MOUNTAINS AND HANDRAILS: LINKING THEORIES OF ATTRIBUTION, RISK PERCEPTION, AND COMMUNICATION TO INVESTIGATE RISK MANAGEMENT IN THREE U.S. NATIONAL PARKS

A Dissertation

Presented to the Faculty of the Graduate School

of Cornell University

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

by

Laura Nicole Rickard

August 2012

MOUNTAINS AND HANDRAILS: LINKING THEORIES OF ATTRIBUTION, RISK PERCEPTION, AND COMMUNICATION TO INVESTIGATE RISK MANAGEMENT IN THREE U.S. NATIONAL PARKS

Laura N. Rickard, Ph.D.

Cornell University 2012

Psychologists and sociologists alike have contributed to our understanding of how individuals attribute the causes of—and responsibility for preventing—events both common and extraordinary. This dissertation envisioned responsibility and risk holistically by applying attribution theory on both an individual level (i.e., how individuals explain the causes of accidents and unintentional injury) and within a social context (i.e., how they perceive their responsibility to promote safety in public spaces). The research integrated risk perception concepts into attribution theory, examining how the perceived nature of risks (e.g., controllability, desirability) and the context in which they are encountered (i.e., the novel setting of a national park) may affect attribution of responsibility. Finally, the dissertation examined how sociocultural variables (e.g., past experiences in a setting, group memberships) and exposure to "official" (i.e., institutionally-scripted) and "unofficial" (i.e., unscripted) park-related communication relate to attribution of responsibility for causing and preventing visitor injury. The study pursued these goals in the context of three U.S. national park units, Mount Rainier National Park (Washington), Olympic National Park (Washington) and Delaware Water Gap National Recreation Area (Pennsylvania and New Jersey) using in-depth interviews with park employees and volunteers, and an online survey of employees, volunteers, and visitors.

Results suggested differences between employees and visitors in attributing the cause of a hypothetical visitor accident, as well as between those with varying levels of experience in a park

setting, and with varying perceptions of the "controllability" of park-related risk. The tendency among all respondents to interpret visitor accidents as "user errors" or "acts of God" also corresponded to certain attributional processes, such as "blaming the victim." Among visitors, differences in attributing responsibility for preventing accidents were observed on the basis of individual characteristics, including activity choice and demographics (e.g., age, sex, race/ethnicity). Likewise, among employees, attributions of responsibility varied by occupational division, but the idea of a "shared" responsibility for preventing visitor accidents was commonly understood as temporal, distributed, and spatial. These and other results suggest various management implications, such as whether the NPS should consider co-orientation or attribution "re-training" in order to counteract "misalignment" of attributions of responsibility between park staff and visitors.

BIOGRAPHICAL SKETCH

Laura Rickard received a B.A. degree from Brown University in Environmental Studies, where her research focused on science communication and informal science education with respect to climate change. Prior to beginning post-graduate study, she held a position at North Country School/Camp Treetops in Lake Placid, NY, where she worked as a farm/garden intern and as an ESL (English as a Second Language) teacher. At Cornell, her research interests focused broadly on science, health, environmental, and risk communication. Her M.S. thesis explored how "non-traditional" or non-recognized individuals, such as commercial pesticide applicators, communicate risk information in informal settings and to the larger public. Since then, she has collaborated with representatives of the National Park Service (NPS) to investigate how risks are communicated and perceived in national parks. Whether focusing on how audiences seek information, perceive risk, or attribute responsibility, her research has broad application to organizational risk and environmental management. Drawing from sociology, social psychology, and natural resource management, her research is highly interdisciplinary; she has utilized both quantitative and qualitative methods, such as surveys, social network analysis, participant observation, and interviews, to explore complex, applied communication questions, often with policy implications.

After completing a Ph.D. in Communication at Cornell University, Laura will join the faculty of State University of New York College of Environmental Science & Forestry (SUNY-ESF) as an Assistant Professor of Environmental Studies. In her spare time, she enjoys running, hiking, gardening, and exploring beautiful places with family and friends.

DEDICATION

This dissertation is dedicated to the memory of Mount Rainier National Park (MORA) law enforcement ranger Margaret Anderson (February 2, 1977- January 1, 2012), who was fatally shot in the line of duty while attempting to intercept a vehicle that failed to stop at a routine checkpoint in the park. She left behind a husband, Eric, also a law enforcement ranger at the park, and two young children.

While an intern at MORA (in Summer 2009 and in Winter/Spring 2011), I had the pleasure of interacting with Margaret on a regular basis. I was struck by her fierce commitment to the mission of the National Park Service, which she carried out most directly in her day-to-day duties at MORA. As the park's emergency medical services coordinator, she took visitor and employee safety seriously, and my understanding of the topic grew from our conversations. Despite the innumerable commitments and responsibilities competing for her time, in April 2011 she spent several hours sitting with me to review the findings from my statistical analysis of visitor injuries at MORA—a project that she had contributed to since beginning her tenure at MORA three years earlier. I remember feeling honored that Margaret had found time in her busy schedule to provide her input and, in a sense, to validate my findings based on her numerous and varied experiences in the field. A few weeks later, when sharing my findings with the MORA management team, it was Margaret who stepped in to help troubleshoot a malfunctioning screen projector to ensure that my presentation would be accessible to all in the room.

It is my hope that, in some small way, the results of this dissertation support Margaret's legacy by contributing to the goal of visitor and employee safety in national parks. Margaret, thank you for all that you did to make MORA a safer place.

ACKNOWLEDGEMENTS

While ostensibly a solo endeavor, completing this dissertation has, at times, seemed an impossible feat without the care and support of those around me. I consider these incredible people my co-authors and co-pilots on this remarkable journey, and to them I owe heartfelt thanks:

- To my Special Committee (Dr. Katherine McComas, Dr. Bruce Lewenstein, and Dr. Cliff Scherer, Dr. Rich Stedman), for their insightful comments and encouraging words. Thank you for allowing your student to disappear into the temperate rainforest of the Pacific Northwest for a few months, and for trusting that she would return (relatively) unscathed! Throughout this process, you have made me feel like a valued colleague, and for that I am so grateful. I look forward to more national park field trips, stimulating conversation, and research collaborations with all of you in the years to come.
- To Dr. Sara Newman, for her unyielding support of and commitment to my research. How fortuitous that we were connected a few years back! Thank you for serving as an invaluable resource and a superb co-author. I continue to be inspired by your commitment to visitor safety and public health in the national parks. I've learned so much from you, and hope we will continue to work together in years to come.
- To my family, for their continuous love and support, even when they have trouble explaining my research to their friends! Thank you for serving as my loyal cheering section since my first science fair presentation in 7th grade.
- To Jeremy, for putting up with the trials and tribulations of graduate school, even though you weren't enrolled. You deserve your own Ph.D. in patience, moral support, and active listening, but I hope that marrying you will suffice!
- To Gina, for being the best graduate school "twin" a girl could ever hope for. What would I have done without you? Thank you for finding your way back to Ithaca and for never failing to inspire me, crack me up, and, of course, inform me of the weather.

- To my fellow Cornell graduate students, who serve as colleagues, study partners, and, above all, friends. In particular, I owe considerable thanks to the members of the Risk Communication Research Group and the Human Dimensions of Wildlife Graduate Seminar, whose valuable comments I took into consideration when envisioning, writing, and revising this dissertation.
- To the Chief Rangers at Delaware Water Gap National Recreation Area (Eric Lisnik), Mount Rainier National Park (R. Chuck Young), and Olympic National Park (Colin Smith) for taking a chance with a veritable stranger wielding a clipboard and digital recorder. Your help was critical in all aspects of this study, from identifying employees to interview, to finding the nearest grocery store. Thank you for taking time away from your unenviable schedules to help me find my way.
- To the National Science Foundation for their generous support of this research in the form of a doctoral dissertation improvement grant (No. 1060433), the Student Conservation Association for providing the additional funding necessary to support my field research at Mount Rainier National Park, and to the Cornell University Graduate School for a travel grant that helped fund my work at Delaware Water Gap National Recreation Area.

And lastly, many thanks are due to those who participated in the interviews and survey. They graciously offered their thoughts and feelings to me for scrutiny, and I hope to have represented them honestly and fairly.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1.

INTRODUCTION

> The classification of any event as "accidental" is certainly often provisional: misfortunes are only described as accidents until responsibility can be apportioned (Green, 1997, p. 3).

Common parlance suggests that "accidents" are part and parcel of daily life, from stubbing one's toe to spilling one's coffee; we accept and even expect them to occur from time to time. But in less mundane situations, in which injury or even death are unfortunate outcomes, how do we allocate responsibility for what we perceive as "accidents"? Who (or what) is responsible for causing them, and for preventing them from occurring in the first place? Consider, for example, the following accidents:

- A 34 year-old mother of two is shot as she attempts to intercept a speeding car. The driver had failed to stop at a checkpoint intended to ensure that all vehicles install tire chains (necessary for driving in icy conditions). Waiting for backup from her co-workers, she succumbs to her wounds.
- An Iraq veteran, the 24 year-old shooter abandons his car and runs into a wooded area of waist-high snow, wearing little more than a t-shirt and tennis shoes. He is found the next day submerged in a snowy creek, a victim of hypothermia and drowning.
- Attempting to reach a 14, 410 ft. summit, two experienced mountaineers are caught by strong winds and snow. Hit by the same storm, another party of two fails to return from an overnight trip to a popular base camp (10, 200 ft). To date, none of the four individuals have been found.

As I sat in my cloistered office, analyzing data collected over seven months in three national parks, the news of these accidents found their way in, plastered on CNN newsfeeds and assembled on Facebook pages. The stories were at once compelling and tragic. In some ways, I reacted to the news of January 2012 at Mount Rainier National Park (MORA) in Washington state—the death of a law enforcement ranger, her killer, and four climbers—much like my friends at the National Park Service (NPS) and the wider public: with a mixture of shock and grief. Yet, for me, the events took on an even greater academic significance. A brief biographical tangent is due in order to better explain the emergence of this dissertation research.

I had spent the previous three years exploring the psychological and sociological underpinnings of safety, including the idea of "accidents," in the context of the NPS. My inquiry had brought me to Mount Rainier, a literal landscape of fire and ice, where the active volcano reigns far above the Puget Sound metropolitan area. Following my interest in risk communication and love of the outdoors, I first found myself at the park in the summer of 2009, when I pursued an opportunity with the Student Conservation Association (SCA) to conduct public risk management research. Working with Dr. Sara Newman, director of the NPS Public Risk Management Program, I designed a research program to explore how MORA utilizes both formal and informal sources to convey safety-related messages to park visitors. Studying risk communication at MORA led me to consider perceptions of responsibility and risk management: when a visitor is hurt or killed in a park, who (or what) is perceived as responsible for the tragedy? Moreover, how might such attributions relate to perceptions of park-related risk, such as unpredictable weather or rough terrain? During my first visit to MORA, I posed these questions to visitors in an online survey. The results suggest that most visitors perceived themselves as responsible for their own safety, and their perceptions of the uncontrollability of park risks were positively related to these attributions; however, attribution of responsibility for safety to park management failed to predict support for preventative risk management as expected (Rickard, Scherer, & Newman, 2011). These survey results further piqued my interest in the relationship between risk perception, communication, and attribution theory, an intersection that this dissertation research attends to in greater depth.

Back in Ithaca, NY, thousands of miles removed from the Pacific Northwest, turning on the evening news now meant confronting the very questions driving my research. Measuring how visitors perceive and evaluate park-related risks, as well as attribute responsibility for their own safety in a park can illuminate potential differences between visitor "types" and suggest strategies for targeting and tailoring park safety messages accordingly. If NPS staff and park visitors apportion responsibility for causing and preventing visitor accidents differently, for example, we can use such information as a baseline to design communication strategies that work toward aligning these attributions of responsibility with each other and with NPS visitor safety policy. In the rest of this chapter, I provide a brief orientation to the theoretical and applied contexts of this research, followed by an overview of each of the chapters that follow.

Theoretical context

In its simplest form, attribution theory tells us how individuals come to attribute both the causes of and the responsibility for phenomena: whether to "internal" traits of individuals or to "external" characteristics of the environment (Heider, 1958; Shaver, 1985). One classic application of this theory has been to consider individuals' attributions of the cause of accidents: whether to an individual's characteristics (e.g., clumsiness, unsafe behavior), or to situational factors outside of her control (e.g., weather, terrain) (Harvey & Weary, 1984; Walster, 1966). To date, psychological studies linking attributions of responsibility for accident causation, risk perception, and safety have largely considered occupational settings, such as factories (e.g., Gyeke, 2003), and everyday routines, such as driving (e.g., Kouabenan, 1998, 2002). Instead of focusing on the cause of accidents, a second body of scholarship situates attribution of responsibility in the larger context of risk management and thus seeks to explain how individuals attribute responsibility for preventing accidents (i.e., for ensuring safety) in cultural, moral, and ethical terms. (I refer to this broad literature, collectively, as describing "prevention attribution"). Taking a sociological perspective, this literature has examined issues such as the social construction of accidents (Green, 1997) and citizens' perceptions of the role of government and other institutions in regulating risk and safety (e.g., Bickerstaff, Simmons, & Pidgeon, 2008). While the causal attribution and prevention attribution literatures share an attention to perceptions of risk, risk management, and risk-related behavior, no apparent research has attempted their integration.

Taking a step in this direction, this dissertation links these two previously segregated approaches to attribution theory, thus attempting to broaden our understanding of attribution theory on both an individual level (i.e., how individuals explain the causes of accidents and unintentional injury) and within a social context (i.e., how they perceive their role in the promotion of safety in public spaces). The research also works towards a more thorough integration of risk perception concepts into attribution theory, examining how the perceived nature of risks, such as controllability (Slovic, 1987) or desirability (Machlis & Rosa, 1990), and the context in which they are encountered (e.g., the novel settings of a national park) may affect attributions of responsibility. Finally, the research helps clarify how sociocultural variables often important to perceptions of risk (e.g., past experiences, institutional memberships) (e.g., Rayner, 1986; Tansey & O'Riordan, 1999) and exposure to both "official" (i.e., NPS-scripted) and "unofficial" (i.e., unscripted, informal) park risk and safety-related communication (Rickard, 2011) relate to causal attribution and attributions of responsibility. To date, few studies have examined how communication, such as exposure to certain information sources (e.g., newspapers, family members), might influence the development of causal attributions (e.g., Doria, Abubakar, Syed, Hughes, & Hunter, 2006; Ford & Kaphingst, 2009; O'Neill, McBride, Hensley, Alford, & Kaphingst, 2010).

Applied context

According to data from the Centers for Disease Control and Prevention (CDC), unintentional injury (including suicide and homicide) constitutes the leading cause of death for Americans under age 44 (CDC, 2010). From a public health perspective, these injuries result from a variety of contributory factors, including individual behavior (e.g., driving while intoxicated), organizational management and regulation (e.g., seatbelt laws), as well as environmental and infrastructural conditions (e.g., road conditions) (Waller, 1994). Hosting hundreds of millions of visitors each year, U.S. national parks represent one context in which unintentional injuries are both recurrent and often fatal (NPS, 2009). Data reported by the NPS indicate that on average three visitors die in parks every week due to unintentional injuries and an average of 14 people are seriously injured daily (S. B. Newman, personal communication, May 2009). Given these unsettling statistics, this research broadly supports the NPS' public health goal of limiting injuries and fatalities among park visitors. To do so, this study compares park employees,' volunteers,' and visitors': (1) attributions of responsibility for maintaining safe park visits; (2) perceptions of the cause of unintentional injury; (3) understanding of the role of risk and risk management in national parks. Awareness of these groups' attributional beliefs and opinions of safety, in turn, can help inform the content of future official and unofficial risk communication strategies in parks, especially in locations where engineering or enforcement strategies are inappropriate or impossible, and given racially and ethnically-diverse visitor populations.

Research overview

Methods. By using a mixed method design, including quantitative and qualitative methods, and by allowing for immersion into three national parks, the research attempted to provide richer, experiential accounts of participants, a perspective that has received only limited attention to date in the safety literature (Dorn & Brown, 2003). Three U.S. national parks, Mount Rainier National Park (MORA), Delaware Water Gap National Recreation Area (DEWA), and Olympic National Park (OLYM), provided the setting for data collection, which included (1) an online survey of park visitors (n = 773) and park staff, including employees (n = 251) and volunteers (n = 163) and (2) in-depth interviews with park staff (n = 57). This study adopted a "concurrent nested strategy" (Creswell, 2003, p. 218), as both qualitative and quantitative data were collected simultaneously during a single phase with an emphasis placed on the survey to visitors and employees (quantitative), and the interviews (qualitative) serving as the "nested" method. A "complementary" mixed method study, each method focused more directly on one of the main dependent variables to provide an "enriched, elaborated understanding" of the central "phenomenon" of attribution theory and risk management in an applied context (Greene, Caracelli, & Graham, 1989, p. 258).

Outline of chapters. Following this introduction, Chapter 2 provides an overview of the scholarly literature informing this research. First, I present the foundational social psychological literature explicating causal attribution theory, including the central concept of defensive attribution, and the application of attribution theory to studies of workplace safety. Next, I delve into the sociological literature, exploring how prevention attribution can include cultural beliefs, such as fatalism, as well as be connected to a given organization's "safety culture" (e.g., Cooper, 2000; Guldenmund, 2000). Following is an overview of the connection between attribution theory and risk perception, including an attention to how one's connection to, or understanding of, a physical place may influence perceptions of risk (e.g., Masuda & Garvin, 2006), and how risk may become desirable given certain circumstances, such as participating in outdoor recreation (Machlis & Rosa, 1990). A fourth section considers extant literature drawing connections between risk communication and attribution theory, while the final section introduces the context of a national park, highlighting its unique attributes by comparing them to those found in a theme (amusement) park or an occupational setting. The chapter concludes with an overview of previous relevant research in a national park context, and a presentation of research goals and hypotheses.

To clarify how the data for this study were collected, Chapter 3 presents an extensive review of the research methods. The chapter involves an explanation of how the research sites were selected, and permission was obtained to conduct the research, as well as a justification for using "mixed" methods. For the online survey, I present the sampling strategies employed to select employees, volunteers, and visitors, as well as an overview of the items included in the survey, and the logistics involved in conducting the survey. Likewise, for the in-depth interviews, I explain how interviewees were selected, and what general subject areas the interviews entailed. The chapter concludes with a discussion on data analysis, including how I integrated the qualitative and quantitative data, and implications for generalizability of study results.

The first of two chapters presenting results of the survey, Chapter 4 considers the hypotheses and research questions related to causal attribution theory. The chapter begins with a brief description of the sample, including demographic characteristics of employees, volunteers, and visitors who responded to the survey. Drawing upon results from survey respondents' interpretations of a hypothetical scenario in which a visitor is injured (presented in the survey), this chapter illustrates differences between visitors' and employees' causal attributions (H1), and the relationship between employees' and visitors' experience with the context and attributions of responsibility (H2 and H3, respectively). I also explore relationships between causal attribution (as an outcome variable) and several predictor variables, including sense of place (RQ1), perception of risk (RQ2), and exposure to park-related information (RQ3). Alongside quantitative results to the survey questions, I also present qualitative, free-response data in order to better illustrate the meaning of the findings.

Chapter 5 presents the second part of the survey data, this time with respect to prevention attribution (i.e., attribution of responsibility for preventing accidents/ensuring safety). First, I investigate the relationship between visitors' voluntary risk-taking (operationalized as participation in certain "risky" recreational activities) and attributions of responsibility (H4). Shifting the focus to employees, I explore whether these individuals tend to attribute responsibility for preventing visitor injury to the visitor (i.e., internal responsibility), to the NPS (i.e., external responsibility), or to a combination of both (i.e., shared) (H5). The analysis next considers whether visitors' attributions of responsibility for preventing injury vary by certain demographic characteristics, such as sex, age, and country of origin (H6). As in Chapter 4, Chapter 5 also includes a series of research questions that explore the relationships between attribution of responsibility (as an outcome variable) and various predictor variables, including sense of place (RQ4), causal attribution (RQ5), perception of risk (RQ6), and exposure to park-related information (RQ7). Once again, the analysis relies on both quantitative and qualitative data, as free-response answers are used to further interpret statistically significant findings.

