NAME & RADIO #: [redacted]
WEATHER: Cloudy/Showers		VEHICLE/BOAT #: [redacted]	PARK OR RECREATION AREA: BT - Estes

SUPPLIES AND GEAR CHECKLIST

___ GAS	___ ALL LIGHTS	___ FIRE EXTINGUISHER
___ BROCHURES, SELF-SERVES, etc.	___ HORN	___ BLANKET
___ OIL (if low, see maint. personnel)	___ FLASH/SPOTLIGHT	___ BROOM
___ CLEANLINESS	___ RADIO	___ RADIO CODE
___ LITTER BAG/TOILET PAPER	___ FIRST AID KIT	WW - 0 VW - 13 wind - 0

NOTE ALL DEFICIENCIES, THEN FIX OR REPORT TO SUPERVISOR

TIME IN	TIME OUT	LOCATION	NOTES
1705		Hermit	Patrol
			B19 - (VW) day pass
			B23 - (VW) hummingbird feeder
			K1 - (VW) collecting (denied)
			K4 (VW) dogs off leash
			Switch K4 & E5 - ok's by all.
			(VW) C4 - dog passes
			(VWx3) Big Gulch (VW) driving off road-dec, leg
			B13 (VWx2) dogs off leash, hiking off trail
			B-24 (VWx2) glass speeding
			B 25 - (VW) Headgum visible
			H 29 - Bear above site
			H 32 - Bear into cooler.

Lcpp-37.xls (02/15)

PR (14) HHT HHT IIII

LE (11) HHT HHT I

Appendix B: Follow-up Survey Questions

1. Consent
2. Introduction
    a. How long ago was your most recent camping trip? (Less than 1 month ago, 1-3 months ago, More than 3 months ago-6 months ago, More than 9 months ago-12 months ago, More than 12 months ago
    b. How often do you typically camp in a given year? (Less than 1 time each year, 1-3 times each year, 4-6 times each year, More than 7 times each year
    c. During your most recent stay at Hermit Park Open Space, where did you camp/sleep primarily? (Tent, Tent trailer, Trailer, Truck camper, Fifth wheel, RV/motorhome, Van, Cabin, Other and list)
3. Test for study objectives
    a. During or immediately prior to your most recent camping experience at Hermit Park, do you recall noticing any signs or receiving or picking up any information about storing your food at your campsite? (Yes/No for sign posted at my campsite, sign(s) posted elsewhere in the campground, handout from campground check-in or campground host, Larimer County website, Email from Larimer County, Other and list)
    b. Did anyone from Larimer County talk to you about storing your food during your most recent camping trip to Hermit Park? (Yes/No for Front desk/check-in staff, Campground hosts, Rangers, Other and list)
    c. Did any other campers who weren't in your party talk to you about storing your food? (Yes, No, Don't remember)
    d. In general, what is your experience using food storage containers/bear boxes while camping in areas where black bears also live? (Never used before, Sometimes use while camping, Use about half the time while camping, Use most of the time while camping, Always use while camping)
4. Previous experience with black bears
    a. Have you ever seen a black bear in the wild (not at a zoo or wildlife park)? (Yes, No)
        i. If yes, did you have a positive or negative interaction with the black bear? (1=Extremely negative, 5=Extremely Positive)
    a. How many times have you seen a black bear in the wild? (Daily, weekly, monthly, once every 6 months, yearly, once or twice in total, or have never seen a black bear)
    b. Has your property ever been damaged by a black bear? (Yes, No)
    c. Have you ever been personally threatened by a black bear? (Yes, No)
5. Risk perceptions
    a. Please indicate the extent to which you agree or disagree with the following statements (1=strongly disagree, 5=strongly agree):
        i. The risk of being threatened by a black bear is acceptably low at Hermit Park Open Space.
        ii. The risk of being injured by a black bear is acceptably low at Hermit Park Open Space.

iii. I worry about problems that black bears may cause at Hermit Park Open Space (reverse coded).

6. Recall/self-reported behavior
    a. Do you remember storing your food in any way while camping at Hermit Park Open Space? (Yes, No)
    b. How important is it to you to protect your food from bears when camping at Hermit Park Open Space? (1=Not at all important, 5=Extremely important)
    c. About how often do you remember leaving food unattended and out on a table either while you were away from your site for longer than 5 minutes or inside your camping dwelling (tent, RV, etc.)? (1=Every time, 5=Never)
    d. About how often do you remember leaving food unattended and out at your site in a cooler, plastic or cardboard box, and/or bag(s) while you were away from your site for longer than 5 minutes or inside your camping dwelling (tent, RV, etc.)? (1=Every time, 5=Never)
    e. About how often do you remember leaving food unattended and out at your site in a cooler, plastic or cardboard box, and/or bag(s) while you were away from your site for longer than 5 minutes or inside your camping dwelling (tent, RV, etc.)? (1=Every time, 5=Never)
7. Behavioral beliefs/attitudes
    a. How would you describe your experience storing food at Hermit Park Open Space on the following dimensions?
        i. Not fun (1), Fun (5)
        ii. Difficult (1), Easy (5)
        iii. Bad (1), Good (5)
        iv. Worthless (1), Valuable (5)
        v. Unnecessary (1), Necessary (5)
        vi. Ineffective (1), Effective (5)
        vii. Undesirable (1), Desirable (5)
        viii. Impractical (1), Practical (5)
        ix. Dull (1). Exciting (5)
        x. Unenjoyable (1), Enjoyable (5)
8. Normative beliefs/subjective norms
    a. To what extent do you agree or disagree with the following statements? (1=strongly disagree, 5=strongly agree)
        i. During my visit to Hermit Park Open Space, the people most important to me made me feel as though I should store my food properly.
        ii. During my visit to Hermit Park Open Space, other people camped nearby made me feel as though I should store my food properly.
        iii. During my visit to Hermit Park Open Space, Larimer County Natural Resources staff made it seem important for me to store my food properly.
    b. How often do your friends and family store their food when camping? (1=never, 5=always)
9. Control beliefs/perceived behavioral control
    a. Were bear-proof food storage containers provided by Hermit Park Open Space available for use during your camping trip? (Yes, No, Don't Remember). If yes:

i. Please indicate the extent to which you agree or disagree with the following statements in reference to your camping experience at Hermit Park Open Space (1=strongly disagree, 5=strongly agree):
    1. Food storage container:
        a. The food storage container at my campsite was large enough to store my food.
        b. The food storage container at my campsite was easy to use.
        c. I knew how to use the food storage container at my campsite.
    2. Behavior:
        a. It was difficult to store my food properly (reverse coded).
        b. It was convenient to store my food properly.
        c. I felt that storing my food properly (in a vehicle or food storage container) was my choice to make.

10. Behavioral intentions
    a. Please indicate the extent to which you agree or disagree with the following statements (1=strongly disagree, 5=strongly agree)
        i. Even in areas where it isn't required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.
        ii. In areas where it is required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.
11. Motivations
    a. In general, how influential are the following factors in your decision to store your food properly while camping? (1=Not at all influential, 5=Extremely influential)
        i. Keeping bears wild
        ii. Protecting my food
        iii. Protecting my friends and family
        iv. Avoiding a citation
12. Barriers
    a. In general, how influential are the following factors in your decision to store your food properly while camping? (1=Not at all influential, 5=Extremely influential)
        i. Convenience
        ii. Time
        iii. Knowledge of how to store my food properly
13. Self-efficacy
    a. Please indicate to what extent you agree or disagree with the following statements: (1=strongly disagree, 5=strongly agree)
        i. I believe I can make a difference in keeping myself and others safe if I store my food properly.
        ii. My individual actions in storing my food properly can make a difference in keeping wildlife safe.
    b. Manipulation Check Questions
        i. Participants are presented with one of 3 flyers:
            1. Control

2. Promotion
3. Prevention

ii. To what extent does the flyer make you focus on having a peaceful, enjoyable camping experience as a result of storing your food properly? (1=Not at all, 5=A great deal or Does not apply)

iii. To what extent does the flyer make you focus on avoiding having an unenjoyable camping experience and putting yourself and bears at risk as a result of storing your food properly? (1=Not at all, 5=A great deal or Does not apply)