Switching gears, Chapter 6 considers the interviews with park employees and volunteers. Instead of considering each of the research questions articulated earlier in the dissertation sequentially, as done in Chapters 4 and 5, in following the tradition of grounded theory analysis (Glaser & Strauss, 1969) I present my findings thematically. First, I explore the idea of risk as taking on value in certain contexts, such as national parks, where its presence may be desired and even sought. I next present employees' and volunteers' interpretations of their (and the National Park Service's) responsibility to prevent visitor injury, which evokes the concept of the "three Es"—education, engineering, and enforcement—of risk management (Baker, 1973; Heberlein, 1974), and how interviewees understood each of these realms. In addition to recognizing their own responsibility, interviewees also saw visitors as playing a role in their own safety, which seemed to translate into a "checklist" of things to do (and ways to act) both before and during a park visit. A subsequent section presents the ways in which employees and volunteers thought about visitor "accidents"—including issues of definition (what *is* an "accident"?), causality, and blame. Rounding out the chapter, the final section considers how interviewees spoke of the "culture" of safety more broadly in the NPS, including attention to employee safety, and the role of communication.

Considering each of the previous chapters, Chapter 7 reviews pertinent findings and presents avenues for future inquiry. As an overall conclusion, this chapter attempts to not just present the results, but also to answer the larger "so what?" question. To do so, I re-visit the literature presented in Chapter 2, and also re-cast my theoretical net even further to locate possible connections to empirical findings in other disciplines, such as safety science and cultural geography. These ideas provide interesting fodder for future studies, as I suggest throughout this chapter. At the same time, I revisit the present study to highlight potential limitations in methodology, such as challenges in achieving a random visitor sampling strategy, and measurement, such as an inadequate distinction between "controllability" and "voluntariness" of park-related risk.

What should the reader take away from the combination of these chapters? From a pragmatic perspective, this research sheds light upon how one institution, the National Park Service, manages risk for a varied amalgamation of employees and public users. Moreover, by integrating research in risk perception, tourism/leisure studies, and environmental psychology with existing work in attribution theory, the research provides new evidence of how previously unconsidered variables tend to predict differences in how individuals attribute the causes of, and responsibility for preventing, unintentional injury. As will be discussed in Chapter 7, anticipating how individuals attribute responsibility for safety can provide a platform for designing public communication, as well as influencing desired visitor behavior, both central to institutional risk management practices. From a theoretical perspective, this research aims to link two different ontological and epistemological approaches to considering attribution of responsibility. Discussion in Chapter 7 suggests using Construal Level Theory (CLT) as one potential avenue for marrying the concepts of prevention and causal attribution; however, the broader question remains as to whether the operationalization of "prevention attribution" via standardized survey questions, such as were used in this dissertation, maintains loyalty to its original conceptualization.

In its inclusion of the qualitative and the quantitative, and attention to the psychological and the sociological, this dissertation, like the concept of risk management itself, is, at times, complex and cumbersome. By placing a widely known psychological concept in conversation with a broader field of ethical and moral inquiry, I intended to better represent what I see as a theoretical and applied concept resisting neat packaging. Unsurprisingly, integrating the concepts of both literatures into a single predictive model, neither a small nor uncontroversial task, remains an unmet, but future goal of this line of research. It is my hope that the reader comes away assured of the breadth and depth of risk management practice, and aware of the role that social science, generally, and communication theory, more specifically, can play in keeping places and people safe.

CHAPTER 2.

LINKING THEORIES OF ATTRIBUTION, RISK PERCEPTION, AND RISK COMMUNICATION

Causal Attribution

During the past fifty years, social scientists have amassed an impressive body of literature establishing and applying the principles of attribution theory. Sociologists and social psychologists alike have contributed to our understanding of how individuals come to attribute both the causes of and the responsibility for such wide-ranging phenomena as diseases, natural disasters, institutional failure, and academic success. An early leader in attribution research, social psychologist Howard Kelley (1973, p. 107) described attribution theory as:

> …About how people make causal explanations, about how they answer questions beginning with 'why?' It deals with the information they use in making causal inferences, and with what they do with this information to answer causal questions.

From a more contemporary perspective, sociologist Kathleen Crittenden (1989) characterized attribution as, "A process that begins with social perception, progresses through causal judgment and social inference, and ends with behavioral consequences" (Crittenden, 1989, p. 2). In its simplest form, social psychological attribution research questions whether a given victory or calamity is perceived as caused by the "internal" ("dispositional") traits of individuals, or by the "external" ("situational") characteristics of their environment (Heider, 1958). For their part, sociologists have embraced attribution theory as a platform to explore various social processes such as impression management and labeling (e.g., Crittenden, 1983, 1989; Crittenden & Bae, 1994; Howard & Levinson, 1985), as well as social roles and expectations (e.g., Hamilton, 1978; Hamilton & Sanders, 1981). Given the expansiveness of this multidisciplinary literature, for the purpose of this chapter I limit my review to the aspects and applications of attribution theory most relevant to understanding perceptions of risk, accidents, and unintentional injuries, the substantive focus of this research. I begin this section by reviewing the concepts and variables central to social psychological attribution research, next introducing defensive attribution and its application to occupational contexts.

Social psychological definition

Using mostly experimental methodologies, social psychologists have applied attribution theory to illustrate how individuals assign responsibility for a hypothetical event given a variety of conditions. Pioneering researchers in the 1950s and '60s characterized citizens as "naïve psychologists," (Heider, 1958) motivated to decipher the complexities of daily life by seeking explanations for why events occur. Given adequate time and cognitive reasoning tools, Kelley (1972) explained that individuals tend to gather and analyze information about the world around them by way of an analysis of variance (ANOVA). By referencing the statistical procedure popular with social scientists, Kelley (1972) meant that most people weigh the contributions of various factors to the eventual "outcome" in question, whether a car accident or passed test, attending to the pattern with which such factors (i.e., independent variables) and effects (i.e., dependent variables) relate to one another. Individuals may consider, for example, the particular circumstances in which an event occurred, and whether any other events have occurred under similar circumstances in the past. Put simply, individuals' informal observational data allow them to attribute effects to factors with which they covary (Kelley & Michaela, 1980). Two more specific principles, theorized by Kelley (1972) and empirically validated by various social psychologists, further describe the attribution process. First, the "discounting principle" (Kelley, 1972) posits that, "the role of a given cause in producing a given effect is discounted if other plausible causes are also present" (Shaver, 1985, p. 55). A companion effect, the "augmentation principle," describes the process by which "the perceiver will perceive [a cause] to be stronger when the effect occurs in the presence of the obstacle…than when the effect occurs in the absence of the obstacle" (Shaver, 1985, p. 56). For example, if an individual succeeds in building a house despite considerable adversity (e.g., inclement weather, insufficient funding, etc.), observers are more likely to attribute the cause of the individual's success to her own abilities (e.g., fortitude, work ethic, etc.), than if she had completed the task under more favorable circumstances.

When distinguishing a cause of an event from multiple causes, however, whether or not individuals are afforded one or multiple observations of the phenomenon matters in their eventual attributional judgments; given just one observation or "data point," people tend to rely on cognitive schemata to "fill in the gaps" of a given scenario (Kelley, 1972, 1973; Shaver, 1985). While amassing multiple observations of a given scenario may be ideal, in situations of incomplete information, Kelley (1972) noted that individuals may rely on so-called "causal schemata": general conceptions about how certain causes may interact to produce particular kinds of effects. As he explained:

> …The mature individual undoubtedly has acquired a repertoire of abstract ideas about the operation and interaction of causal factors. These conceptions afford him a solution to the need for economical and fast attributional analysis, by providing a framework within which bits and pieces of relevant information can be fitted in order to draw reasonably good causal inferences (Kelley, 1972, p. 152).

Following the ANOVA approach, these causal schemata replace "actual" observations, providing the observer with "an assumed pattern of data" (Kelley, 1973, p. 115) on which to base attributional judgments.

As indicated above, much social psychological attribution research distinguishes the locus of causality of a given event as internal ("dispositional"), those presumably brought about by actions or characteristics of the individual, or external ("situational), forces outside of the person

(Shaver, 1985). A third category of the locus of causes, so-called “superphysical causality,” the explanation that “God has a reason,” may also exist. Research indicates that the religiosity of individuals and the nature of the event described may be important variables in determining whether superphysical explanations are generated (Shaver, 1985). In addition to the locus of the cause, Weiner (1996, 2006) proposes that individuals attribute the cause of a given event based on two additional properties: (1) its *controllability*: the extent to which the cause is perceived to be under personal or situational control), and (2) its *stability*: the extent to which the cause is perceived to vary over time. Building on Weiner’s work, Anderson (1983) focused on properties of the event to predict how individuals generate causal attributions. Using an experimental methodology, Anderson (1983) showed that varying the context by illustrating cases of *interpersonal failure* (i.e., failing to make friends), *noninterpersonal failure* (i.e., failing a test), *interpersonal success* (i.e., cheering up a friend), and *noninterpersonal success* (i.e., winning a board game) associated with hypothetical scenarios led respondents to generate causes that differed in causal dimensions (i.e., changeability, locus, stability, intentionality, globality, and controllability). Concluding that individuals “do not simply examine a standard list of possible causes” (Anderson, 1983, p. 192), Anderson explained that a causal explanation of a given event might become salient under particular circumstances and not others.

Just as the perceived characteristics of a cause or the context of the situation matter, how individuals understand the intentionality of an event may also affect resulting causal attributions. Importantly, Weiner (1996) suggests that controllability and intention are distinct concepts, with controllability a property of the cause itself, and intention related to a person’s motives or goals; both concepts, however, contribute to the larger, encompassing concept of individual responsibility. Illustrating the distinction between these concepts, Weiner (1996, p. 204) explained:

> … A person failing because of a lack of effort is deemed to be personally responsible inasmuch as one can choose to expend effort or not. On the other hand, one does not make a decision about aptitude. For this reason, failure because of lack of aptitude does not result in a judgment of responsibility.

According to Malle (1999), when individuals perceive a given behavior as intended, they utilize "reason explanations" that "cite the agent's reasons for acting that way" (Malle, 1999, p. 24). The inverse is also true: when individuals encounter "reason explanations," they are more likely to understand a given behavior or event as intended. When behaviors or events are unintentional, the author further explained, individuals develop "cause explanations"—explanations "without the mediating role of an intention" (Malle, 1999, p. 27). Based on his experimental work, Malle (1999) concluded that people's explanations for *intentional* behaviors and events explode the dualistic categories of external or internal locus of causality, and rather should be understood as more complex "folk explanations" anchored by perceived intentionality.

Defensive attribution

Among social psychologists studying perceptions of unintentional accidents, however, the internal-external causal duality remains a popular approach: whether an accident is perceived as having been caused by an individual's characteristics (e.g., clumsiness, unsafe behavior), or by situational factors outside of her control (e.g., weather, uneven terrain) (Harvey & Weary, 1984; Walster, 1966). In a seminal study examining perceptions of hypothetical car accident scenarios, Walster (1966) found that judgments of causal responsibility were dependent upon the *severity* of accident consequences; as she explained, motivated by our need to think of unfortunate events as avoidable, as the magnitude of harm (e.g., bodily injury, property damage) increases, we are more likely to see the event as predictable or controllable, rather than the product of random chance. Viewing the accident victim as culpable serves as a self-protective mechanism: a way to convince ourselves that, had the individual behaved differently, disaster may have been averted. Walster's work provided a foundation for the exploration of "defensive attribution" in experimental settings by researchers interested in how individuals attribute responsibility for a range of unfavorable outcomes, from diseases to damages associated with natural disasters (Burger, 1981; Shaver, 1970).

Like the concept of defensive attribution, the Just World Hypothesis (Lerner & Miller, 1978) describes situations in which people's perceptions of causality tend to follow self-protective patterns (Burger, 1981). When unfortunate events befall individuals, as Lerner and Miller (1978) explained, we tend to believe that such individuals "deserve" what they get or, as a corollary, "get what they deserve." The Just World Hypothesis describes attempts to preserve a systematic view of a fair world—one that punishes the guilty, for instance—as a way to navigate an increasingly complicated daily life. As the authors explain:

> Since the belief that the world is just serves such an important adaptive function for the individual, people are very reluctant to give up this belief, and they can be greatly troubled if they encounter evidence that suggests that the world is not really just or orderly after all (Lerner & Miller, 1978, pp. 1030-1031).

According to the researchers, as circumstances of a particular fate approach the experiences or traits of an individual, she experiences empathy, a reaction that may motivate her to develop explanations for this possible injustice. Conversely, individuals may be drawn to "derogate" an innocent victim, i.e., to view the person as less attractive given his or her suffering of a particularly unsavory fate, and reacting in this way appears to function as a self-protective mechanism; for instance, *she "deserved" this outcome because she's a bad (mean, treacherous, etc.) person, but it won't happen to me because I'm a good (kind, generous, etc.) person*.

Despite the attractiveness of the concept, in practice, defensive attribution (and the related Just World Hypothesis) research has produced mixed results, leading researchers to seek additional variables to better explain the psychological process. Eschewing the experimental approach most often used by attribution researchers, Bulman and Wortman (1977) conducted interviews with individuals who had experienced serious accidents, such as spinal cord injuries associated with falls, in order to better understand the predictors of "successful" coping. Though testing hypotheses related to defensive attribution did not constitute a central aim of the study, the authors found scant evidence that study participants were motivated to avoid blame for becoming accident victims; instead, "in general, the respondents appeared to attribute more blame to themselves than objective circumstances would warrant" (Bulman & Wortman, 1977, p. 361). After failing to replicate Walster's (1966) experimental findings, Shaver (1970) concluded that the perceived *similarity* between the accident victim and the respondent, in terms of personal characteristics and situational circumstances, matter in determining whether defensive attribution occurs. In sum, respondents avoided concluding that a situationally relevant accident could have been by caused by a like individual through the following reasoning pattern:

> …Assign responsibility when personal similarity is low, secure in the knowledge that as a different kind of person, you are safe. When personality similarity is high, attribute the accident to unfortunate, but unavoidable, circumstances (Shaver, 1970, p. 108).

Following Shaver's (1970) lead, in a meta-analysis of the defensive attribution hypothesis, Burger (1981) investigated whether Walster's fundamental conclusion, that attribution of responsibility to the victim of the accident increases as consequences become more severe, holds across diverse experiments. Importantly, Burger's (1981) review of the literature uncovered several variables largely unexplored in Walster's work that may contribute to the process of attribution with respect to accident causation, including:

Personal and situational similarity. Following Walster's logic, the observer of an accident who sees himself as *different* from the victim may be motivated to blame this person for the event, and in so doing, rule out the possibility that the event may have happened due to chance. Alternatively, researchers such as Shaver (1970) noted (as described above) that if observers perceive themselves as *similar* to the accident victim, they may be motivated to attribute the accident to external factors, rather than to internal characteristics of the individual, a process known as "blame avoidance."

Experimental realism. At the time of his writing, Burger (1981) observed that most psychological attribution research relied on the presentation of hypothetical scenarios. He and other researchers questioned whether bolstering the "realism" of the experiment, such as by presenting the scenario from the point-of-view of the victim, reading the scenario out loud (rather than presenting it to respondents in written form), and providing multiple perspectives on the victim (e.g., highlighting his or her personal relationships, career aspirations, and so forth) might affect respondents' attributional judgments.

Level of responsibility attributed to the accident victim. Beginning with Heider (1958), many researchers have noted that the *level* of responsibility attributed to a (hypothetical) victim can vary considerably, from, for example, "holding a person responsible for anything associated with him or her to attributing responsibility only for intentional, uncoerced acts with foreseeable consequences" (Burger, 1981, p. 509). If respondents are unaware of the level of responsibility on which they are to base their attributional judgments of a given experimental scenario, each individual may choose a different level, thus introducing error. Fishbein and Ajzen (1973, p. 150) summarized this potential dilemma as such:

> A question such as, "Is the actor responsible for the accident?" can be interpreted in different ways: (1) Was the actor associated with the accident?, (2) Was he instrumental

> in producing the accident, i.e., did he cause it?, (3) Is he responsible in the sense that he could have foreseen the accident?, (4) Did he intend to cause the accident?, and (5) To what extent was his behavior justified? Since subjects are usually not told at what level they are to respond, judgments of responsibility may take on different meanings in different conditions of an experiment, in different investigations, and for different subjects.

Recognizing the need to parse out the contribution of these variables, Burger (1981) concluded his review by noting that future research "should not be whether the defensive attribution effect exists but rather under what conditions it can be found" (Burger, 1981, p. 509).

Counterfactual thinking. Elsewhere, researchers have suggested additional personal or situational attributes that may influence the course of defensive attribution. First, defensive attribution may be influenced by counterfactual thinking—that is, "the tendency to mentally undo negative outcomes by imagining how events might have been better or worse" (Williams & Lees-Haley, 1996, p. 2100). In an experimental study, Williams and Lees-Haley (1996) showed that the *mutability*, or ease with which individuals could imagine an alternative outcome, of a given car accident scenario led participants to view the accident as more avoidable, and thus they ascribed a greater causal role to the accident perpetrator. Other experimental studies of hypothetical accidents have measured participants' own locus of control**,** the degree to which individuals judge themselves as in control of their own fate**,** finding that "internals" (i.e., individuals with a high internal locus of control) tend to assign the most responsibility to the victim for the accident, whereas "externals" (i.e., individuals with a high external locus of control) assign the least (e.g., Sosis, 1974; Steensma, den Hartigh, & Lucardie, 1994). In such experiments, participants appear to extend their personal philosophy of responsibility to judging the hypothetical accident victim's fate. Moreover, internals and externals may construct dissimilar interpretations of the accident, such as "a case of negligent behavior" versus "a case of bad luck" (Sosis, 1974, p. 398).

Level of experience. Causal attributions of accidents also appear to be affected by the level of experience of the perceiver in the hypothetical activity described. Surveying West African drivers of differing occupations (e.g., professional drivers, police officers, students) and experience levels (e.g., non-drivers, novices, professionals), Kouabenan (2002) explored the relationship between driving experience and causal attribution of car accidents. Findings indicated that one's occupation and past exposure to road risks do affect causal attributions, in that greater driving experience tends to predict both internal *and* external attributions. That is, Kouabenan (2002) argues that the varying attributions made across the occupations studied represent a common pattern of defensive attribution by occupational group; all respondents "tend in their explanations to present themselves positively and decline causal responsibility for accidents, passing the blame onto others or pointing to factors beyond their control" (Kouabenan, 2002, p. 65). In a different context, Kumagai, Daniels, Carroll, Bliss, and Edwards (2004) present similar results. In a community affected by wildfire in the Sierra Nevada region of California, respondents who had already experienced wildfires in the past were more likely to attribute responsibility for the fire to people other than themselves, such as government agencies. Moreover, Kumagai et al.'s (2004) interviews provided evidence that individuals who felt a loss of control over their situation tended to attribute fire damage to factors associated with others, including firefighters and bureaucrats (see also Kumagai, Bliss, Daniels, & Carroll, 2004; Winter & Fried, 2000).