14. Gender and additional demographic information
    a. In what year were you born?
    b. What is the highest level of school you have completed or the highest degree you have received? (Less than a high school degree, High school graduate, Some college but no degree, Associate degree, Bachelor's degree in college, Master's degree, Doctoral degree, Professional degree)
    c. Choose one or more races that you consider yourself to be: (American Indian or Alaska Native; Asian; Black or African American; Native Hawaiian or Pacific Islander; Spanish, Hispanic, or Latinx; White; Other and list)
    d. What is your gender? (Female, Male, Other)
    e. Information about income is very important to understand. Please indicate the answer that includes your entire household income in 2017 before taxes.
    f. What is your ZIP code of your permanent residence?

Appendix C: Pilot Study Questions

1. Consent
2. Introduction
    a. How long ago was your most recent camping trip? (Less than 1 month ago, 1-3 months ago, More than 3 months ago-6 months ago, More than 9 months ago-12 months ago, More than 12 months ago
    b. How often do you typically camp in a given year? (Less than 1 time each year, 1-3 times each year, 4-6 times each year, More than 7 times each year
    c. Where do you normally stay when you camp at Hermit Park Open Space? (Tent, Trailer, RV/fifth wheel, Cabin, Other and list)
3. Previous experience with black bears
    a. Have you ever seen a black bear in the wild (not at a zoo or wildlife park)? (Yes, No)
        i. If yes, did you have a positive or negative interaction with the black bear? (1=Extremely negative, 5=Extremely Positive)
    d. How many times have you seen a black bear in the wild? (Daily, weekly, monthly, once every 6 months, yearly, once or twice in total, or have never seen a black bear)
    e. Has your property ever been damaged by a black bear? (Yes, No)
    f. Have you ever been personally threatened by a black bear? (Yes, No)
4. Regulatory Focus Questionnaire (1=strongly disagree, 5=strongly agree)
    a. When it comes to achieving things that are important to me, I find that I don't perform as well as I would ideally like to do.
    b. I feel like I have made progress toward being successful in my life.
    c. When I see an opportunity for something I like, I get excited right away.
    d. I frequently imagine how I will achieve my hopes and aspirations.
    e. I see myself as someone who is primarily striving to reach my “ideal self” to fulfill my hopes, wishes, and aspirations.
    f. I usually obeyed rules and regulations that were established by my parents.
    g. Not being careful enough has gotten me into trouble at times.
    h. I worry about making mistakes.
    i. I frequently think about how I can prevent failures in my life.
    j. I see myself as someone who is primarily striving to become the self I “ought” to be – fulfill my duties, responsibilities and obligations.
5. Participants are presented again with one of 3 flyers:
    a. Control
    b. Promotion
    c. Prevention
6. Behavioral intentions
    a. Please indicate the extent to which you agree or disagree with the following statements (1=strongly disagree, 5=strongly agree)
        i. Even in areas where it isn't required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.

ii. In areas where it is required, I will store my food in my car or food storage container (bear-proof box or canister) on my next visit to Hermit Park Open Space.

7. Risk perceptions
    a. Please indicate the extent to which you agree or disagree with the following statements (1=strongly disagree, 5=strongly agree):
        i. The risk of being threatened by a black bear is acceptably low at Hermit Park Open Space.
        ii. The risk of being injured by a black bear is acceptably low at Hermit Park Open Space.
        iii. I worry about problems that black bears may cause at Hermit Park Open Space (reverse coded).
8. Recall
    a. How important is it to you to protect your food from bears when camping at Hermit Park Open Space? (1=Not at all important, 5=Extremely important)
    b. Do you remember storing your food while camping at Hermit Park Open Space? (Yes, No)
        i. If yes, how did you store your food while camping at Hermit Park Open Space? (In a vehicle, In a cooler, In a tent, In a bear-proof canister that I or someone in my party brought with, In a bear-proof box provided by the park, Other and list)
9. Behavioral beliefs/attitudes
    a. How would you describe your experience storing food at Hermit Park Open Space on the following dimensions?
        i. Not fun (1), Fun (5)
        ii. Difficult (1), Easy (5)
        iii. Bad (1), Good (5)
        iv. Worthless (1), Valuable (5)
        v. Unnecessary (1), Necessary (5)
        vi. Ineffective (1), Effective (5)
        vii. Undesirable (1), Desirable (5)
        viii. Impractical (1), Practical (5)
        ix. Dull (1). Exciting (5)
        x. Unenjoyable (1), Enjoyable (5)
10. Normative beliefs/subjective norms
    a. To what extent do you agree or disagree with the following statements? (1=strongly disagree, 5=strongly agree)
        i. During my visit to Hermit Park Open Space, the people most important to me made me feel as though I should store my food properly.
        ii. During my visit to Hermit Park Open Space, other people camped nearby made me feel as though I should store my food properly.
        iii. During my visit to Hermit Park Open Space, Larimer County Natural Resources staff made it seem important for me to store my food properly.
    b. How often do your friends and family store their food when camping? (1=never, 5=always)
11. Control beliefs/perceived behavioral control

a. Were bear-proof food storage containers provided by Hermit Park Open Space available for use during your camping trip? (Yes, No, Don't Remember). If yes:
    i. Please indicate the extent to which you agree or disagree with the following statements in reference to your camping experience at Hermit Park Open Space (1=strongly disagree, 5=strongly agree):
        1. Food storage container:
            a. The food storage container at my campsite was large enough to store my food.
            b. The food storage container at my campsite was easy to use.
            c. I knew how to use the food storage container at my campsite.
        2. Behavior:
            a. It was difficult to store my food properly (reverse coded).
            b. It was convenient to store my food properly.
            c. I felt that storing my food properly (in a vehicle or food storage container) was my choice to make.

12. Feedback
    a. While taking this survey, were any questions confusing to you? (Yes, No)
        i. If yes, which question(s) do you recall being difficult to answer? Please describe as best as you can. Your response will be used to improve the survey and run it again in the near future. (Open ended)
    b. We're trying to understand what motivates people to store their food properly while camping. Were there any questions we didn't ask that you think could help us understand that better? (Yes, No)
        i. If yes, please briefly describe the kinds of questions you think would help us understand how you decide to store your food while camping. (Open ended)
13. Manipulation Check Questions
    a. Participants are presented again with the same message condition.
    b. To what extent does the flyer focus on achieving good outcomes? (1=Not at all, 5=A great deal or Does not apply)
    c. To what extent does the flyer focus on making sure everything goes right when storing food? (1=Not at all, 5=A great deal or Does not apply)
    d. To what extent does the flyer focus on having a painful experience? (1=Not at all, 5=A great deal or Does not apply)
    e. To what extent does the flyer focus on avoiding negative outcomes? (1=Not at all, 5=A great deal or Does not apply)
    f. To what extent does the flyer focus on avoiding anything that could go wrong when storing food? (1=Not at all, 5=A great deal or Does not apply)
14. Gender and additional demographic information
    a. In what year were you born?
    b. What is the highest level of school you have completed or the highest degree you have received? (Less than a high school degree, High school graduate, Some college but no degree, Associate degree, Bachelor's degree in college, Master's degree, Doctoral degree, Professional degree)

c. Choose one or more races that you consider yourself to be: (American Indian or Alaska Native; Asian; Black or African American; Native Hawaiian or Pacific Islander; Spanish, Hispanic, or Latinx; White; Other and list)
d. What is your gender? (Female, Male, Other)
e. Information about income is very important to understand. Please indicate the answer that includes your entire household income in 2017 before taxes.
f. What is your ZIP code of your permanent residence?

Appendix D: Stimulus Messages

Promotion-framed Message

Do Everything You Can to Store Your Food PROPERLY to Have a GREAT Camping Experience

If you store your food properly, you are more likely to have an enjoyable camping experience – whether that be finding peace and quiet by connecting with nature or having fun with friends and family.