A few studies have also investigated how one's experience may also lead to the development of "optimistic bias" (e.g., Weinstein, 1980, 1987; McKenna, 1993): the propensity for individuals to see themselves as less susceptible to certain risks than those around them, or the sense that "it won't happen to me" (Caponecchia, 2010). This perceptual bias, in turn, can affect how one perceives the cause of accidents. In a questionnaire study of college students regarding perceptions of hypothetical driving-related accidents, DeJoy (1989) found that more experienced drivers, as well as those who viewed themselves as skilled drivers, tended to assign greater importance to “human factors” such as operator errors (i.e., internal attribution) in accident causation as opposed to external factors, such as technical problems or bad luck. Since this “risk optimism” appears “related to an exaggerated sense of control,” DeJoy (1989, p. 339) explained that more experienced drivers tend to perceive others as similarly “in control” of their safety on the road, and thus blameworthy in the case of an accident. Similarly, in a qualitative study examining police officers’ perceptions of their on-the-job driving accidents, Dorn and Brown (2003) found that officers tended to attribute the causes of these accidents to sources other than themselves, perceiving themselves as “invulnerable.” A qualitative study of residents’ reactions to wildfire in six Western U.S. communities provides additional evidence of the role of optimistic bias and perceptions of controllability in influencing attributional judgments (Cohn, Williams, & Carroll, 2008). Overall, residents were hesitant to attribute any responsibility for a fire to their own actions, preferring to “attribute the magnitude, damage, or cause of the fires to others, the acts of others, or natural processes” (Cohn et al., 2008, p. 38). Somewhat paradoxically, the authors describe these individuals as:

> …Willing to accept the risk of living in the [fire-prone community] and the responsibility of undertaking firesafing measures, but they did not include themselves as responsible agents for damage to their homes and property (Cohn et al., 2008, p. 36).

While the findings from these three studies provide a useful foundation for future analysis, the extent to which causal attribution may be linked to optimistic bias in other contexts remains uncertain.

Workplace safety

Outside of the laboratory, defensive attribution has been researched most extensively with regard to workers' and managers' interpretations of the causes of workplace accidents (e.g., Dejoy, 1985, 1994). Such studies focus primarily on occupational safety, such as preventing accidents on the factory floor, and consider both managers' and workers' perspectives (e.g., Dejoy, 1985, 1994; Goncalves, da Silva, Lima, & Melia, 2008; Gyekye, 2003; Hasle, Kines, & Andersen, 2009; Lehane & Stubbs, 2001). Much of this research argues that identifying causal attributions of both "expert" (e.g., managers) and "lay" (e.g., rank-and-file employees) individuals constitutes a central element of designing effective accident prevention strategies in occupational settings (e.g., Dejoy, 1985, 1994; Goncalves, da Silva, Lima, & Melia, 2008; Gyekye, 2003; Hasle, Kines, & Andersen, 2009; Kouabenan, 1998, 2002, 2009; Kouabenan & Cadet, 2005; Kouabenan, Gilbert, Medina, & Bouzon, 2001; Lehane & Stubbs, 2001; Torell & Bremberg, 1995). For instance, in a survey-based study of managers and workers who suffered slipping or tripping-related accidents in British worksites, Lehane and Stubbs (2001) argue that the misalignment between managers' and workers' perceptions of the cause of accidents, as attributed to the individual or to the work environment, may result in tension, mistrust, and misunderstanding. They describe how both managers and employees might be persuaded—through training and targeted information—to adopt a more "balanced" view of causal responsibility, in order to "foster a better environment for the effective implementation of preventative [injury] strategies in a mutually supportive way" (Lehane & Stubbs, 2001, p. 125). As these and other studies show (e.g., Desai, Roberts, & Ciavarelli, 2006; Hofmann & Stetzer, 1998; Salminen, 1992; Steensma et al., 1994), wide disparities often exist between perceived causal attributions of those in different hierarchical levels of organizations; these differences, in turn, may impact the effectiveness or appropriateness of various risk communication or management strategies.

Prevention Attribution

As reviewed above, applied studies linking attributions of responsibility for accident causation, risk perception, and safety have largely been conducted in occupational settings, such as factories (e.g., Gyeke, 2003), and in the course of everyday routines, such as driving (e.g., Kouabenan, 1998, 2002).[1] Such studies have concentrated on applying attribution theory to highlight how particular individuals (e.g., managers and employees) perceive the causes of accidents. Scaling up from this micro-level perspective, relationships between attribution theory and risk perception have also been explored on a broader, societal level in terms of risk management and safety promotion.

Taking a sociological perspective, a small body of literature has focused more directly on the social construction of accidents and how audiences attribute the responsibility for accident prevention (i.e., safety promotion) in various social settings. Differing from the psychologically focused studies on causal attribution, this literature situates attribution of responsibility in the larger context of risk management and thus seeks to explain it in cultural, moral, and ethical terms. While this literature adopts the language of causal attribution, some clarification is necessary to understand the meaning of the terms employed. An *internal* attribution of responsibility denotes personal responsibility: the responsibility to the individual him/herself to prevent injury, and to maintain safety. An *external* attribution of responsibility, on the other hand, holds an external source accountable: the responsibility for keeping individuals safe is seen as falling on a third party, such as a manager, an organization, or a larger institution. The

[1] To a much lesser extent, this research has considered the context of communities, such as residential neighborhoods (e.g., Butchart, Kruger, & Lekoba, 2000).

following section briefly reviews attribution theory and safety in the social constructionist tradition then examines this perspective in the context of occupational settings. Before delving into this specific literature, however, I take a step back to consider, more generally, how sociologists, geographers, and political scientists, among others, have considered the management of risk in terms of individual or institutional responsibility.

Managing risk: Individual (internal) or institutional (external) responsibility?

Beginning in the early 1990s, a multidisciplinary collection of social scientists drew increasing attention to how citizens understand both their own, as well as the government's, role in regulating risk (e.g., Beck, 1992; Eden, 1993; Hinchliffe, 1997). Based largely, but not exclusively, in the European context, such research seems to question the larger implications of attributing responsibility for preventing the "ills" associated with an increasingly industrialized, technologically-based society, whether exposure to genetically modified organisms, or the effects of a changing climate. Rather than focusing more narrowly on processes of human cognition, for instance, as might be said of seminal work on causal attribution by social psychologists (see previous sections), therefore, this research asks more broadly what such attributions might tell us about the nature of contemporary society. Understanding the contribution of this diffuse collection of studies to our understanding of risk and attribution of responsibility may be best accomplished in describing four broad, underlying themes, which I discuss in turn.

First, this research presupposes the existence of a "risk society" (Beck, 1992): one in which advancements in science, and the ever-increasing division of labor present opportunities for risks to emerge, yet does not (necessarily) allocate responsibility to manage such risk—so-called "organized irresponsibility" (see also Bickerstaff, Simmons, & Pidgeon, 2008). With this notion comes the idea that institutional actors can "offload" responsibility for avoiding risk onto individual citizens, people who may be ill equipped to address such responsibility. At the same time, citizens themselves may hold certain expectations about who should be addressing risks, which can influence their perception of risk, including its acceptability (Freudenberg, 1993). Analyzing quantitative and qualitative data related to two risk-based case studies in the U.S., toxic waste exposure and the citing of a nuclear facility, Freudenberg (1993) used the term "recreancy" to describe how political institutions can fail to carry out their responsibility to manage risk to a level meriting public support and the cultivation of trust. As such, the *expectation* of responsibility becomes an important driver of perception of risk, as Freudenberg concludes (1993, p. 927):

> …The issue may still be risk, but it is at least in part the risk that socially consequential actors will fail to carry out their duties with the full degree of competence and responsibility that their fellow citizens need to expect.

The expectation that an outside (external) institution—government or otherwise—will address a risk issue drives the second theme of this research: the idea of transferring or "shifting" responsibility from the individual to an outside other (Bickerstaff & Walker, 2002; Eden, 1993; Hallman & Wandersman, 1992; Maestas, Atkeson, Croom, & Bryant, 2008). In part, shifting responsibility can be contingent on the attributes of the individual actor, including one's perception of response efficacy: the belief that his or her actions will contribute to the solving of a problem, such as the minimization of an environmental ill (Eden, 1993). In a qualitative study of citizens and environmental activists in Leeds, England, Eden (1993) introduced the concept of "actionable responsibility" to describe how some people experience an almost moral responsibility to engage in pro-environmental behavior; this sense of responsibility, Eden (1993) explained, may be supported by their understanding of the nature of the problem(s) as well as their having the relative "privilege" necessary contribute to the process (e.g., being financially able to make a donation to an environmental group). Those who did not identify as environmental activists, however, tended to divert responsibility away from themselves, either to the aforementioned activists, or to generalized institutional "others." In a U.S. context, Maestas, Atkeson, Croom, and Bryant (2008) described how news coverage of Hurricane Katrina showcases what they referred to as "transfer attributions": the process of transferring blame for the consequences of the record-breaking storm from one level of government to another (see also Iyengar, 1989). The tendency to shift—or to share—responsibility can also be related to the history of governance in a particular place, including the (non)existence of a "social contract" between the nation state and its citizens (Harrison, Burgess, & Filius, 1996).

Part of the process of "shifting" responsibility, this research demonstrates, is also dependent on the social context of the risk. Most centrally, is a given risk, or social ill, perceived as a "collective" or an "individual" problem? (Bickerstaff et al., 2008; Bickerstaff & Walker, 2002; Petts, 2005). In her exploration of two risk-based case studies, the MMR vaccination and air pollution, Petts (2005) illustrated how focus groups of English citizens tended to view themselves as having individual (internal) responsibility for MMR (i.e., a mother's responsibility to get her child vaccinated to avoid potential disease), but not for air pollution; instead: "…people either passively distanced responsibility to the rest of society or sought to transfer responsibility for action to government and industry" (p. 799). As a "collective," rather than "individual" risk, air pollution thus, "challenges concepts of individualization because people do not conceive that either the cause of the problem, or its solution, lies with them personally and solely" (p. 801). Also employing focus groups in the UK, Bickerstaff et al. (2008) reached a similar conclusion: that different types of risks conjure different "representations of the problem"

(p. 1317), and thus expressions of responsibility. For instance, a mobile device was seen as an individual responsibility, “typically framed in terms of a consumer-choice model of action: the power of the sovereign consumer to reject a product or service that was considered to present an unacceptable risk” (p. 1317). In turn, respondents saw themselves as having agency, personal choice, and control over their exposure to the risk. Most generally, such research suggests the importance of knowing how individuals experience and understand risks in order to predict how they will see their responsibility to prevent and respond to them (e.g., Hinchliffe, 1997).

A final theme underlying this literature surrounds the idea of “ambivalence”: the lack of certainty about what one’s own, as well as others,’ responsibility is and ought to be (Bickerstaff et al., 2008; Hinchliffe, 1997). As Bickerstaff et al. (2008) illustrated, even as respondents in their study viewed themselves as responsible for their exposure to a risk, they also acknowledged their dependence upon institutional actors; as they conclude:

> …Attempts to position individuals as ‘responsible citizens’ in relation to various forms of risk are faced with citizen ambivalence, both ambivalence towards assuming responsibility themselves and ambivalence towards the exercise of responsibility by institutions (Bickerstaff et al., 2008, p. 1327).

Part of this ambivalence may be a function of ignorance: a lack of knowledge about just who and what these “external” sources of institutional power are even in the midst of their reliance on them; as Hinchliffe (1997, p. 205) put it, “…the distance and obscurity of institutions that people felt should either be in their control or lobbied to enable control.” Finally, as this research shows, opinions about responsibility for managing risk are often dynamic, rather than set in stone.

Constructing accidents and safety

Despite its common usage, the term “accident” may conjure distinct meanings for individuals depending on their background and social context. Tracing the historical and etymological roots of the word, Loimer and Guarnieri (1996, p.106) situate the modern meaning of “accident” as emerging in the 1400s, a word that "conveyed a mixture of ideas: injury, property loss, unexpected events, and unintended results," and, eventually, "act of God." Interestingly, these notions of unpredictability and randomness have led many contemporary public health professionals to reject the word entirely, judging it an "obstruction" to the modern study of injury prevention (e.g., Girasek, 1999; Loimer & Guarnieri, 1996). Using both sociological and historiographic data, Green (1997a) argued that, within an increasingly rationalized "risk society" (Beck, 1992), accidents have transformed from events we fail to predict to events for which we can assign blame. As accidents come to be understood as resulting from a clear set of identifiable risk factors, those who suffer them are seen as lacking in their ability to properly assess these risks; indeed, "accidents no longer demonstrate the proper limits of rational explanatory systems, but rather individual failure" (Green, 1997a, p. 143).

As preventability replaces notions of "luck" or "fatalism," so, too, do blameworthiness and responsibility become attached to the accident victim. By holding people responsible for their choices, and resulting ill health anthropologist Mary Douglas (1990) suggested that we begin to view these individuals as "sinners," rather than as victims, as our increasing exposure to risk in everyday life becomes intertwined with notions of accountability and blameworthiness. Arguing that the concept of risk has become appropriated as a "forensic resource," Douglas (1990) argued that risk discourse perpetuates an individualistic culture: "[playing] the role equivalent to taboo or sin, but the slope is tilted in the reverse direction, away from protecting the community, and in favor of protecting the individual" (1990, p. 7). Similarly, research conducted by Green (1997a) and others is founded on the idea that both "expert" and "lay" explanations of (and proposed solutions for) accidents reflect salient values and beliefs, as well as normative conceptions of “proper” social identities and responsibilities (Green, 1997a, 1997b; Green & Hart, 1998; Roberts, Smith, & Bryce, 1993, 1995).

Like those studying attribution in occupational settings, these researchers see value in gauging the perspectives of multiple publics. For instance, suggesting that safety “experts” (e.g., policymakers, law enforcement officials) may lack insight on the particular risks facing populations in a disadvantaged British neighborhood, Roberts et al. (1995, p. 18) interviewed community members in an attempt to “[draw] on ordinary people’s knowledge built up during the day-to-day routines associated with life in an uncertain environment.” Further, such scholars view safety as not only as a state of physical wellbeing, but also as a “social value” experienced by individuals, groups, and communities (e.g., Roberts et al., 1995; Suchman, 1961). Similarly focused on the social context, Factor and colleagues (Factor, Mahalel, & Yair, 2007; Factor, Yair, & Mahalel, 2010) argue that, in the case of automobile collisions involving two or more drivers, the drivers’ decision-making is inextricably embedded in cultural norms and values. Referring to these car collisions as “social accidents,” Factor et al. (2007; 2010) argued that interactions *between* drivers matter more than the behavior or characteristics of a single driver, as different drivers may draw on distinct cultural “tool kits” to respond to a given situation. The authors conclude that road accidents are not random events, but rather, “manifest social predispositions that exogenously affect an individual’s tendency to become involved in an accident” (Factor et al., 2010, p. 1420).

Safety culture

Perceptions of accidents, and safety in general, become increasingly salient among workers in particularly hazardous occupations, whether coal mining or construction work. Considerable research has documented the extent to which the organizational decisions, communication between managers and workers, and attributes of occupational settings (among other factors) both construct and perpetuate a unique "safety culture": shared values, beliefs, and practices related to safety, defined at group level (e.g., Cooper, 2000; Guldenmund, 2000). Key to the current study, safety culture may also encompass perceptions of responsibility for ensuring on-the-job safety. Importantly, these values may stem from organizational norms and rules for dealing with work-related risk, as well as members' own attitudes towards occupational safety; such values may, in turn, influence on-the-job behavior (e.g., Didla, Mearns, & Flin, 2009**;** Guldenmund, 2000; Lund & Aaro, 2004; Pidgeon, 1991; Pidgeon, 1998; Wilson-Donnelly et al., 2005), as organizational members are encouraged to learn from errors to minimize their personal risk and maximize safety (Silbey, 2009).

Despite over twenty years of research, one universally recognized definition of safety culture[2] continues to evade researchers (Guldenmund, 2000); however, within the occupational safety literature, researchers have increasingly drawn a causal line between a "positive" safety culture and "safe practices" within an organization or workplace, often in industrial settings (e.g., Cooper & Phillips, 2004; Nielsen, Rasmussen, Glasscock, & Spangenberg, 2008; Wilson-Donnelly et al., 2005). Occupational trainings and programs centered on risk and safety issues, for instance, have been increasingly viewed as means to solidify a favorable safety culture and, in following, ensure best practice in organizations (e.g., Leiter, Zanaletti, & Argentero, 2009; Lund & Aaro, 2004), as has effective communication between employees and management (e.g., DeJoy, Schaffer, Wilson, Vandenburg, & Butts, 2004). Safety culture may also influence the ways in which managers and employees develop causal attributions about occupational accidents (Hofmann & Stetzer, 1998). In a field experiment of utility workers, Hofmann and Stetzer (1998)

[2] This dissertation utilizes the concept of "safety culture" concept, but recognizes the related concept of "safety climate," including the contentious academic discussion regarding the similarities and differences between these two terms (e.g., see Dov, 2008).

illustrated that individuals who openly discussed safety issues within their workplace were more likely to make *internal* attributions about an occupational accident scenario, given evidence that implicated the worker.

Approaches to studying safety culture also vary widely, ranging from descriptive, interpretivistic accounts of a workplace (see, e.g., Zoller, 2003), to more normative appeals for organizational change (Guldenmund, 2010). In an overview of the current use of safety culture in the academic and applied literature, Guldenmund (2010) described three main approaches to studying the concept: (1) the "academic approach," using mostly qualitative field research to produce value-free assessments of an organization's historical approach to safety; (2) the "analytical approach," adopting mostly quantitative survey instruments to measure the current status of an organization's safety culture; and (3) the "pragmatic approach," relying on expert opinion to evaluate the structures and processes of an organization to make suggestions for future improvements. By classifying the studies as such, Guldenmund (2010) provides a useful distinction between scholarship using safety culture to describe, and research intended to evaluate, a difference not always acknowledged by researchers (see Silbey, 2009).

Attribution Theory and Risk Perception

Despite its focus on determining beliefs about accident causation and prevention, the attribution literature has paid only limited attention to risk perception theory. Studied from a variety of ontological and epistemological perspectives, research in risk perception converges on the central premise that interpretations of, and responses to, risks (whether present or hypothetical) are rarely uniform among individuals, groups, or communities. While early experimental research focused heavily on the contrast between so-called "expert" and "lay" estimates of hypothetical risks, such as nuclear energy or blood transfusions (e.g., Slovic, 1987), subsequent scholarship has attended more to the ways in which an individual's characteristics, community memberships, as well as lived experiences, may shape understandings of risks salient to his everyday life (e.g., Lupton & Tulloch, 2002; Masuda & Garvin, 2006; Scherer & Cho, 2003). While references to risk-taking and risk perception do appear in several studies examining causal attributions, the unsystematic incorporation of risk perception theory across such studies create substantial gaps in the literature that merit further attention. In an attempt to locate these gaps, the following section establishes potential linkages between attribution theory and risk perception in the context of safety through several conceptual areas, including cultural theories of risk, sense of place, and the context in which the risk is encountered.

Cultural theories of risk

A few noteworthy studies explore the connections between cultural beliefs, risk perceptions, and attributions of responsibility for accidents (Kouabenan, 1998, 2002, 2009; Peltzer & Renner, 2003). Using a sample of West African respondents, Kouabenan (1998) investigated the relationship between fatalistic beliefs, causal attributions for car accidents, and risk-taking/risk perception with regard to driving. Survey results indicated that respondents' beliefs and social practices did influence both risk perceptions and causal explanations of accidents. Fatalistic subjects were more likely to over- *or* under-estimate driving-related risks, and in either case were more likely to take bigger risks, as compared to other respondents. In terms of causal attributions, Kouabenan (1998) found that those with fatalistic beliefs were more likely to attribute accidents to external factors outside of the driver's control, such as road infrastructure or fate, rather than to factors related to the driver (e.g., carelessness). While this pattern may be understood as a form of defensive attribution, the author suggests that the response is more likely a mechanism for fatalistic individuals to feel that they can exercise some control over their environment; despite their worldview, such individuals, "…do not necessarily want to believe that the world in which they live is altogether unpredictable and that any kind of catastrophic event could happen to them at any moment" (1998, p. 250). Working in a different context, Kimhi, Canetti-Nisim, and Hirschberger (2009) draw upon cultural differences between Israeli Jews and Palestinians to explain their respondents' differing causal perceptions of terrorism-related violence in the Middle East.

While Kouabenan's and colleagues' research provides a window into the importance of cultural beliefs to developing causal attributions, attention is needed to explore these relationships more fully with regard to cultural theories of risk. As numerous scholars have articulated, such a perspective argues that the sociocultural experiences and background of individuals, as well as the social institutions to which they belong, or with which they interact (e.g., schools, churches, corporations, etc.) contribute to how they construct the meaning and judge the acceptability of risk (e.g., Kasperson, Kasperson, Pidgeon, & Slovic, 2003; Lupton, 1999; Rayner, 1986, 1992, 1993; Rayner & Cantor, 1987; Tansey & O'Riordan, 1999; Wildavsky & Dake, 1993). For instance, whereas fatalism and superstition may represent salient belief systems for residents of the African Ivory Coast, such beliefs may not translate across nations or cultures in affecting understandings of risk. Perceptions of risk, as well as its "appropriate" management may also vary widely within an organization; for instance, Rayner (1986) documented how occupational role and hierarchical status within a hospital predicted a typology of judgments regarding institutional trust and acceptability of radiation risk. Importantly, cultural theories of risk consider the association between perceptions of—and exposure to—risk in everyday life and notions of accountability and blameworthiness of individuals and institutions (e.g., Douglas, 1990, 1992).

Sense of place

Like religious beliefs and group memberships, an individual's understanding of, and attachment to, a physical setting may also influence how she perceives risk. Humanist geographers such as Tuan (1977) differentiate "place" from "space," arguing that the former takes on value and meaning for people, whereas the latter remains abstract and undifferentiated. Neither is a place the same as a "landscape," as these are the assemblages of *visual* attributes that we can readily describe; as Cresswell (2004, p. 11) explains, "We do not live in landscapes—we look at them." Rather, places, according to Cresswell (2004), citing political geographer John Agnew (1987), are "meaningful" and fundamentally comprised of three components: (1) location; (2) locale; and, (3) sense of place (SOP). Whereas *location* implies a dot on a map, *locale* relates to the physical (or "material") characteristics of the setting, and *sense of place* refers to the "subjective and emotional attachment people have to place" (Cresswell, 2004, p. 7): an understanding of being there and experiencing daily life. Accordingly, place entails a physical setting, our experiences in this setting, as well as our subjective interpretations of this setting (e.g., Cheng, Kruger, & Daniels, 2003; Farnum, Hall, & Kruger, 2005; Galliano & Loeffler, 1999; Low & Altman, 1992).

After an extensive review of the literature, Farnum et al. (2005) find no single definition of SOP, and arrive at the idea of SOP as a human relationship to a physical location, including related meanings, attachments, attitudes, emotions, and cognitions. In this same vein, suggesting that place is "multidimensional and multidisciplinary," Stedman (2003a, p. 825) argues that understanding SOP means accounting for human (e.g., individual behaviors), social (e.g., group or community-level behaviors) and biophysical elements. Two elemental constructs in this literature include:

Place attachment. The affective responses an individual (or group) may experience towards a place, place attachment is often—but certainly not always—positive (e.g., Farnum et al., 2005; Low & Altman, 1992). Farnum et al. suggest that place attachment can be further divided into two separate constructs: (1) *place identity*, or, "how one views oneself in relation to the environment" (Farnum et al., 2005, p. 4), resembling the social psychological construct of identity or identity salience (Stedman, 2002) and (2) *place dependence*—for instance, "connections based specifically on activities that take place in an outdoor, recreational setting" (Farnum et al., 2005, p. 4). Based on their extensive review of the SOP literature, Farnum et al. suggest that no clear consensus exists as to a relationship between place identity and dependence: for instance, does one's place identity precede the dependence she develops on this setting, or vice versa? Moreover, other researchers find that place identity and dependence actually measure the same underlying construct (e.g., Jorgensen & Stedman, 2001), while still others see place attachment as "[incorporating] several aspects of people-place bonding" (Low & Altman, 1992) that are not reducible to component parts. While researchers may disagree on the existence of and/or relationships between place attachment, identity, and dependence, all of these measures are fundamentally evaluative: they seek to define the degree to which "a setting is important…is useful for achieving goals… or reflects one's sense of self" (Stedman, Beckley, Wallace, & Ambard, 2004, p. 581).

Place meaning. SOP studies also measure what places mean to people, eliciting their cognitive responses to these settings (e.g., Farnum et al., 2005; Stedman, 2002). Scaling up from this individual perspective, Galliano and Loeffler (1999, p. 11) define *place themes* as "shared meanings that applied to broad areas," such as "wilderness area" or "working landscape." According to Stedman (2002, p. 564), place meanings can be understood as "descriptive statements, rooted in symbols about 'what kind of place is this'" (Stedman, 2002, p. 564). These meanings, in turn, can lead to the development of place-related attitudes (Stedman, 2002).

Research in SOP also integrates a number of additional variables. Due to the variety of theoretical and methodological perspectives underlying SOP studies (e.g., phenomenological vs. positivistic), the importance of these variables can be highly contested:

Physical attributes of the place. Some SOP research identifies specific characteristics of the physical setting, such as the water quality of its lakes. While such attributes may not *determine* the place-related meanings attachments, or satisfaction people express, they nonetheless may come to influence the nature and development of these sentiments (e.g., Stedman, 2003a, 2003b).

Experience in the place. Whereas some researchers emphasize the centrality of physical involvement in a place to developing SOP (e.g., Tuan, 1977; Stedman, 2002), others view SOP as existing even in the absence of in-person interaction in settings.

Specificity and scale of the place. Does SOP develop from a particular corner of the forest, or a larger swath of wilderness? Moreover, does SOP differ with respect to a 1-mile trail, or a 100,000 square-mile wilderness area? The degree to which researchers see the specificity of a place as important to measuring SOP relates to their theoretical approach; however, little conclusive empirical evidence suggests whether, or how, scale influences SOP (Farnum et al., 2005; Low & Altman, 1992).

Recreation-related variables. Focusing on the relationship between outdoor recreation and SOP, Farnum et al. (2005) uncover a number of potentially important variables, such as: *activity type* (e.g., mountain biking vs. hiking), *level of involvement or specialization in this activity*, *type of user* (e.g., local vs. tourist), *level of visitation* to a particular area (as well as *expectations* related to such visits), and *potential for social conflict* between different recreational user groups.

Place and perception of risk

Working from the above definitions, researchers in a variety of disciplines have applied place-related concepts to further understand risk meanings and perceptions. As Masuda and Garvin (2006) note, risk perception may be a product of one's place attachment and sense of community, or even the unique social context, such as the existence of other well-publicized risks "competing" for public attention (see also Lewis & Tyshenko, 2009). Exploring public reactions to a proposed industrial park in Alberta, Canada, Masuda and Garvin (2006, p. 447) described risk perceptions not as "isolated within the minds of individuals," but rather, "manifested as threats to shared 'ways of life' that included people's sense of belonging and well-being in the community at large" (see also Jardine, Boyd, & Furgal, 2009; Hugh Jones & Madill, 2009). Individuals' occupations and historical relationships with the land, whether as farmers or subdivision residents, mattered in determining whether the proposed development represented a "risk" or an "opportunity"; in following, risk concern depended on whether residents "saw the region generally as a place to live, or as a place for economic progress" (Masuda & Garvin, 2006, p. 450). Likewise, a risk may be deemed more "acceptable" to individuals based on their relationship with and proximity to its source. For instance, Baxter and Lee (2004) found evidence of low concern among residents living adjacent to a hazardous waste facility in Alberta, Canada, a source of employment and economic support for the community, despite amplified concern among citizens elsewhere in Canada. Similarly, in a study of Israelis living in a tumultuous, violence-prone region of the West Bank, Billig (2006) suggested that strength of place attachment and religious ideology predicted respondents' tendency to downplay the "riskiness" of their home.

The risk perceptions stemming from a shared sense of place or place attachment may also serve to delineate “insiders” from “outsiders.” In a qualitative case study exploring reactions to the 2001 foot and mouth disease outbreak in the United Kingdom, Bickerstaff, Simmons, and Pidgeon (2006) found that the people’s recollections of the event produced and reproduced a cultural identity that separated the “local insiders” from “outsiders who do not share the knowledge and experience of living in rural communities” (p. 853). At the same time, these relationships to place mobilized particular responses to risk and “official” (i.e., government) risk management strategies. Describing the citing of a waste facility, Baxter (2009) explained how place meanings and attachments motivated both risk concern and the seeking of particular information sources, whether so-called information “insiders” (i.e., local media, local family and friends), or “outsiders” (i.e., national media or family and friends living outside of the geographical area).

Characteristics and context of the risk

Like one’s individual biography, community ties, and relationship(s) to the physical place, the context in which an individual encounters a given risk, as well as the characteristics of the risk itself, also matter in the development of risk perceptions. Previous applications of attribution theory to explaining accidents have generally failed to account for the nature of the risk, as well as the context in which a given risk may be encountered. As pioneering experimental studies in the so-called “psychometric paradigm” of risk perception illustrated (e.g., Slovic, 1987; Slovic, Fischhoff, & Lichtenstein, 1981), individuals’ judgments of a given risk depend on, among other attributes, perceived controllability (i.e., the degree to which individuals believe they can control the level of risk to which they are exposed) and voluntariness (i.e., whether individuals believe they can choose to be exposed to the risk). Risks judged *more* controllable and *more* voluntary, as well as more *known* (i.e., produce observable effects, are known to current science, etc.)—in Slovic's (1987) experiments, riding motorcycles or downhill skiing, for instance —tend to be less "dreaded"; in turn, they tend not to generate inflated risk perceptions among non-"experts." Though a handful of studies have considered individuals' risk perceptions and their attributions of responsibility for events such as car accidents or occupational accidents (DeJoy, 1985; Dorn & Brown, 2003; Kouabenan, 1998, 2001, 2002), no known research has investigated the role of perceived controllability or voluntariness of risk in the assignment of attributions. In the context of social psychological causal attribution research, Weiner (1996, 2008) and others have highlighted the importance of the perceived controllability of a cause as predicting attributions of responsibility; however, the perceived ability to exert "control" over one's study habits, for instance, may or may not be equivalent to the perceived control one feels over exposure to an avalanche in a national park. This dissertation attempts to determine this question empirically. Moreover, while the aforementioned studies explore respondents' risk perceptions and causal attributions with regard to everyday surroundings (e.g., job sites) or daily routines (e.g., driving cars), they make no mention of the meanings respondents may attach to such contexts, nor to how respondents' beliefs might change given contexts that are unfamiliar, novel, or non-routine.

Previous research has also paid limited attention to circumstances in which individuals may perceive risk (and risk-taking) as a desirable (Machlis & Rosa, 1990), rather than detrimental, aspect of an experience, and thus consciously seek, rather than avoid its presence. Characterized as "sensation-seeking" by social psychologists (Zuckerman, 1979), most individuals who participate in activities such as rock climbing, for example, consciously choose to put themselves in high-risk environments and circumstances (e.g., Beedie & Hudson, 2003; Dimmock, 2009; Dunn & Gublis, 1976; Ewert, 1994; Ewert & Hollenhurst, 1989; Galloway & Lopez, 1999;

Pomfret, 2006). Researchers in recreation and leisure studies have pointed out that, as engagement in "adventure recreation" increases, so too does the expertise or skill-level of the recreationist, as well as her preferred level of risk, and preference for challenge, achievement, and control. As Ewert and Hollenhurst (1989, p. 135) maintain, adventure recreation may surpass the goal of physical fitness to encompass complex meanings for its participants.

Sociologists, too, have looked toward recreational contexts, and even the more mundane events of everyday life, to understand the role and meaning of voluntary risk-taking. Coining the term "edgework," Lyng (1990) proposed a sociological framework for how and why people voluntarily take risks, such as sky-diving, examining general social-psychological variables rather than "idiosyncratic motives or personality characteristics" (Lyng, 1990, p. 854). Lyng's (1990) ethnographic analysis brings to light, among other findings, the dialectic between spontaneity and constraint, and feelings of self-actualization and "oneness" with the environment experienced by a group of skydivers (see also Lipscombe, 2005). In an ethnographic study of technical rock climbers, Csikszentmihalyi (1975) applied the concept of "flow" to explain the alignment of mind and body throughout the practice, from confronting challenge, to engaging in deep concentration, to experiencing competence and control. In less physically "risky" contexts, sociologists Tulloch and Lupton (2002) found instances of voluntary risk-taking, such as a painter taking a creative risk on a canvas, as eliciting similar feelings of self-improvement, as well as emotional engagement and control (see also Lupton & Tulloch, 2002a, 2002b; Parker & Stanworth, 2005). Importantly, the authors define these moments as instances of "deliberate" risk-taking as contrasting with:

> …Taking part in activities that to the dominant culture are coded as 'risky' but are not perceived as such by those involved, or in activities which are perceived by participants to be unacceptably risky but because of their circumstances have little choice of avoiding, or of which they are unaware at the time (Lupton & Tulloch, 2002a, pp. 114-115).

Through Lupton and Tulloch's research, we are reminded that actions and situations *become* "risky"—or "safe"—in the eye of the beholder, and that the voluntariness of a given risk implies both awareness and choice.

Relationships between variables

As previously noted, few studies consider both risk perception and attribution theory, and even fewer in the context of unintentional injury or safety. Of the research that does link risk perception and attribution, considerable differences exist in the treatment of the relationship between these variables, as well as the object of the perceptions (i.e., the individual himself, or a third party). For instance, in a survey addressing Italian healthcare workers' perceptions of AIDS patients, Mannetti and Pierro (1991) measured the healthcare workers' own perceived susceptibility of contracting AIDS, along with their perception of how hypothetical AIDS patients described in a scenario, including homosexual or heterosexual, promiscuous or monogamous, contracted the disease (i.e., "third person" causal attributions); no relationship was drawn between risk perception and the type of causal attribution made. In another survey-based study, researchers measured both risk perceptions and causal attributions from the respondents themselves; questioning the general public about a recent waterborne disease outbreak in the Milwaukee, WI water supply, Kahlor, Dunwoody, and Griffin (2002) showed that the respondents' personal risk estimates varied depending on their personal experience, and that these estimates influenced the nature of causal attributions. As the authors concluded:

> …Individuals who had avoided becoming ill from exposure to a waterborne pathogen were more likely to 'explain' their choice of risk estimate in terms of personal causal factors. In other words, when a past outcome (having become ill or not) was good, respondents were more likely to attribute their future likelihood to personal actions (Kahlor, Dunwoody, & Griffin, 2002, p. 253).

In yet another substantive context (and country), Sellstrom, Bremberg, Garling, and Hornquist (2000) conducted a survey exploring Swedish mothers' causal attributions of hypothetical common accidents involving children (e.g., burns, bicycle injuries). The authors found a strong, positive correlation between the mothers' perceived risk of injury to the child, and their attribution of responsibility for causing the accident to the child (i.e., third person risk perception and attribution of responsibility). When considered with other variables, such as mothers' normative beliefs and sociodemographic characteristics, attributing responsibility to the child emerged as the most important *predictor* of elevated parental risk perceptions. Other studies (Kouabenan, 1998, 2002) have investigated how variables such as experience and cultural beliefs influence risk perceptions and causal attributions—as dependent variables—but do not establish a clear relationship between the latter two variables. More research is needed to clarify how (or whether) an individual's perception of risk (to self or others) might influence how she attributes the cause of accidents (involving self or others).

Attribution Theory and Risk Communication

Just as limited research has incorporated risk perception into attribution theory, few studies have examined whether (and how) risk communication influences judgments of responsibility. Because risk communication often emerges from multiple sources, it is helpful to distinguish between "types" of sources (e.g., disseminated by an "official" agency or among an "unofficial" group of friends) as well as the style of dissemination (e.g., a "formal" report or an "informal" conversation. While references to risk communication appear in a handful of studies examining causal attributions, including those involving health information seeking, limited research precedents exist for basing future study.

Official/unofficial and formal/informal risk communication

Within public settings, risk information circulates through both official (i.e., affiliated with a publicly-recognized organization or institution, such as a government agency) and unofficial (i.e., not affiliated with a recognized organization) messages and messengers. Likewise, risk information may be formal (i.e., scripted, such as the text of a written press release) or informal (i.e., unscripted, such as an impromptu conversation). Limited scholarship in risk communication has focused on either the unofficial or the informal categories. Whereas posted signs and the enforcement of safety regulations convey an official view of risk, for example, safety information may also be passed on via water cooler gossip or non-verbal cues (e.g., a worker failing to wear appropriate personal protective equipment) (Rickard, 2011). In their seminal Social Amplification of Risk Framework, Kasperson et al. (1988) allude to both official and unofficial sources of risk information, suggesting that the latter, such as interpersonal communication with friends or neighbors, may play a central role in the attenuation or amplification of risk perceptions. Along these lines, McComas, Lundell, Trumbo, and Besley (2010) illustrated that individuals attending public meetings about local cancer clusters explained their feelings of cancer concern by referencing their exposure to both "official" sources of information (e.g., scientific presentations) and "symbolic" risk messages (e.g., information from other citizens). The distinction between official and unofficial risk communication also holds in the workplace. For instance, a commercial pesticide applicator may engage in conversation with a homeowner about the potential human health risks of the product he is applying to the client's lawn (Dantzker, Chandrasekaran, & Snedeker, in press; Rickard, 2011). Using commercial pesticide applicators as an example, Rickard (2011, p. 646) proposes that the defining characteristics of "informal risk communicators" (IRCs) may include his or her:

- Exposure to occupational risks (or potential risks).
- Complex understanding of a given risk, founded on both cultural and technical meanings.
- Exposure to training and/or other education in dealing with (potential) occupational risks.
- Opportunity to interact directly with the public through both verbal and nonverbal communication.
- (Perceived) similarity to an "average" member of the public, perhaps leading him/her to be more trusted than public officials.
- Potential to deal with socially stigmatized risks on a daily basis.
- Potential lack of recognition for providing information about health- or risk-related issues.

The present study is concerned less with identifying examples of IRCs than with distinguishing between forms of prevalent official/unofficial and formal/informal risk communication both inside and outside of an organizational setting. Combining "formal" and "official" in a 2 x 2 table thus creates a typology of risk information consisting of four main types: (1) official/formal; (2) official/informal; (3) unofficial/formal; (4) unofficial/informal (see Table 2.1). Given the substantive context of the research, which will be elaborated below, we can use the National Park Service as an example organizational setting to apply this typology of risk information potentially available to the public (i.e., national park visitors). Whereas the designation of official refers to information coming from the NPS, such as a park brochure distributed by the agency, unofficial would signify messages emerging from sources outside of the Park Service, such as private businesses located in towns adjacent to the park. Likewise, formal information would be available in a scripted, possibly non-editable form, such as road signs or visitor center exhibits, whereas informal information would be unscripted and possibly modifiable by members of the public (e.g., face-to-face conversations or interactive blogging sites). (See Table 2.1 for an overview of a typology of risk information sources potentially available to a national park visitor).