- **Never leave food or trash unattended.** Any food, trash, or coolers left out will be confiscated.
- **Stash your trash, food, beverages, cookware, tableware, and toiletries.** Store anything with a scent in your vehicle, or a bear-proof container. Put trash in bear-proof dumpsters located at each campground.
- **Keep a clean tent.** Don't bring anything with an odor into your tent. Don't sleep in the clothes you cooked in; store them in your vehicle.
- **Never intentionally feed wildlife.**

Prevention-framed Message

AVOID Attracting Bears to Your Camp and RUINING Your Camping Experience

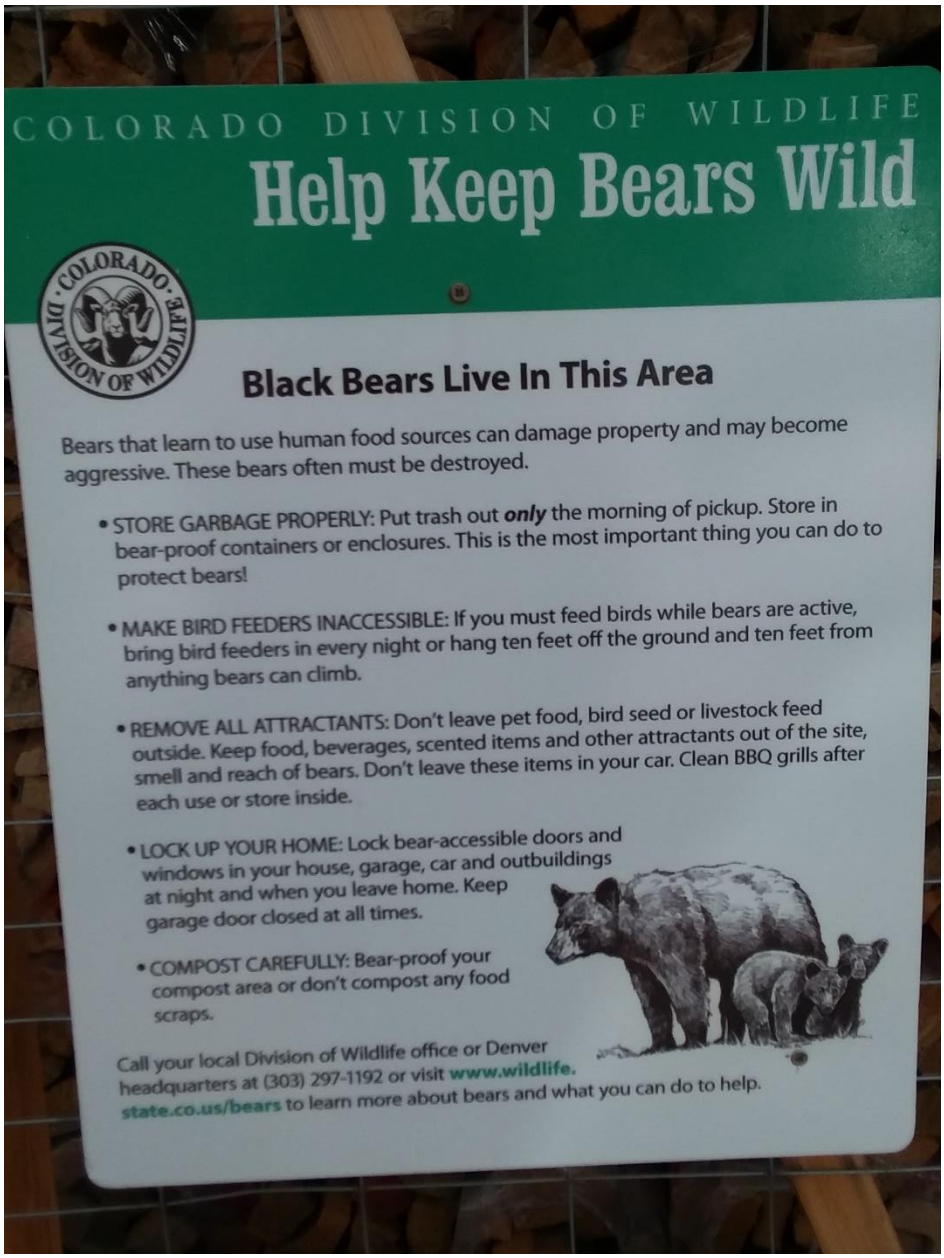
If you don't store your food properly, you are more likely to have an unenjoyable camping experience and put yourself and those with you, your property, and bears at risk.