Table 2.1. Typology of Risk Information Available to National Park Visitors

	Official (NPS)	Unofficial (non-NPS)
Formal (Scripted)	• Interpretive programs • Junior Ranger Program • Permits • Brochures, handouts, maps • Website • Signs and exhibits • Park movies and podcasts • Traveler Information Systems (AM radio station) • Press releases • Pre-recorded phone messages	• Guidebooks and maps/atlases • Highway road signs • GPS devices (i.e., directions to the park) • Print information in local chamber of commerce, private business, or visitor center outside of the park • Commercial websites (e.g., guide services) and other websites including park information. • AM or FM radio stations
Informal (Unscripted)	• Interacting face-to-face with NPS staff (e.g., rangers, fee collectors, maintenance workers) • Talking with an NPS employee (e.g., dispatcher) on the telephone • Hand-drawn maps, directions, etc. given by NPS staff or volunteers	• Interacting with climbing guides, boating guides, or other recreational trip leaders • Interacting with staff at restaurants, gift shops, or hotels • Interacting with other park visitors, family members, or friends • Visitors' blogs, personal websites, and podcasts • Visitors' personal photographs, videos, audio recordings, etc

Linking attribution of responsibility and risk communication

Few known studies have explored how individuals' attributions of responsibility may be affected by the nature of the risk communication they receive. As described above, Kahlor et al. (2002) studied the relationship between personal estimates of risk susceptibility and individuals' causal attributions for becoming ill from a waterborne pathogen. Though the authors did *not* measure exposure to risk communication explicitly, their finding that status (a measure of education and income) was positively related to external attributions led them to hypothesize that such attributions may have been an artifact of heavier media use among high status individuals (see, e.g., Viswanath & Finnegan, 1996); because media outlets tend to interpret environmental risks as stemming from external sources, such as poor management and oversight by government agencies, (e.g., Griffin & Dunwoody, 1997), heavy media users may be inclined to adopt these attributional patterns in their own causal reasoning (Kahlor et al., 2002).[3] A second study, focused on causal attributions related to cryptosporidiosis in the United Kingdom, linked individuals' reported information sources about the pathogen to their perceptions of the cause of the outbreak (Doria, Abubakar, Syed, Hughes, & Hunter, 2006). Using quantitative and qualitative survey data, Doria and colleagues (2006) reported that information sources, such as medical documents (e.g., stool sample results), environmental health officers, and doctors or nurses, appeared to influence the causal attributions reported. By relating information sources and respondents' attributional reasoning, Doria and colleagues concluded that, "Respondents who heard about the disease from a particular source were more likely to point out or to reject certain specific causes" (Doria et al., 2006, p. 749); for instance, individuals who relied on information from doctors and nurses tended to perceive contaminated water as the cause of the outbreak.

Two additional studies associate health information sources with causal attributions about the occurrence of disease. Using the 2005 Health Information National Trends dataset, Ford and Kaphingst (2009) investigated the relationship between causal beliefs about cancer and lay interpersonal sources of health information (i.e., community organizations, family members, and

[3] A handful of studies link media coverage of "risky" events to the attributions of the general public about controllability (McClure, Allen, & Walkey, 2001; McClure, Walkey, & Allen, 1999; McClure, Sutton, & Wilson, 2007). For instance, McClure et al. (1999) suggest that media coverage in New Zealand of natural hazards such as earthquakes tends to overemphasize the sheer *magnitude* of the event, leading the public to form attributions that damage is uncontrollable, and thus to downplay its preventability (i.e., leading to feelings of fatalism).

friends). Their results indicate that those individuals who *never* spoke with family or friends about health concerns, for instance, were more likely to view colon cancer risk as modifiable—that is, able to be lessened by engaging in certain preventative behaviors. Because the survey relied on cross-sectional data, however, we can assume neither causality, nor directionality of the results; as Ford and Kaphingst (2009, p. 1980) stress, "…individuals' beliefs about cancer causation may also influence what sources they choose to interact with to seek health information." In a related survey-based study of the general public, O'Neill, McBride, Hensley Alford, and Kaphingst (2010) explored how behavioral risk factors and family history influence causal attributions for prevalent diseases such as hypertension, and how such attributions might influence health-related information-seeking preferences. Interestingly, their results suggest that certain attributional beliefs, such as linking the cause of a disease to genetic factors, may *discourage* individuals from seeking complementary information about health behaviors. As the authors conclude, "those with the greatest need for behavior change are at most risk for responding defensively and devaluing information for behavior change (O'Neill et al., 2010, p. 135). Despite the wide range of substantive contexts, the studies reviewed above converge on the conclusion that the nature of risk information matters in the development of causal attributions; however, less is known about the relative roles or importance of the risk communication "type" (i.e., official/unofficial) or "style" (i.e., formal/informal) (Rickard, 2011) in influencing these attributions.

Attribution Theory, Risk Management, and National Parks

This research explores the linkages between attribution of responsibility, risk perception theory, and risk communication with regard to safety promotion in the context of three U.S.

national park units.[4] Whether sightseeing or spelunking, camping or bird watching, hundreds of millions of people enjoy visits to national parks each year (NPS, 2009). Spurred in part by President Obama's recent signature of the presidential memorandum "America's Great Outdoors Initiative" (Office of the Press Secretary, 2010), as well as by the promotion of so-called "nature deficit disorder" in American children (Louv, 2005), increasing attention has focused on the value of open space and wilderness areas such as are maintained in these settings. Moreover, given continuing efforts to attract diverse and traditionally under-served populations to parks, as well as to document and support unique patterns of use in these spaces (e.g., Baas, Ewert, & Chavez, 1993; Floyd & Johnson, 2002), providing appropriate risk communication has become critical. While limited research has investigated issues of risk perception and responsibility for safety in national parks, I have located no published studies that have utilized such settings to formally investigate causal attribution of unintentional injury or accidents. Before reviewing prior research, I first further describe relevant characteristics of U.S. national park settings.

Characteristics of the research context

To better understand the relevant features of the research setting, we can compare and contrast U.S. national parks with two other contexts: occupational settings such as factories (i.e., those used in previous research on attributions of accident causation and risk perceptions) and amusement theme parks (e.g., Disneyworld). By denoting the similarities and differences between these settings, I intend to illustrate the uniqueness of national parks as supporting inherently "risky" recreational opportunities (see Table 2.2).

[4] The National Park Service uses the inclusive term "national park unit" to encompass several different categories of the 397 designated locations managed by the NPS (U.S. Department of the Interior), such as national parks, national monuments, and national seashores. The proposed study will consider issues relevant to two *national parks* and one *national recreation area*, with the understanding that each designated "unit" of the National Park System may entail a unique set of management issues, potential risks, and visiting publics.

Table 2.2. Comparison of Occupational Settings, Theme Parks, and National Parks

	Occupational Setting	Theme Park	National Park
Primary audience	Workers	Visitors (tourists)	Visitors (tourists)
Type of risk	• Familiar • Mostly controllable • Undesirable	• Familiar • Mostly controllable • Undesirable	• Novel, unfamiliar • Controllable and uncontrollable • Undesirable <u>and</u> desirable (e.g., "authentic" wilderness experience)
Type of setting	Ordinary/familiar	Extraordinary/unfamiliar	Extraordinary/unfamiliar
Injuries/deaths	Regular injuries and deaths; rate varies greatly by occupation	Small number of injuries and deaths	Many injuries and deaths; often predictable by park location, time of the week/year, activity, characteristic(s) of the visitor involved, etc.
Risk communication	"Official" and "unofficial" (e.g., posted signs, rules/regulations, other workers)	"Official" and "unofficial"	"Official" and "unofficial"
Institutional goals/ "mission"	• Produce materials to secure profits • Prevent worker injury	• Attract visitors to secure profits • Prevent visitor injury	• Conserve natural and cultural resources • Attract diverse visitors • Prevent visitor injury ***In most situations***
Risk management	• Risk managers known to workers (e.g., Safety Officers) • "Safety culture" known to workers	• Risk managers unknown/unfamiliar to visitors • "Safety culture" unknown to visitors	• Risk managers unknown/unfamiliar to visitors • "Safety culture" unknown to visitors

Primary audience. Whereas occupational settings house workers performing repeated daily routines, both theme parks and national parks cater to tourists engaging in recreational activities, usually for a limited time period. Within the recreation and tourism literature, researchers have suggested that tourists may not take appropriate safety-related precautions when traveling to new locations, may be more vulnerable to risks such as crime, and may not have access to the most appropriate and/or timely information about the locale (e.g., Tarlow & Muehsam, 1996). Other research has documented that tourists may tend to behave differently in unfamiliar contexts, taking more risks than they would in their day-to-day settings, and being unaware of (or perceiving themselves as invulnerable to) potential risks to their safety (e.g., Page & Meyer, 1997; Dann, 1996). Such behaviors, in turn, may be "compounded by the fact that many tourist destinations are located in natural hazard prone areas (Espiner, 2001, p. 109).

Type of setting. As opposed to spending time in an occupational setting, for most individuals, a trip to a theme park or a national park is an out-of-the-ordinary trip (such as part of a vacation) rather than a regular routine, such as a daily commute or a trip to a local town park.

Novel or unfamiliar risk. Both occupational settings and theme parks represent built environments in which most individuals are familiar with risks to their safety, such as malfunctioning machinery, or tripping on slippery or uneven surfaces. National parks, on the other hand, vary widely in environmental characteristics such as topography, elevation, and climate, creating a range of potential risks, from geohazards (e.g., volcanic eruptions) in the Pacific Northwest to encounters with bears in the Rocky Mountains, to Lyme disease-carrying ticks in the Northeast (Tuler, Golding, & Krueger, 2002). Some individuals may have never before visited a particular park and thus may not be aware of the associated risks, such as rapidly changing weather, narrow, winding roads, or the effects of elevation. While driving on an interstate highway might also entail encountering wildlife or navigating through inclement weather, individuals may perceive driving as a "known" (Slovic, 1987) part of their everyday experience and thus may have developed complacency towards the associated risks (e.g., Kouabenan, 1998, 2002). In both cases, one's past experiences and perceptions of the particular environment (e.g., experience in the outdoors) may inform perceptions of risk.

Desirable/undesirable and controllable/uncontrollable risk. In settings such as factories and theme parks, many—though certainly not all—risks can be controlled through engineering, such as through the addition of safety controls to equipment, whether in manufacturing machinery or roller coasters. Visiting a national park, however, entails both risks that one voluntarily chooses, such as participating in recreational activities, such as hiking in an undeveloped area, and also risks that one can neither "choose" nor "control," such as inclement weather (Slovic, 1987). Due to the novelty of the location, however, some visitors may be unaware of the risks associated with certain park locations or activities, and thus fail to perceive them as voluntary (e.g., Whittlesey, 1995). At the same time, empirical research in leisure studies has demonstrated that tourists may tend to perceive less personal control over the outcome of their decisions, as compared to during non-vacation experiences (Jackson, White, & Schmierer, 1996). For other visitors, however, these risks may be perceived as desirable (Machlis & Rosa, 1990), in that they contribute to an "authentic" experience of being in a wilderness setting. While riding certain attractions in theme parks may also entail voluntary thrill seeking, due to the safety controls mandated on these rides, such risk-taking does not carry with it an equivalent—however remote—potential for injury or death.

Risk managers. Both theme parks and national parks attract conglomerations of diverse individuals other than employees who do not necessarily have a commitment to the institution, nor to its employees. While protecting park visitors' safety remains an institutional goal (see below), NPS employees are neither obligated—nor in most cases, able—to establish the sort of familiarity, camaraderie, or trust with visitors that might be expected to develop among managers and employees, or between co-workers in occupational settings.

Safety culture. For their part, national park or theme park employees may be familiar with a given park's safety culture (e.g., Guldenmund, 2000), including knowing what constitutes "safe" and "appropriate" behaviors when encountering certain risks in order to prevent on-the-job accidents. On the other hand, visitors may be unfamiliar with this culture, or even subscribe to their own, potentially conflicting accounts of acceptable behavior in such locations.

Risk management as one of many institutional goals. Occupational settings, theme parks, and national parks all engage in risk management as part of a larger institutional mission. As for-profit entities, both occupational settings, such as factories, and theme parks focus attention on the bottom line, whether through manufacturing products or increasing visitation. With a mandate to protect the country's natural and cultural resources, as well as to engage a diverse public, NPS is also tasked with preventing unintentional injury among visitors. While the latter goal might be best met by developing engineering controls and enforcing rules (e.g., banning particular activities), such strategies might run counter to the first and second goals of sustaining landmarks and attracting visitors. As such, NPS must rely on educational programs and public communication (e.g., signs, brochures, employees) to relay preventative risk and safety messages to its visitors (U.S. Department of the Interior, 2010).

Protecting health and safety as institutional responsibility. Thanks to federal, state, and local regulations, the carefully engineered settings characterizing both occupational and theme park settings promise employees and tourists, respectively, a great deal of safety assurance. Whereas the Occupational Health and Safety Administration (OSHA) regulates workplaces (including theme parks as occupational settings) and worker safety, the safety of theme park rides are regulated by state and local governments, with specific arrangements varying by state (Saferparks, 2009). Given lapses in the protection of health and safety, such settings can be liable to legal claims. While NPS commits to protecting the safety of its visitors in its internal regulatory code, individual parks can choose *not* to engage in any effort that may endanger the welfare of their employees, or the character of the natural environment, such as a complicated search and rescue (SAR) operation (U.S. DOI, 2010). Therefore, the degree to which a given park may or may not offer assistance to visitors (whether to prevent or to respond to an accident) may vary on a case-by-case basis. Moreover, given the unpredictability and uncontrollability of many of the risks present in national parks, safety cannot always be unquestionably guaranteed. Above all, as stated in Director's Order 50C, NPS sees its commitment to safety as *shared* with park partners (e.g., concessions services) and park visitors, and dependent upon the active cooperation and coordination of all three parties (U.S. DOI, 2010).

Risk communication. Within all three settings, risk communication circulates through official and unofficial messages and messengers, in both formal and informal styles (Rickard, 2011; Rickard, McComas, & Newman, 2011). While visitors routinely encounter examples of NPS-scripted) risk communication in physical and virtual park spaces, they are also exposed to unofficial messages and messengers, such as through interactions with concessions workers (e.g., restaurant or hotel staff) or other visitors.

Injuries, accidents, and deaths. Occupational settings, theme parks, and national parks all report accidental injuries and deaths. In occupational settings, such injury/fatality rates vary tremendously by occupation, with farmers and miners experiencing more fatal accidents than those engaged in occupations such as retail trades (U.S. Department of Labor, 2010).[5] Data released by the International Association of Amusement Parks and Attractions suggest that, per one million patron-rides in such locations in 2008, there were .05 serious injuries (National Safety Council, 2008). Pelletier and Gilchrist (2005) examined fatalities related to roller-coaster rides in the United States between 1994-2004, concluding that an average of 4 deaths annually could be attributed to such attractions (see also Braksiek & Roberts, 2002).

---

[5] For example, OSHA (2008) reports the number of fatal occupational injuries per 100,00 full-time equivalent workers as the following: agriculture, 30.4; mining, 23.9; retail, 2.8.

While available accident rates are not directly comparable across settings, data indicate that visitors in national park settings experience more frequent injuries and deaths than theme park tourists and many occupational workers. Data reported by NPS indicate that on average three visitors die in parks every week due to unintentional injuries and an average of 14 people are seriously injured daily (S. B. Newman, personal communication, May 2009). According to SAR data, many injuries, accidents, and deaths are predictable by location, time of the week/year, activity, and/or characteristic(s) of the visitor involved (Heggie & Amundson, 2009; Heggie & Heggie, 2004, 2009). For instance, in a comprehensive review of NPS SAR records collected between 2003-2006, Heggie and Heggie (2009) found that rescues disproportionately occurred on Saturdays and Sundays, were initiated by activities such as day hiking, boating, or technical climbing, and involved visitors aged 20-29. (See Appendix A for an overview of 10 years of visitor injury/fatality data for Mount Rainier National Park).

National parks management in the popular press

The preponderance of natural hazards and associated visitor injuries in national parks has not escaped the attention of the popular press, with many authors themselves former NPS employees. Several recent volumes document in voyeuristic detail visitor deaths in the nation's most iconic parks, such as Yellowstone (Madgic, 2005; Whittlesey, 1995), Yosemite (Ghiglieri & Farabee, 2007), and Grand Canyon (Ghiglieri & Myers, 2001). Other accounts (e.g., Blehm, 2006; Lankford, 2010; Loewen, 2009) depict the experience of working in these environments, in so doing providing ample commentary on visitor *and* employee tragedies. In describing these instances in which various men, women and children met their demise, these authors present clear opinions of an individual's responsibility to prevent such accidents from occurring. A former Yellowstone National Park ranger and tour bus driver turned lawyer, Whittlesey (1995), for example, chronicles the documented deaths of visitors and employees in the park from the 1870s to the early 1990s. Much of his account portrays park visitors as ignorant and irrational: unaware of (and often unperturbed by) the dangers inherent in national park settings, and of their responsibility to protect themselves from harm. Throughout the narrative, Whittlesey (1995) interjects commentary on the responsibility to ensure safety in national parks, whether through the preparedness of park visitors or the crafting of safety warnings by park staff. At the same time, he describes the barriers to doing so, such as the unfamiliarity of many contemporary visitors with the appropriate norms and practices—in some sense, the culture—of recreating in such "wild" areas. As he writes:

> Many visitors to Yellowstone and other national parks enter the gates with a false sense of security. These persons wrongly believe that the animals are tame, and that the place surely is a lot like a city park, with swings, horseshoe pits, golf courses, swimming pools, and total safety—a place where lawns are watered and mowed regularly and fallen tree branches are picked up and carted away, all nicely managed, nicely sanitized. But national parks are not like that; they are places where nature and history are preserved intact. And intact nature includes dangers (Whittlesey, 1995, p. xii).

Visitor perceptions notwithstanding, whether national parks *should* resemble country clubs or wilderness sanctuaries, including the risk management implications implied by each, is an issue raised by legal scholar Joseph Sax. In *Mountains without Handrails*, Sax (1980) integrates the environmental philosophy underlying the founding of the National Park Service with contemporary development and management issues; he questions whether parks are (or should be) "recreational commodities" or "temples of nature worship" and whether a modern-day "preservationist" ethic can be sustained in these places. Like scholars interested in sense of place (see above), Sax (1980) points out that national parks carry symbolic meanings and can play a role in perpetuating and teaching visitors values such as self-reliance. For Sax, the "intensity" of experiences available to park visitors, such as encountered when backpacking in remote terrain, contrasts with other more predictable, pre-packaged tourist activities. Importantly, in these more developed tourist settings, such as amusement parks or seaside resorts, Sax suggests that maintaining personal safety (or the corollary, preventing unintentional injury) is *not* necessarily linked to an individual's preparation, knowledge, or skills; therefore, "Nothing distinctive about us as individuals is crucial. The margin of error permitted is great enough to neutralize the importance of what we know" (1980, p. 31).

While visitor safety does not constitute a central focus of his book, Sax's "prescription" for the national parks as providing for "reflective recreation" that is "challenging and demanding" (Sax, 1980, p. 61) certainly alludes to the role of voluntary risk-taking in these places (see above). As Sax points out, however, encouraging *all* park visitors to seek "challenge" may be not only an inappropriate, but also a paradoxical management scheme. Since the most inexperienced park visitors are likely ill-equipped to tackle untrammeled backcountry areas, as we set aside larger tracts of these areas for use, most people will be inevitably drawn to the smaller, more crowded, urbanized areas in national parks—those equipped with general stores, restaurants, and so forth. Noting the importance of providing opportunities for visitors to "set their own agendas" rather than "be entertained" by the NPS, Sax (1980, p. 80) concludes:

> Management committed to contemplative recreation should be just that, whether for the young and hardy or the old and infirm. One does not provide such an opportunity for older people or inexperienced visitors by building a highway to the top of the mountain. Rather we can assure that places that *are* accessible to them are not so deprived of their natural qualities as to put such an experience beyond their reach.

Sax's (1980, p. 108) ideal management scheme, in sum, recognizes the differences between national park and theme park—including the safety concerns entailed—by "[encouraging] the visitor to adapt to the setting of the place visited."

Social science contributions

From a social science perspective, a handful of studies have considered attributions of responsibility for safety in the context of outdoor recreational settings. Three studies conducted in New Zealand explored visitors' and park managers' hazard awareness, perceptions of risk and safety, as well as attributions of responsibility for safety within the context of a national park (Espiner, 1999, 2001) and during guided adventure recreation tours (Smith & Espiner, 2007). Triangulating interview, observation, and survey data, Espiner (1999, 2001) found that park visitors demonstrated only "rudimentary" awareness of the hazards to which they may be exposed in such settings; despite the rugged, glaciated terrain, visitors perceived such settings as "managed, consumable, and safe" (2001, p. 245), and for some foreign visitors, even safer than their home countries. As opposed to visitors, park managers tended to perceive park-related risks much differently and as more dangerous; such perceptions varied by occupational and hierarchical position and reflected their own experiences as park managers, as well as the moral and legal culture in which the New Zealand Department of Conservation operates. While the majority of park visitors and recreation tour participants acknowledged a modest degree of individual (internal) responsibility for their own safety, many also viewed park managers (or tour guides) as jointly responsible for shouldering some of the burden of safety. Moreover, findings from all three studies suggest that these judgments of responsibility varied by characteristics of the visitor, such as gender and nationality, and recreational activity choice. Importantly, Espiner's findings pose a critical question that invites empirical inquiry: given visitors' reported low perceptions of risk and high perceptions of safety, is willingness to assume personal responsibility based, at least in part, on a failure to fully recognize existing safety risks?

Within the U.S. context, three unpublished studies investigated the perspectives of managers and visitors with regard to safety within national parks. First, a groundbreaking survey of visitor safety and risk communication in 30 national parks commissioned by the NPS in 2000 found that visitor opinions regarding the attribution of responsibility for preventing visitor injury varied from park to park (Tuler & Golding, 2002). In general, the majority of visitors to "backcountry parks" (i.e., parks where popular activities include off-trail pursuits such as backpacking) believed the visitor to be responsible for his safety. On the other hand, the majority of visitors to "frontcountry parks" (i.e., parks that offer limited or no backcountry activities) placed the burden of responsibility on *both* the visitor and the park staff. Finally, very few visitors at any of the parks surveyed felt that park employees should be held entirely responsible for guaranteeing visitor safety. In explaining the differing attributions of responsibility reported by those visiting backcountry and frontcountry parks, Tuler and Golding (2002, p. 60) noted that this distinction may reflect the perception that risks in frontcountry parks can be more easily "controlled" "since visitor activities tend to be less physically rigorous and the venues tend to be more 'benign,' with many paved walkways, regular stairs, and buildings." On the other hand, as the authors note, such deviating attributions may reflect the perceptions, characteristics, and expectations of the visitors who frequent each park "type."

A second survey considered the perspective of NPS park employees in attributing responsibility for visitor accidents (Newman & Chanlongbutra, 2008). Results from the park managers (e.g., Superintendents, Chief Rangers) of 51 national park units in the Pacific West Region surveyed revealed that participants tended to attribute responsibility for visitor injury to the visitor himself, while viewing park facilities and infrastructure as appropriate for ensuring safe visits. For instance, the majority of participants agreed or strongly agreed that visitors' inattention to their surroundings, physical health, risk-taking, and lack of preparedness contributed to injuries and fatalities within parks. On the other hand, the majority of participants disagreed or strongly disagreed that cultural and/or natural park protection requirements, inadequate park maintenance, and insufficient law enforcement activity were contributory factors leading to unintentional visitor injury and death.

Finally, research conducted in 2009 with both employees and visitors at Mount Rainier National Park investigated the relationship between risk perceptions, attributions of responsibility for ensuring safety, and support for risk management policy. First, a survey of park visitors (Rickard, Scherer, & Newman, 2011) found that over 93% of those surveyed perceived themselves as responsible for their own safety. Contrary to previous findings (Weiner, 2006), internal attributions of responsibility for safety failed to predict support for risk-preventative policy; however, as evidenced by free-responses to the survey, this measure may have been compromised by its inability to account for the contingent nature of visitors' perceptions of responsibility (e.g., dependent on the activity in which the individual was participating, or the area of the park he was visiting) as well as a the belief that such responsibility might be shared between visitors and park managers. Perceptions of risk, participation in high-risk recreational activities (e.g., skiing, mountaineering), and visiting the park with family and friends were all negatively related to support for risk-preventative policy; without data on the ages and relationships existing in these groups, however, we cannot fully interpret the latter result.

A second arm of this research explored park employees' roles in official and unofficial risk- and safety-related communication with park visitors (Rickard et al., 2011). Using interview and observational data, this study examined how park staff rely on heuristic cues to evaluate visitors during face-to-face interactions, so-called "proficiency profiling," using these assessments as a basis for either encouraging or discouraging visitors from participating in inherently risky recreational activities. While many employees described visitors as responsible for their own safety, they also routinely told stories in which visitors appeared as deficient: lacking the clothing, skills, or common sense to act appropriately in a national park. Despite serious ethical implications, such as the potential for proficiency profiling to lead to inaccurate judgments or to perpetuate visitor stereotypes, the authors conclude that it:

> …Represents a beneficial risk management tool, especially when considering the high-risk scenarios and potentially tragic outcomes associated with some park settings. Relying on intuition developed through experience to pinpoint ‘red flags’ allows staff to intercept visitors with unreasonable itineraries or inappropriate preparation, thus potentially preventing injury (Rickard et al., 2011, p. 77).

Directions for future research

While the above studies represent critical first steps in studying attribution theory in a national park context, several limitations highlight the need for additional research. First, while Espiner (1999, 2001) considers the role of park signage in affecting visitors’ behavior and risk awareness, and Rickard et al. (2011) show how informal, face-to-face interactions between staff and visitors function as a form of risk management, more research is needed to understand how both official *and* unofficial, formal *and* informal communication may influence attributions of responsibility for causing and preventing visitor injury. Second, differences in the institutional and legal contexts of park management in New Zealand and the United States raise questions about the generalizability of studies conducted in international locations. Third, while previous research in U.S. parks more closely reflects the proposed research, a limited survey instrument (Rickard et al., 2011) and the reporting of mostly descriptive data (Newman & Chanlongbutra, 2008; Tuler & Golding, 2002) restricts the applicability of these findings. Finally, and perhaps most centrally, none of the studies reviewed consider how both visitors and employees perceive the *causes* of accidents and unintentional injuries in park settings and how such perceptions might be related to perceptions of risk and attributions of responsibility for preventing injury/ensuring safety.

Hypotheses and Research Questions

This study combines psychological concepts utilized to explain causal attribution of accidents with sociological concepts applied to understanding the attribution of responsibility for preventing accidents/ensuring safety to create a mixed-method, multiple case study approach. By using both quantitative and qualitative methods, and through extended visits at three national parks, the approach accounts for both the sociocultural and psychological factors that may predict attributions of responsibility, as well as the contextual nature of these judgments (see Marris, Langford, & O'Riordan, 1998). In so doing, the intent is to provide richer participant accounts, a perspective that has received only limited attention to date in the safety-related literature (Dorn & Brown, 2003). I have divided the attribution-related hypotheses into two sections with respect to the two dependent variables denoted above.

Attribution of responsibility for causing accidents/unintentional injuries

While previous safety science research highlights differences in managers' (tasked with managing risk) versus employees' (tasked with acknowledging management rules while completing a job) perspectives (e.g., Lehane & Stubbs, 2001), I hypothesize that parallel differences may exist between NPS employees (tasked with managing risk) and park visitors (tasked with acknowledging rules while enjoying recreational activities). Formally stated:

H1: Employees' causal attributions of visitor accidents will differ from visitors' causal attributions of accidents.

The second hypothesis builds on the findings of Kouabenan (2002) and DeJoy (1989), in that it poses a relationship between the degree of experience one has in the given activity, such as driving a car, and how one attributes the cause of a hypothetical accident. The rationale is that employees with *more* experience working in national parks will tend to attribute the cause of visitor accidents in a matter that reflects positively on their occupational position in the park. For instance, those with positions most closely related to visitor protection (e.g., law enforcement rangers), or highly involved in SAR operations will be more likely to attribute the cause of visitor accidents to characteristics of the visitor (i.e., internal attributions), rather than place blame on themselves or on aspects of the park environment or infrastructure (i.e., external attributions). I hypothesize:

> ***H2:*** Employees' experience with the context will relate positively to self-defensive attributions of responsibility for causing accidents.

Third, following research on defensive attribution and optimistic bias (e.g., DeJoy, 1989; Shaver, 1970; Walster, 1966), I hypothesize that visitors who report having *more* experience in outdoor settings will be more likely to attribute the cause of a "third person" visitor accident to internal factors (e.g., inadequate preparation, clumsiness) rather than to external factors (e.g., weather, park infrastructure). Formally, I state this hypothesis as:

> ***H3:*** Visitors' experience with the context will relate positively to internal attributions of responsibility for causing accidents.

Next, given limited existing research considering the relationship between causal attribution and (1) sense of place and place attachment; (2) the nature and context of risks encountered in a location; and (3) exposure to different forms of risk- and safety-related communication, I pose the following research questions:

RQ1: How do sense of place and place attachment relate to attributions about the cause of accidents?

RQ2: How do perceptions of controllability, voluntariness, and desirability of park risks relate to attributions of responsibility for the cause of accidents?

RQ3: How does exposure to formal/informal and official/unofficial risk communication relate to attributions of responsibility for the cause of accidents?

Attribution of responsibility for preventing accidents/unintentional injuries

The findings of Tuler and Golding (2002) suggest that visitors who spend the majority of their park visit engaging in frontcountry activities (e.g., visiting indoor exhibits, walking to outdoor attractions) will be more likely to attribute responsibility for preventing accidents to both managers and visitors (i.e., a "shared" responsibility) than to just themselves or to park managers. On the other hand, visitors who spend the majority of their park visit engaging in backcountry activities (e.g., hiking, camping) will be more likely to attribute responsibility for preventing accidents to themselves than to managers or to visitors and managers (see also Rickard et al., 2011). Because participating in these activities entails voluntary exposure to different levels of objective risk, I therefore hypothesize:

H4: Visitors' voluntary risk-taking will relate positively to internal attributions of responsibility for ensuring safety.

The fifth hypothesis is based broadly on the idea that institutional actors may "offload" responsibility for risk management onto individual citizens (Bickerstaff et al., 2008), and that safety, in the context of the National Park Service, may be conceived of as an "individual," rather than a "collective," responsibility (Bickerstaff et al., 2008; Bickerstaff & Walker, 2002; Petts, 2005). More specifically, I draw on the findings of Newman and Chanlongbutra (2008), whose data suggest that NPS managers tend to attribute responsibility for ensuring visitor safety to the park visitor himself, rather than to park officials or elements of the park environment. Formally stated:

H5: Employees will be more likely to report internal attributions of responsibility for ensuring safety than external or shared attributions of responsibility.

Next, I draw from cultural theories of risk, which suggest that perceptions of the "appropriateness" of risk management strategies, as well as notions of accountability and blameworthiness in the event of accidents, can vary widely among individuals and members of organizations (e.g., Douglas, 1990, 1992; Rayner, 1986). More specifically, I also refer to the research of Espiner (1999, 2001), who found attributions of responsibility among park visitors and employees to vary by both individual characteristics and larger group memberships. I hypothesize:

H6: Visitors' attributions of responsibility for ensuring safety will vary by: (1) age; (2) gender; and (3) country of origin.

H7: Employees' attributions of responsibility for ensuring safety will vary by occupational position and level in the agency.

Due to the limitations in previous research linking risk perception and attribution theory (described above), I explore the relationships between attribution of responsibility for preventing injury/ensuring safety and: (1) sense of place and place attachment; (2) the nature and context of the risk; (3) exposure to park risk communication, and; (4) perceived causal attribution with the following research questions:

RQ4: How do sense of place and place attachment relate to attributions of responsibility for preventing accidents?

RQ5: How do attributions of responsibility for safety relate to attributions about the cause of accidents?

RQ6: How do perceptions of controllability, voluntariness, and desirability of park risks relate to attributions of responsibility for preventing accidents?

RQ7: How does exposure to formal/informal and official/unofficial risk communication relate to attributions of responsibility for preventing accidents?

Risk management and cultural theories of risk

To explore cultural theories of risk and perceptions of risk management, I draw upon the work of scholars interested in social construction of risk and accidents (e.g., Green 1997a; Roberts et al., 1995), and research exploring how individuals interpret risk within the context of organizations and institutions (e.g., Bickerstaff et al., 2008; Rayner, 1986; 1993). Because much of this research has been qualitative in nature, employing interviews, participant observation, and ethnomethodological approaches, research questions are more appropriate than hypotheses. I pose the following research questions, with the understanding that respondents will draw upon their values, beliefs, experiences, and so forth in crafting their responses:

RQ8: How do employees understand risk management in relation to the "mission" of the National Park Service?

- ***RQ8a:*** How do formal/informal and official/unofficial communication fit into risk management?
- ***RQ8b:*** What comprises a given park's "safety culture"?

RQ9: According to employees, what are "acceptable" vs. "unacceptable" risks or levels of risk in park settings?

- ***RQ9a:*** How does risk fit into the "experience" of being in a national park?

- ***RQ9b:*** In the context of a national park, what do employees classify as "accidents"?

CHAPTER 3.

METHODS

Description of Cases

Case study approach

Having interacted with the National Park Service (NPS) in various capacities over the past 15 years as a volunteer trail crew member, intern, and backcountry ranger, in following Lofland, Snow, Anderson, and Lofland (2006, p. 9), I decided upon this research by "[starting] where I was." With the assistance of Dr. Sara Newman of the NPS Public Risk Management Program and with funding from the Student Conservation Association (SCA), in 2009 I designed a research program to better understand how both "official" (i.e., from the NPS) and "unofficial" (i.e., non-NPS), as well as "formal" (e.g., scripted) and "informal" (e.g., unscripted) risk and safety information is conveyed to the visiting public at Mount Rainier National Park (MORA). Based on the recommendations I made to the park in 2009, MORA Chief Ranger Chuck Young invited me to return in 2011 to assist park management in learning about the nature of visitor injuries in the last ten years. By compiling and analyzing these data, the management team hoped to better design and implement the park's emergency services programs, as well as to determine how to allocate park resources to enhance prevention efforts in the park. While the quantitative analysis of this data did not constitute the present research, returning to MORA for several months (during January-May 2011) did allow me access to the employees and visitors who became my study participants. (See Appendix A for an abridged version of the MORA visitor injury analysis).

Following a case study approach, in addition to MORA, I selected two other national park units to serve as research sites, Olympic National Park (OLYM) and Delaware Water Gap

National Recreation Area (DEWA). According to Yin (1994) case study approaches garner strength in their ability to use multiple sources of evidence to "[converge] on the same set of facts or findings" (Yin, 1994, p. 78), a positive attribute that is likewise mentioned with regard to mixed method research approaches, as will be described below. Extensive consultation with Dr. Newman and the Chief Rangers from all three sites helped inform the site selection, logistics, and research timeline. Before the start of the research, officials from all three parks had demonstrated an ongoing commitment to NPS safety prevention and risk communication efforts, as well as expressed interest and enthusiasm in participating in research. The study adopted a multiple case, embedded design, meaning that it included multiple cases (i.e., national parks), and within each case, multiple units of investigation (i.e., both park employees and park visitors). To allow for theoretical development, I selected cases that would allow for both literal replication (i.e., case(s) predicted to produce similar results to a comparison case) and theoretical replication (i.e., case(s) predicted to produce contrasting results for predictable reasons) (Yin, 1994). More specifically, the three park units I selected are characterized by known similarities *and* differences with regard to: (1) visitation patterns and levels of visitation, (2) seasonal recreational activities, (3) region of the U.S., climate, and natural hazards; (4) prevalent visitor injuries and causes of injury, and, (5) potential risks (see Table 3.1). For instance, while all three park units are within driving distance of major U.S. metropolitan areas, two are located in the Pacific Northwest region (MORA and OLYM), and a third is in the Northeast/Mid-Atlantic region (DEWA). All three parks employ between 100 and 200 full-time employees, yet the physical size of the park (i.e., acreage) varies. And while all the parks report annual visitor accidents, the *types* of injuries/mortalities (e.g., drowning, falling), as well as the activities associated with them (e.g., swimming, mountaineering) differ considerably. Due to scheduling constraints, data collection occurred during Winter and Spring 2011 at MORA and OLYM and during Summer 2011 at DEWA (see Table 3.2). (Potential limitations of this approach are discussed below and in Chapter 7).

Research settings

Between January and August 2011, I conducted on-site data collection in MORA, OLYM, and DEWA. The descriptions below characterize each site and provide the reader with a brief history of the park unit (see also Table 3.1). Of note, my research period at MORA and OLYM overlapped with the period in which lawmakers debated, and eventually avoided, the potential closure of the U.S. federal government (April 2011), a decision that would have closed all national parks and furloughed all but "essential" NPS employees. Though far from Washington, D.C., MORA employees reacted to the unfolding political discussion with understandable anxiety and apprehension. As an SCA intern, I sat in on park-wide meetings involving discussion of operating plans under a potential federal closure, and was privy to employees' reactions; for me, a government shutdown would have meant an end to visitor recruitment, as well as my paid internship. Fortunately, the averting of the closure "crisis" in the final hours allowed life and work to proceed as usual for me and for most NPS employees.

Table 3.1. Summary Characteristics of Study Sites

	Mount Rainier National Park	Olympic National Park	Delaware Water Gap National Recreation Area
NPS abbreviation	MORA	OLYM	DEWA
Location	Western Cascade Range, WA [~50 miles from Seattle-Tacoma]	Olympic Peninsula, WA [~100 miles from Seattle-Tacoma]	PA/NJ [~100 miles from New York City and Philadelphia]
Park size (2010)[1]	236,381 acres	922,650 acres	66,741 acres
Full-time employees (2006)[2]	184	180	116
Recreational visitors per year (2010)[1]	1,191,754	2,844,563	5,285,761
Popular recreational activities	*Summer:* Day hiking, backpacking, mountaineering *Winter:* Skiing, snowshoeing, "snow play"	*Summer:* Day hiking, backpacking, mountaineering *Winter:* Skiing, snowshoeing, day hiking	*Summer:* Swimming, canoeing/kayaking, day hiking, fishing, backpacking *Winter:* Skiing, hunting
Activities commonly associated with visitor injuries and fatalities	Driving; mountaineering, day hiking, backpacking	Driving; mountaineering, day hiking, backpacking	Driving; swimming
Fatalities per 100,000 visitors[3]	.10	.10	.04
Injuries & illnesses per 100,000 visitors[3]	6.30	3.53	1.91

[1]NPS Public Use Statistics Office (http://www.nature.nps.gov/stats/index.cfm)
[2]S. B. Newman, personal communication, July 2010
[3]Tuler and Golding (2002)

Table 3.2. Overview of Data Collection, 2011

	January-February (Washington)	March-May (Washington)	June-August (Pennsylvania/ New Jersey)
Interviews (employees & volunteers)	MORA	MORA, OLYM	DEWA
Survey recruitment (employees)	MORA, OLYM	------	DEWA
Survey recruitment (visitors)	MORA	MORA, OLYM	DEWA

Mount Rainier National Park. America's fifth national park (established in 1899), located about 50 miles southeast of the Seattle-Tacoma, Washington metropolitan area, MORA is a 236, 381 acre park on the west side of the Cascade Mountains. The mountain itself is a well-known presence in the Pacific Northwest: a majestic backdrop against the Seattle skyline and an iconic image on the state vehicle license plate. A volcanic mountain, Mount Rainier boasts the most extensive single-peak glacial system in the U.S. Ringed by the Tatoosh Mountains, the park is also heavily forested and dotted with alpine streams, lakes, and waterfalls. Whether attempting the summit (elevation 14, 410 ft), camping in the backcountry, or sledding, MORA offers year-round recreational opportunities.