- **Never leave food or trash unattended.** Any food, trash, or coolers left out will be confiscated.
- **Stash your trash, food, beverages, cookware, tableware, and toiletries.** Store anything with a scent in your vehicle, or a bear-proof container. Put trash in bear-proof dumpsters located at each campground.
- **Keep a clean tent.** Don't bring anything with an odor into your tent. Don't sleep in the clothes you cooked in; store them in your vehicle.
- **Never intentionally feed wildlife.**

Appendix E: Existing Food Storage Messages

Main Entrance Kiosk
Number and Location: One sign at Hermit Park main entrance

Help Keep Bears Wild: Black Bears Live in This Area
Number and Location: One sign outside the Hermit Park main office



Help Keep Bears Wild: Camping in Bear Country
Number and Location: Two signs in Hermit's Hollow Campground

Living with Wildlife in Bear Country
Location: One sign in in Bobcat Campground

Appendix F: Recruitment Emails

Invitation to Participate
Subject: Hermit Park camping experience survey: Win an REI gift card

Hello,

Thanks for camping at Hermit Park Open Space! Because you spent time at Hermit Park this summer, Larimer County Natural Resources, in partnership with Colorado State University, requests your feedback to learn more about how food storage may impact human-black bear interactions.

You have been chosen to complete a short questionnaire about your camping experiences, experiences with black bears, and thoughts on storing your food while camping. Your participation in this study will provide valuable insights to help improve your camping experience at Hermit Park Open Space. You would also be helping me with my Master's thesis research.

If you complete the survey, you will have the opportunity to be entered into a drawing to win one $100 REI gift card or one of five $20 REI gift cards. After completing the questionnaire, you will be taken to a separate link that is not connected with the original survey to fill out your name, email address, and phone number to be entered into the drawing to win. You may only enter once. Your name will not be associated with your survey responses.

The survey will only take 8-10 minutes to complete.

Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
${l://SurveyURL}

All survey responses are anonymous and your participation is voluntary. Every question in the survey is optional, and you may choose to skip a question if you prefer not to answer it. If you have any questions, comments, or concerns, please contact Heather Young at Heather.Young@colostate.edu or by calling 970-672-6775.

On behalf of Larimer County Department of Natural Resources and Colorado State University, I sincerely appreciate your help with this survey!

Thank you,

Heather Young
Education Program Coordinator/Larimer County Department of Natural Resources
Graduate Student/Colorado State University
Heather.Young@colostate.edu

970-672-6775

Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

First Reminder
Subject: Reminder – Hermit Park camping experience survey: Win an REI gift card

Hello,

I recently reached out to you asking for your participation in an online survey to learn more about how food storage may impact human-black bear interactions. I wanted to remind you of the opportunity.

Your response is valuable to Larimer County Department of Natural Resources and Colorado State University to help improve the camping experience at Hermit Park Open Space.

If you complete the survey, you will have the opportunity to be entered into a drawing to win one $100 REI gift card or one of five $20 REI gift cards. After completing the questionnaire, you will be taken to a separate link that is not connected with the original survey to fill out your name, email, and phone number to be entered into the drawing to win. You may only enter once. Your name will not be associated with your survey responses.

The survey will only take 8-10 minutes to complete.

Follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
${l://SurveyURL}

All survey responses are anonymous and your participation is voluntary. Every question in the survey is optional, and you may choose to skip a question if you prefer not to answer it. If you have any questions, comments, or concerns, please contact Heather Young at Heather.Young@colosate.edu or by calling 970-672-6775.