Like most national parks, MORA houses a constellation of natural hazards, unique environmental conditions, and concentrated human activity (Tuler et al., 2002). Since the mountain is an active volcano, the park and surrounding areas are subject to mud flows (lahars), flooding, and earthquakes. Climbing the mountain requires glacier travel and poses high-altitude hazards such as altitude sickness, hypothermia, and fast-changing weather. At lower elevations, visitors may encounter wildlife (e.g., bears, foxes, deer), poisonous plants, and river crossings. Accessing many of the trails and interpretive centers requires driving on narrow, winding roads providing only limited shoulders and distance from obstacles such as large trees. Designated as historic, these roads were designed by landscape architects at the turn of the 20th century to provide spectacular views of the mountain, as Mount Rainier became one of the first national parks allowing visitors a scenic experience without leaving their cars (Louter, 2006). While several entrances around the park perimeter provide visitors road access to MORA, much of the park's interior is accessible only by foot, skis, or snowshoes. From late fall (e.g., November) to early summer (e.g., June), depending on snowfall and road conditions, access to the park is often limited to one road in the southwestern corner of the park, the Nisqually entrance road, approximately five miles from the town of Ashford, WA. Moreover, throughout the winter, park officials often close this road, which leads to the base of the mountain (Paradise, located at 5,400 ft), due to inclement weather and/or avalanche concern.

Olympic National Park. About 100 miles northwest of Seattle, Washington, OLYM is an expansive (922, 650 acre) park situated in the Olympic Peninsula in the northwest corner of the state, bordered by the Pacific Ocean (to the west), the Strait of Juan de Fuca (to the north), and the Puget Sound (to the east). Declared a national park in 1938, OLYM has since earned the distinction of an International Biosphere Reserve and a World Heritage Site. Despite its proximity to urban centers of the state, 95% of OLYM has been designated by Congress as wilderness, bordering only sparsely populated towns and Native American reservations, with few maintained roads running through the park interior.

The park is characterized by a variety of diverse ecosystems: the glaciated sub-alpine environments of the Olympic Mountains, temperate rain forests, hot springs, placid mountain lakes, and rugged coastline. Due to unique patterns of geological and climatic conditions, the park hosts a variety of plants, mammals, amphibians, fish, insects, and mollusks found nowhere else in the world (McNulty, 2009). While winter park visitors are most often found at Hurricane Ridge (elevation 5, 200 ft.) skiing or sledding, others find year-round recreational opportunities camping on the park's remote Pacific coast beaches, or venturing into the dense greenery of the temperate rainforest. Within all of OLYM's ecosystems, visitors may encounter rough terrain, inclement weather, and wildlife, such as deer, bears, or cougars.[6] Like MORA, many park roads close throughout the winter and early spring, and winter access to Hurricane Ridge is limited to a single road from the Heart O' the Hills entrance (approximately 5 miles from Port Angeles, WA) which is often closed due to snow and avalanche concern.

---

[6] Of note, in 2010, an OLYM visitor died on a popular hiking trail from injuries sustained in an attack by a particularly aggressive mountain goat.

Delaware Water Gap National Recreation Area. A much newer addition to the National Park System, DEWA is a smaller park unit (nearly 70,000 acres) straddling the states of New Jersey (NJ) and Pennsylvania (PA) on a roughly 40-mile section of the Middle Delaware River. Following the dissolving of a controversial plan in the 1960s to build a dam on Tocks Island in the Delaware River for flood control and hydroelectric power, the federal government transferred authority over the present DEWA to the NPS in 1978 (Albert, 1987). The "gap" itself is a portion of ridgeline carved out by the eroding action of the river over thousands of years. In close proximity to New York City, Philadelphia, as well as the popular vacation area of the Pocono Mountains (PA), the park borders heavily populated, developed areas, ranging from golfing resorts to farms to single-family homes. As such, one can access the park from a multitude of county roads and semi-maintained rural lanes; unlike at MORA and OLYM, visitors are not shuttled through a centralized park entrance, and accessing most areas of the park is possible by car.

As a "national recreation area," DEWA requires that visitors pay entrance fees only in certain "expanded amenity" areas of the park (e.g., lifeguarded swimming areas), and also permits a wider range of recreational activities, such as hunting and motorized boating, which are often banned in national parks. While day hiking, canoeing, and kayaking are popular activities, a substantial portion of DEWA visitors use the park for picnics, family reunions, or even as a scenic and convenient driving route to New York City. Occupying a landscape in transition, ecosystems in DEWA range from fallow farmland to rural villages, and the historic Appalachian Trail follows about 25 miles of the park's eastern boundary. With its strong currents, slippery rocks, and underwater obstructions, the Delaware River poses the most obvious potential risk to visitors; however, the park also hosts a substantial population of black bears, poisonous snakes, and Lyme disease-carrying ticks. Large mosquito populations also pose the risk of West Nile Virus.

Study Logistics

Study approval

The current study received funding from a Dissertation Improvement Grant from the National Science Foundation (NSF) (Grant No. 1060433). Prior to data collection, I secured approval of the study from multiple entities. All research conducted in national parks requires a research permit, which involves an application process coordinated by each park's division of research. Before applying for permits in MORA, DEWA, and OLYM, I consulted with each of the Chief Rangers to determine acceptable times and locations to carry out date collection. I took this information into account when proposing my research plan, and ultimately received three research permits during Fall 2010. At the same time, I obtained human subjects approval from the Cornell University Institutional Review Board (IRB) (protocol ID #1011001776).

While my internship with the SCA in 2011 allowed me to live and work on-site at MORA for several months, this affiliation with the NPS also led to somewhat challenging circumstances for gaining approval for the visitor research portion of the study. Importantly, I received "support" from the NPS through the use of its resources, such as an apartment to live in, and the research involved posing the same questions to more than seven visitors; therefore, due to the guidelines of the Office of Management and Budget (OMB), the federal office tasked with upholding the Paperwork Reduction Act, my study required additional approval. After extensive consultation with NPS Chief Social Scientist Dr. Bruce Peacock as well as Dr. Newman, however, it was determined that I could collect visitor data (i.e., recruit visitors to take an online survey; see below) during designated "time off" from my SCA internship, such as on weekends. In these instances, as a Cornell University affiliate, I was to receive *no* support (e.g., help with recruiting visitors) from park staff. When contacting park visitors, for instance, I wore a nametag identifying myself as a "Cornell University graduate student" and a Cornell hat or jacket; further, I refrained from wearing or using any paraphernalia with the NPS or SCA logos. All three Chief Rangers were informed of this situation, and I drafted a memorandum of agreement for Chief Ranger Chuck Young to ensure proper documentation.

Though the situation described above represented an acceptable solution, in late 2010 Dr. Newman and I nonetheless decided to pursue OMB approval for the final phase of visitor data collection in DEWA. By securing OMB support, we hoped to afford the study more flexibility and additional resources—namely, the permission to allow NPS-affiliated personnel to contact visitors, and to publicly endorse the research. In June 2011, we received OMB approval, allowing two individuals associated with the volunteer program at DEWA to assist with visitor recruitment during the following two months.

Role of the researcher and "gaining access"

While collecting data, I lived and worked on-site, interacting with Park Service employees in the office, on the trail, and sometimes in the local bar. Through these extended field visits, I not only gathered information specific to this study, but also gained a richer understanding of the general culture of each of the park units. Though MORA, OLYM, and DEWA each belong to the National Park System, individual parks tend to operate idiosyncratically with minor—and sometimes major—differences in structure and management philosophies. Informally, those familiar with the System tend to refer to each park as its own "fiefdom," operating as a discrete unit separate from its NPS neighbors. While some of the differences between parks are made explicit in each park's "enabling legislation"—for instance, the recreational and management distinctions between a “national park” and a “national recreation area”—others are less obvious. To “gain access” (Lofland, Snow, Anderson, & Lofland, 2006) to the employees at each park, I began by asking each Chief Ranger to circulate an introductory email explaining my work to all park staff, and how they might be asked to participate. At all three parks, the Chief Rangers also discussed my research in management meetings and with less senior employees, allowing individuals to ask questions, and to discuss any potential problems or concerns. The Chief Rangers then reported back to me on the content of these meetings, allowing me to answer any questions, and to modify my plans as necessary. Throughout the research period, this continual communication was instrumental in ensuring successful implementation of the study.

At MORA, data collection involved living at the park for a four-month period. My stays at OLYM and DEWA, though less extensive (i.e., several week-long stays at each park), similarly introduced me to both park employees and to the characteristics—codified and noncodified, —of the work setting. Arguably, my knowledge of the Park Service, gleaned from field research conducted for the present study, as well as past summers spent working for the NPS, offered me a valuable “insider status” (Lofland et al., 2006) perhaps allowing for a more nuanced understanding of the sites and people with whom I interacted. Nonetheless, insider or not, my construal of the parks, employees, and visitors I contacted throughout the course of my research remains uniquely my own. As Becker (1996, p. 58) paraphrases Herbert Blumer, “all social scientists, implicitly or explicitly, attribute a point of view and interpretations to the people whose actions we analyze.”

Mixed Method Research

The present study utilized both qualitative interviews and quantitative and qualitative survey questions to explore a series of research questions and hypotheses. While various researchers have taken this approach since the 1950s, in the past decade, interest has grown in applying "mixed methods" within a variety of disciplinary contexts.[7] The following sections define mixed method research in general and explain how it is applied to this study, in particular.

Explanation and justification

Most simply, mixed method research involves one or more of the following three characteristics: (1) the use of two or more *"types" of data*, often, but not always, classified as "qualitative" and "quantitative"; (2) the use of two or more *data collection methods* (e.g., a controlled experiment and interviews); (3) the use of *data analysis methods* not usually associated with a particular type of data (Small, 2011). These "crossover analyses" refer to instances in which "qualitative data are analyzed primarily through formal, mathematical, or statistical techniques or those in which quantitative data are analyzed primarily through narrative techniques" (Small, 2011, p. 72), sometimes called "qualitizing" or "quantitizing" the data. Other mixed method analyses integrate multiple techniques at the same time, such as combining network analysis and conversation analysis to examine interview transcripts. Mixed method studies can vary in *sequencing*, whether different types of data are collected at the same time or sequentially, for various reasons; a popular example involves using one method, such as qualitative interviews, to generate hypotheses, and a second, such as a survey, to test emergent hypotheses. Studies can also be *nested*, in that multiple types of data can be collected from the same actors (e.g., individuals, organizations) (Small, 2011).

By using a mixed method approach, researchers gain a variety of benefits, including comparing or confirming findings, more fully understanding the data, and balancing the weaknesses of different epistemological paradigms (Creswell, 2003; Greene, Caracelli, &

[7] While this methodology has received varied labels (e.g., multimethod, mixed methodology), the term *mixed method* has increasingly gained universal recognition and will be used in this dissertation (Creswell, 2003).

Graham, 1989; Sieber, 1973). According to Small (2011), the most common motivations for conducting a mixed method study fall into two main categories. First, researchers often seek confirmation of their data, and so utilize a triangulation or "convergence" approach to uncover the same information from multiple research methods. Second, other researchers see mixed method approaches as allowing for complementarity*:* the ability of one method to compensate for the weakness of the other, and vice versa, thus allowing for an interpretive "richness" that would be otherwise unavailable (see also Morgan, 2006). Whether seeking confirmation or complementarity, others have praised mixed method approaches as suited to applied research questions. In so doing, they note that mixed methods research are underlined by a "pragmatist" epistemological foundation (e.g., Cherryholmes, 1992; Creswell, 2003; Johnson & Onwuegbuzie, 2004), one that, "[prioritizes] the act of discovery over the justifications for knowledge" (Small, 2011, p. 62).

Mixed method approaches, however, are not without drawbacks. Employing these approaches may also involve more time and resources than single method studies, as well as the challenge of gaining competence in at least two research methods (Creswell, 2003). As the social sciences continue to specialize, including in particular methodologies utilized in different fields and sub-fields, the mixed method researcher may also run the risk of "falling behind" on emerging techniques (Small, 2011). Less obviously, methodologists have pointed out that the commensurability of multiple research methods may be problematic; that is, the epistemological foundations of two methods, views on the nature of knowledge and how it is generated, may actually contradict one another (e.g., Guba & Lincoln, 1994; Morgan, 2006; Small, 2011). For some, the incommensurability of epistemological foundations renders mixed method approaches impracticable; others, however, note simply that mixed method researchers must be able to, "write and think across not only methodological techniques but also epistemological perspectives" (Small, 2011, p. 79).

Application to this study

This study adopted a "concurrent nested strategy" (Creswell, 2003, p. 218), as both qualitative and quantitative data were collected simultaneously during a single phase with an emphasis placed on the survey to visitors and employees (quantitative), and with the interviews (qualitative) serving as the "nested" method. A "complementary" mixed method study, each method focused more directly on one of the main dependent variables to provide an "enriched, elaborated understanding" of the central "phenomenon" of attribution theory and risk management in an applied context (Greene, Caracelli, & Graham, 1989, p. 258). The survey primarily informed hypotheses and research questions related to *causal attribution*—that is, attributions of responsibility for causing accidents/unintentional injuries among park visitors. In-depth interviews, on the other hand, addressed *prevention attribution* (or, attribution of responsibility for ensuring safety), integrating more sociological and cultural theories of risk. Opportunity for triangulation (i.e., confirmation) also existed, as both methods addressed the study's central independent variables, such as the types of risk communication (i.e., official/unofficial, formal/informal) available to park visitors, and the perceived nature/context of park-related risk. Moreover, as discussed below, survey questions addressed both dependent variables, and interviews often included respondents' reflections on their survey responses. By using the concurrent nested strategy, I hoped to increase my breadth of perspective on a complex issue, as I combined the data from both methods. Unfortunately, little guidance exists in the literature on just how to transform the data, or resolve potential discrepancies between the two data types (Creswell, 2003), a potential limitation that will be discussed below.

Survey

The goal of the survey, which was distributed to both visitors and park employees/volunteers, was to test hypotheses 1-7 by examining the statistical relationships using two main dependent variables, (1) causal attribution, and (2) prevention attribution, and several independent variables, such as: experience in a park context, perceptions of park-related risk, and exposure to park communication. The survey also provided insight into research questions 1-7. Below, I describe the survey, including its format, items, and implementation.[8]

Measurement

Consisting of both closed and open-ended items, the survey was conducted online and existed in two forms: (1) for employees and volunteers, and (2) for visitors. Throughout the research period (February-August 2011), Cornell University Survey Research Institute (SRI) provided technical support in the form of programming the online survey, providing web hosting, and coordinating the logistics of the survey process (e.g., sending email invitations and follow-up reminders to survey respondents, compiling survey responses, etc.).

I gathered data in the following broad areas: (1) exposure to/reliance on communication related to the park; (2) demographic characteristics, including traveling companions; (3) recreational activity involvement in the park; (4) experience at the park and in other park settings; (5) perceptions of park-related risk (and/or safety); (6) causal attribution (i.e., attribution of responsibility for causing accidents); (7) perceptions of risk management and prevention attribution (i.e., attribution of responsibility for preventing visitor accidents/ ensuring safety). In the descriptions of the measures for the key variables that follow, I distinguish between question

[8] It deserves mention that some respondents, after taking the online survey, emailed additional comments. While not formally analyzed, such comments were taken into consideration when interpreting survey results, including both closed and open-ended questions.

sets delivered to just one or both of the groups. (See Appendix B for a copy of the specific survey instrument).

Exposure to/reliance on risk communication (visitors only). Based on Rickard et al. (2011)'s conception of potential risk communication sources and the idea of "information channel reliance" (Griffin, Dunwoody, & Zabala, 1998), visitors were asked to indicate the extent to which they received information related to the park from particular sources, including official/unofficial and formal/informal: not at all, very little, some, a lot, or not applicable (see Table 3.3). Using the same response categories (excluding the "not applicable" category), an additional item asked visitors to indicate which topics they received information about: (1) park hazards (e.g., wildlife, drowning); (2) park regulations (e.g., swimming or boating restrictions); (3) weather conditions; and (4) road conditions/closures.

Table 3.3 Typology of Visitor Information Sources Presented in Survey

	Official (NPS)	Unofficial (non-NPS)
Formal (Scripted)	• NPS Interpretive program • NPS brochures • NPS website • Signs, exhibits, movies • Traveler Information Systems (AM radio station)	• Guidebooks (e.g., hiking guide) • Printed information in local chamber of commerce, private business, or visitor center outside of the park.
Informal (Unscripted)	• Interacting with NPS staff (e.g., rangers)	• Interacting with climbing guides, boating guides, or other recreational trip leaders. • Interacting with staff at restaurants, gift shops, or hotels in the park. • Interacting with other park visitors, family members, or friends.

Visit companions (visitors only). Based on Tuler and Golding (2002) and Rickard et al. (2011), one question asked respondents to describe their group as one of the following: (1) family members; (2) friends; (3) organized tour group, or; (4) "other." A second question asked respondents to record the amount of people in their group falling into particular age groups, including: (1) number of children 5 or under; (2) number of children ages 6-12; (3) number of children ages 13-17; (3) number of adults 18-65; (4) number of adults older than 65.

Recreational activities (visitors only). With the help of the Chief Rangers and by reviewing each park unit's website and relevant brochures, I compiled a list of 16 common recreational activities that visitors engage in at each park unit throughout the year. I first analyzed how the activities grouped via an exploratory factor analysis (varimax rotation). Results of the factor analysis indicated that mountaineering, rock climbing, skiing/snowboarding, and backpacking in the backcountry loaded onto a single factor, and this loading also aligned with the "high risk" classification of recreational activities used by Rickard et al. (2011); participation in "high risk" recreational activities was thus used as a predictor variable throughout the analysis.

In addition to measuring the "riskiness" of the recreational activities, I also gauged the visitors' self-reported *preparedness* for participating in the activity in which they spend the most time; using a five-point Likert scale, a single item asked visitors to indicate how prepared they felt for participating in this activity, from "not at all prepared" to "completely prepared." A second, open-ended item asked respondents to explain why they had described their preparedness as such.

Experience at park(s). To gauge experience, I measured three related items: *frequency* (i.e., number of visits to the park and to all national parks), *impact* (i.e., the extent to which the experience of being in a national park impacted the participant's life), and *outcome* (i.e., whether the experience was positive or negative) (Barnett & Breakwell, 2001). To measure impact and outcome, I used a five-point semantic differential scale and asked respondents to describe their experiences at the park with three sets of antonyms: (1) *unremarkable/remarkable*; (2) *negative/positive*, and; (3) *easy to forget/unforgettable*. Additionally, for visitors who reported participating in more than one recreational activity, one survey item asked them to indicate which activity was the most *memorable*.

Park experience also included measures of *sense of place*. Items pertaining to place meaning were informed by Davenport et al. (2000), as well as by an informal review of the messages contained in official/formal park communication in each of the three parks; eight items were measured on a 5-point Likert scale, from strongly disagree to strongly agree. The items comprising place attachment were adapted from Stedman (2002), and included 7 items also measured on the same 5-point Likert scale. All of the items described above were modified to fit the park that the respondent had visited; for example, a DEWA visitor received an item stating "*Delaware Water Gap National Recreation Area* means a lot to me" whereas an OLYM visitor would have seen "*Olympic National Park* means a lot to me."