On behalf of Larimer County Department of Natural Resources and Colorado State University, I sincerely appreciate your help with this survey!

If you wish to opt out of the study, click this link:
${l://OptOutLink?d=Click here to unsubscribe}

Alternatively, you can reply to this email and write “opt out” in the message and I will manually remove you so you are not emailed again.

Thank you,

Heather Young
Education Program Coordinator/Larimer County Department of Natural Resources
Graduate Student/Colorado State University
Heather.Young@colostate.edu
970-672-6775

If you wish to opt out of the study, click this link:
${l://OptOutLink?d=Click here to unsubscribe}

Final Reminder
Subject: Final Reminder – Hermit Park camping experience survey: Win an REI gift card

Hello,

I wanted to send you one final reminder about the survey opportunity I sent you last week. This is the last time you will be contacted about this survey.

While many people have responded, we are looking to make sure everyone's perspective is represented. I hope you'll please add your response by {Date}. Your response is valuable to Larimer County Department of Natural Resources and Colorado State University to help improve the camping experience at Hermit Park Open Space.

If you complete the survey, you will have the opportunity to be entered into a drawing to win one $100 REI gift card or one of five $20 REI gift cards. After completing the questionnaire, you will be taken to a separate link that is not connected with the original survey to fill out your name, email, and phone number to be entered into the drawing to win. You may only enter once. Your name will not be associated with your survey responses.

The survey will only take 8-10 minutes to complete.

Follow this link to the survey:
${l://SurveyLink?d=Take the Survey}

Or copy and paste the URL below into your internet browser:
${l://SurveyURL}

All survey responses are anonymous and your participation is voluntary. Every question in the survey is optional, and you may choose to skip a question if you prefer not to answer it. If you have any questions, comments, or concerns, please contact Heather Young at Heather.Young@colostate.edu or by calling 970-672-6775.

On behalf of Larimer County Department of Natural Resources and Colorado State University, I sincerely appreciate your help with this survey!

If you wish to opt out of the study, click this link:
${l://OptOutLink?d=Click here to unsubscribe}

Alternatively, you can reply to this email and write “opt out” in the message and I will manually remove you so you are not emailed again.

Thank you,

Heather Young
Education Program Coordinator/Larimer County Department of Natural Resources
Graduate Student/Colorado State University
Heather.Young@colostate.edu
970-672-6775

Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

Appendix G: Institutional Review Board Approval

Colorado State University

Research Integrity & Compliance Review Office
Office of Vice President for Research
Fort Collins, CO 80523-2011
(970) 491-1553
FAX (970) 491-2293

Date: April 10, 2018

To: Katie Abrams, Journalism & Media Communication
Heather Young, Journalism & Media Communication

From: IRB Coordinator, Research Integrity & Compliance Review Office (RICRO_IRB@mail.colostate.edu)

Re: Effectiveness of Promotion or Prevention Message Frames on Food Storage Messages about Black Bears

IRB ID: 330-18H **Review Date:** April 10, 2018
This project is valid from three years from the review date.

The Institutional Review Board (IRB) Coordinator has reviewed this project and has declared the study exempt from the requirements of the human subject protections regulations with conditions as described above and as described in §45 CFR 46.101(b):

Category 2 - Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

The IRB determination of exemption means that:

- **This project is valid for three years from the initial review.** After the three years, the file will be closed and no further research should be conducted. If the research needs to continue, please let the IRB Coordinator know before the end of the three years. You do not need to submit an application for annual continuing review.
- You must carry out the research as proposed in the Exempt application, including obtaining and documenting (signed) informed consent if stated in your application or if required by the IRB.
- Any modification of this research should be submitted to the IRB through an email to the IRB Coordinator, prior to implementing any changes, to determine if the project still meets the Federal criteria for exemption.
- Please notify the IRB Coordinator (RICRO_IRB@mail.colostate.edu) if any problems or complaints of the research occur.

Please note that you must submit all research involving human participants for review by the IRB. **Only the IRB or designee may make the determination of exemption**, even if you conduct a similar study in the future.