Perception of park-related risk. To measure perception of park-related risk, items covered the following sub-areas:

- *Desirability* of park-related risk (Machlis & Rosa, 1998): Using a 5-point Likert scale ranging from "not at all important" to "extremely important," respondents indicated the importance of five different reasons for being in the park, including: (1) to take risks; (2) to experience thrills; (3) to have an adventure; (4) to be challenged; (5) to experience excitement.
- Perceived *controllability* and *voluntariness* of park-related risk (Slovic, 1987): Visitors chose a number along a 5-point semantic differential scale best reflecting their opinion of six opposing statements (e.g., "People **cannot control** whether or not they are harmed by the hazards they face in Mount Rainier National Park/People **can control** whether or not they are harmed by the hazards they face in Mount Rainier National Park).

Causal attribution. To explore attributions of responsibility for *causing* accidents, I presented participants with a brief narrative, formatted as a newspaper press release, describing a hypothetical visitor accident. After reviewing accounts of actual park visitor accidents,[9] I wrote two separate scenarios adapting information from these incidents, while withholding any personally identifiable information (see Appendix B for the wording of these scenarios). In order to increase the degree of perceived personal and situational similarity with the hypothetical victim (Burger, 1981), respondents received the narrative based on which recreational activities they had participated in at the park. Specifically, all park employees and volunteers and visitors who reported participating in at least one “non-guided” activity (i.e., biking, mountaineering, technical rock-climbing/bouldering, horseback riding, day hiking, backpacking, skiing or snowboarding) received the narrative in which a visitor embarks on a solo backpacking trip. A second “group” of visitor survey respondents were those who reported participating in at least one of the following activities, many of which are “guided” and/or more highly regulated/overseen in each of the park units:

- Visiting a visitor center, permitting office, or museum
- Attending a ranger-led program or hike
- Camping in a designated campground
- Playing in the snow, sledding, or snowshoeing
- Riding a snowmobile
- Hunting or fishing
- Swimming

---

[9] Dr. Newman provided a selection of brief narratives describing visitor injuries/mortalities that had taken place in a variety of NPS park units over the past 10 years. I also consulted the NPS Morning Report (http://www.morningreport.nps.gov), which provides, among other information, a daily review of reported visitor accidents submitted by Chief Rangers and Information Officers throughout the Park System.

- Motorized or non-motorized boating

These individuals received a narrative in which the visitor falls while taking part in a guided interpretive hike. After reading the narrative, respondents were asked to indicate whether a similar incident had ever happened to them or to a person they know. Both narratives described activities common in a national park setting (e.g., hiking, taking photographs), and did not include recreational pastimes pursue by a smaller, more selective group of visitors (e.g., ice climbing, mountaineering). Across both scenarios, several variables were held constant, including: (1) Name, sex, age, and place of residence of the hypothetical victim (i.e., Roger Ellison, 35, of Bozeman, MT), (2) Date, time, and location of the incident (i.e., the afternoon of October 17 in Yellowstone National Park) and; (2) degree of physical consequences of the accident (Burger, 1981) (i.e., the victim's described injuries, which included a concussion, bruised ribs, and a wrist fracture).

Both narratives were also written to be purposefully "ambiguous" in that they were intended to elicit a variety of potential internal and external causes for the visitor accident (see Menon, Morris, Chiu, & Hong, 1999); this was verified through pre-testing (see below). After reading the narrative, the respondent was asked to describe what caused the accident by: (1) responding to a free-response question (i.e., "What do you think caused this incident?") and (2) indicating the importance of several potential causal factors (e.g., "Mr. Ellison's excessive risk-taking") using a 5-point Likert scale ranging from "not at all important" to "extremely important."

Perceptions of risk management. To explore prevention attribution, I adapted five items from Espiner's (1999; 2001) "individual responsibility for safety" scale (e.g., "While visitors are at the park, their safety is the responsibility of those who manage the area.") Two items about NPS (external) and visitor (internal) responsibility drew from Tuler and Golding (2002) (e.g., "Besides providing appropriate safety information and warnings, the National Park Service should not limit or prohibit activities that may pose serious risks to the participants.") All items were measured on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree."

Demographics. I measured the following demographic variables across all respondents:

- Sex
- Education (i.e., highest level of formal education completed)
- U.S. residence (including state and/or country of residence)
- Race/ethnicity
- Native language
- Age

In addition, employees received questions measuring the following:

- Status (seasonal or permanent)
- Park division (e.g., Maintenance, Natural and Cultural Resources, etc.)
- Length of time employed by park
- Length of time employed by the NPS

Volunteers were asked to provide a description of their volunteer work at the park.

Pre-testing

Prior to distributing the survey to NPS employees/volunteers and visitors, I conducted several types of pre-tests to ensure the validity of the research instrument. First, during Fall 2010, I gathered a group of undergraduate students familiar with risk communication research to comment on a set of proposed visitor accident scenarios. Each student read the narratives, answered the corresponding questions as if she were taking the survey, and then reacted to a number of additional questions meant to clarify potential issues of misinterpretation, such as, “Please describe anything confusing about this question.” Based on each student’s written feedback, as well as group discussion, I chose the narratives that elicited the widest range of interpretations and causal attributions (i.e., both internal and external). In addition, in order to determine how long the survey would take, as well as the types of answers elicited, I administered the survey to a Cornell undergraduate risk communication class. By doing so, I uncovered several instances of unclear wording, and also decided to shorten the survey length. Finally, prior to releasing the final version of the survey, the questions were reviewed once more by a group of Cornell University professors and graduate students. These individuals responded to the survey in its online format, thus allowing them to make additional comments about the visual layout of the questions on the screen, as well as other “mechanical” concerns.

Survey sampling

For NPS employees, the sampling frame included all employees working at the park during the study timeframe (approximately 100-150 employees at each site; see Table 3.1). All NPS employees receive an email address and are able to access this account at home and from their job sites. I obtained the complete list of current employees at each park from the NPS website (http://www.nps.gov) and also checked this list with each park’s Chief Ranger to ensure that entries were up-to-date. It is important to note that seasonal employees are sometimes furloughed during slower visiting seasons, such as in the winter; in these periods, they often cannot access their NPS email accounts. Therefore, by default, the sampling frame represented individuals who were both currently employed by the park and also actively working during the research period. Unlike employees, NPS volunteers do not uniformly receive government email addresses. Thus, due to the limited availability of volunteer contact information in OLYM and DEWA, the volunteer sample was limited to individuals associated with MORA. With the help of the park’s

Volunteer Coordinator,[10] I obtained a spreadsheet that listed individuals who had recently volunteered at MORA. Due to the large number of individuals in this population, I limited my sampling frame to those who had volunteered in the last two fiscal years. (See Appendices C, D, and E for the letters describing the study disseminated to employees at all three park units).

Sampling park visitors presented a unique set of challenges. Like most park volunteers, park visitors do not share "standardized" contact information that is publicly available, such as an NPS-issued email addresses, and thus cannot be sampled systematically from a particular "frame." Following the precedent of NPS visitor use studies conducted in the past several decades (see Dillman, Dolsen, & Machlis, 1995; Dillman, Smyth, & Christian, 2009), I chose to contact visitors face-to-face at park locations such as fee collection stations and outside of visitor centers (see Table 3.4), selected after consultation with each park's Chief Ranger to represent a popular visitation area in the current season. At each of these locations, I had hoped to randomly select days of the week and times of day (e.g., 2-4 pm) to recruit visitors; however, as I soon found out, various logistical challenges made a truly random sampling pattern both inefficient and ultimately untenable for the study period. My sampling strategy, thus, proceeded as follows: In order to capture the most visitors, at all three parks, recruitment took place almost exclusively on Fridays, Saturdays, and Sundays, with the exception of two Monday holidays, President's Day and the 4th of July. When possible, I also chose days with favorable weather (e.g., no rain or heavy snow), as I learned from my discussions with park staff and personal experience that visitation patterns vary broadly depending on the forecast.[11] Moreover, since the majority of the

---

[10] It is worth noting that MORA's Volunteer Coordinator, a Cornell University alumnus, enthusiastically endorsed this study, going so far as to post an entry on the MORA Volunteer Program blog, a news and information resource read by many of the park's dedicated volunteers, describing the research and encouraging individuals to participate. This situation may help explain, in part, the relatively high survey response rate among the volunteers.

[11] For instance, employees at MORA routinely "predicted" the day's visitation by the status of the sky—more specifically, whether Mount Rainier was visible from the Seattle/Tacoma metropolitan areas. As one backcountry

recruitment sites offered limited indoor shelter, I also planned my exposure to the elements—bitter cold and rain in OLYM and MORA, heat and humidity at DEWA—as strategically as possible. Unfortunately, at MORA and OLYM in particular, my efforts to contact visitors at particular locations and certain times of day were often hampered by road closures, often due to snowfall and avalanche hazard.

When visitor recruitment was possible, I contacted one person out of each visitor group passing by a pre-determined landmark (e.g., a sign or set of stairs). When at a park entrance or area with a fee station attendant, I attempted to contact each incoming car within a pre-determined time period (e.g., 11 am to 2 pm) *before* the visitors stopped to pay the park fee. A few exceptions included:

- If a visitor group consisted of multiple cars (i.e., a caravan); in these cases, I recorded information from the first car only. (When unsure, I asked the driver of the second car whether s/he was part of the group in the first car).
- If the vehicle had a government license plate, or the driver identified him/herself as an NPS employee or concessions employee (e.g., river guide, lifeguard).
- If the vehicle was an NPS visitor bus or another commercial bus transporting visitors (e.g., for river or mountaineering trips).

Upon contacting a visitor group, I used the following introduction or close variant:

> Good Morning/Good Afternoon!
> I am a student surveying park visitors. I am gathering information to help improve your experience at [**Park name**]. I'm asking that you [**addressing car driver or, if group is on foot, first member of group that approaches**] fill out an online survey when you get home. What I would need is a first name and email address. This information will only be used to email you a link to a survey. If you complete the survey, you'll have a chance to win [**incentive—REI gift card or gas card**].

ranger told me, the mountain acts "like a billboard" to attract city dwellers to the nearby park (where, ironically, skies are often cloudier).

- May I have your first name and email address? [*Record information; if refuses, record reason given*].
- Where is your group from? [*Record information; in case of refusal, record license plate state.*]

Thank you for your time! Have a great day!

I then handed the individual a postcard with photographs of park scenery, a brief advertisement of the study, and my contact information, similar to what has been done in other visitor surveys conducted by the NPS (Dillman et al., 2009), and might be considered a "foot-in-the-door" technique. In other words, I asked potential respondents to comply with a relatively small request (i.e., to share their email address as well as basic demographic information) under the assumption that they would be more likely to comply with a larger request (i.e., to fill out an online survey) in the future (Dillman et al., 2009). (See Appendix F for a sample recruitment postcard). As I spoke with each group, I also recorded the number of people, including adults and children under age 18. In the case of a refusal to participate in the study (i.e., not agreeing to provide an email address), I recorded the instance, as well as any reason given. While not all individuals who refused to participate shared a reason for their decision, some of the most common reasons mentioned included:

- **No email access:** This category of response included not having an email address, not having access to a computer, not "liking" to use email, having email/computer access only at work (where, presumably, filling out an online survey would have been impossible and/or inappropriate), and not being able to remember one's email address. While I did not ask visitors to disclose their ages, informal observation suggests that many—though certainly not all—of these individuals were among the older individuals in the sample (e.g., 65 and above) (See below for a discussion of the benefits and drawbacks of Internet surveys).

- **Prefer not to share email address:** Respondents in this category expressed concern about providing their email addresses; despite my explanation otherwise, some stated concern about being on “mailing lists” or being required to share personal information.
- **In a hurry:** Respondents in this category expressed that they were in a rush to meet someone, join up with a recreational tour group, etc. and did not have time to give out their information. For example, many guided canoe, kayak, and rafting trips departed from Smithfield Beach (DEWA), where I was stopping vehicles, and participating individuals needed to meet the trip leader at a pre-established time.
- **Not interested:** These respondents shared a variety of explanations for why they preferred not to participate in the study, including that they felt it would be too much trouble, that they “weren’t interested” in the subject, or that they “never fill out surveys.” Many provided a nondescript statement such as “I’ll pass” or “No thanks.”
- **Language barrier:** These respondents either expressed directly that they did not feel comfortable speaking in English, or indicated in some other fashion that they could not participate. Notably, some sites at DEWA, such as Smithfield Beach and Kittatinny Point Visitor Center, attract a considerable Hispanic/Latino visitor population. In most cases, at least one individual in such visitor groups (often younger in age) was comfortable conversing in English and could help translate for the rest of the group. In a few situations, I interjected words or a short explanation in Spanish to help facilitate understanding.
- **Just driving through:** At some of the park entrance sites, I encountered visitors who did not plan to spend time in the park, but rather were just driving through, or hoping to turn around. While some of them appeared to be lost (i.e., the park was not their intended

destination), others seemed to be disappointed that they would need to pay an entrance fee and decided to turn around.

Across all three sites, rates of compliance (i.e., agreeing to give one's email address) ranged from a low of 80% at Smithfield Beach (DEWA) to a high of 100% at Hurricane Ridge (OLYM), with an average of 89% across sites (see Table 3.5).

Table 3.4. Overview of Visitor Recruitment Sites by Park

Study Site	Location of Site	Description of Site	Dates (2011)
Paradise	MORA	Located at 5,400 ft, the highest point in the park accessible by road in the winter. Access to skiing, "snow play," snowshoeing, and hiking. Visitor center open on weekends; guided snowshoe walks available.	February 12
Nisqually entrance	MORA	Park entrance located in the southwestern corner of the park near the town of Ashford, WA; only accessible park entrance during the winter (entrance fee required).	• Feb. 18 • Feb.19 • Feb. 20 • March 7 • March 19 • April 8 • April 17
Hurricane Ridge	OLYM	Located at 5,200 ft, the highest point in the park accessible by road in the winter. Access to skiing, snow play (children 8 and under only), snowshoeing, and hiking. Visitor center open 7 days/week.	March 24
Heart o' the Hills entrance	OLYM	Park entrance located in the northeastern corner of the park near the town of Port Angeles, WA (entrance fee required).	• March 25 • March 26 • March 27 • April 3 • April 23
Smithfield Beach	DEWA	Lifeguarded beach in PA; popular picnic and swimming site, as well as boat launch (entrance fee required).	• July 2 • July 3 • July 4
Turtle Beach	DEWA	Lifeguarded beach in NJ; new swimming area established in 2010 (entrance fee required).	August 7
Milford Beach	DEWA	Lifeguarded beach in PA; popular picnic and swimming site, as well as boat launch (entrance fee required).	• July 16 • July 17 • August 6
Dingmans Falls visitor center	DEWA	Visitor center in PA, adjacent to boardwalk access to Dingmans Falls; guided interpretive walks offered in Summer and Fall.	• July 16 • July 17 • August 6
Kittatinny Point visitor center	DEWA	Visitor center in PA, located just off of Interstate 80. Popular picnic and boat launch area; no swimming allowed due to hazardous river conditions.	August 7

Table 3.5. Compliance Rates Across Visitor Recruitment Sites

Study Site	Park	Average Compliance Rate[1]
Paradise	MORA	94%
Nisqually entrance	MORA	91%
MORA OVERALL		93%
Hurricane Ridge	OLYM	100%
Heart o' the Hills entrance	OLYM	90%
OLYM OVERALL		95%
Smithfield Beach	DEWA	80%
Turtle Beach	DEWA	87%
Milford Beach	DEWA	87%
Dingmans Falls Visitor Center	DEWA	90%
Kittatinny Point Visitor Center	DEWA	87%
DEWA OVERALL		86%
AVERAGE OF ALL SITES (MORA, OLYM, and DEWA)		89%

[1] Number of acceptances (i.e., individuals who give an email address)/total number of contacts made during a given recruitment interval (e.g., Saturday, 2-4 pm at the Nisqually Entrance). Note that a "contact" corresponds to a visitor *group*, which could range in size from one to several individuals; only one email address was obtained per group.

Survey logistics

SRI contacted all potential survey respondents (i.e., visitors and employees/volunteers) by email with an introductory message that included a link to the survey and a unique ID number. Throughout the study period, those who did not respond to the survey received up to two email reminders, sent at two-week intervals (see Appendices G and H). Upon completing the survey, respondents were offered the chance to enter a random drawing for an incentive. After consultation with the Chief Rangers, these incentives included a gift card to REI, a popular outdoor clothing and gear outfitter in the Pacific Northwest, for OLYM and MORA respondents, and a gas card for DEWA respondents. In an attempt to boost the DEWA visitor response rate, in late August 2011, I offered an additional incentive—a $10 Amazon.com gift card to the first 50 individuals to complete the survey in a one-week timeframe (see Appendix I). Survey data collection ended on September 13, 2011, after which point the survey was no longer available to potential respondents.

Response rate and non-response bias

In total, 1,106 respondents (visitor, employees, and volunteers) completed the survey out of a possible 2, 262 with valid email addresses, yielding a response rate of 48.89% (see Tables 3.6 and 3.7). Additionally, 81 participants started the survey, answered at least one question, but did not complete it. These partially completed cases are also included as part of the final dataset. In the case of visitors, comparisons between several characteristics of respondents and non-respondents at each of the three parks allowed for a measure of non-response bias (see Table 3.6). Specifically, results indicated that, within each of the three parks, non-respondents were no more likely than respondents to reside in the U.S. (versus a foreign country) or to be from one of the states closest to the park (i.e., Washington or Oregon for MORA and OLYM and New York, New Jersey, or Pennsylvania for DEWA); however, in all three of the parks, non-respondents did seem, on average, to have a smaller group size than respondents. While this difference may, in fact, exist, it is also important to note that, due to a shortage of time, in some cases I relied on an estimate of a party's group size, such as by glancing in a vehicle window. It is possible that this method may have introduced error (e.g., consider tinted windows) and that I may have under-estimated actual group sizes for non-respondents. Because of this, and due to the challenges to establishing a random sampling method for park visitors (see above), it is important to exercise caution when generalizing the results of the survey to populations beyond those sampled, such as other visitors to MORA, OLYM, or DEWA, or to other national park units. Chapter 4 provides an overview of visitor demographics (e.g., age, sex, level of formal education achieved, etc.) and compares these characteristics to those observed in other studies of NPS visitors.

Table 3.6. Visitor Respondents vs. Non-Respondents: Sample Characteristics

	Reside in U.S.	Group Size	% From local states	% Surveyed at park location					Response Rate[1]
DEWA Respondents (*n* = 191)	98% (*n* = 188)	*M* = 4.82, *SD* = 5.07	83% (*n* = 128) NY, NJ, PA	Dingman 39% (*n* = 74)	Kittatinny 3% (*n* = 6)	Milford 23% (*n* = 44)	Smithfield 24% (*n* = 46)	Turtle .5% (*n* =1)	39%
DEWA Non-respondents (*n* = 298)	99% (*n* = 294)	*M* = 3.09, *SD* = 1.71	82% (*n* = 243) NY, NJ, PA	Dingman 15% (*n* =44)	Kittatinny 4% (*n* =11)	Milford 23% (*n* = 68)	Smithfield 57% (*n* = 170)	Turtle 2% (*n* = 5)	-------
Sample Differences	χ^2 (489, 1) = .04, p = .84, *ns*	t(193.69) = -5.39, **p = .000**	χ^2 (489, 1) = .11, p = .74, *ns*						
OLYM Respondents (*n* = 171)	96% (*n* = 164)	*M* = 3.70, *SD* = 4.60	84% (*n* = 143) WA, OR	Heart o' the Hills 96% (*n* = 165)		Hurricane Ridge 4% (*n* = 6)			61%
OLYM Non-respondents (*n* =111)	96% (*n* =105)	*M* = 2.40, *SD* = 1.55	88% (*n* = 97) WA, OR	Heart o' the Hills 96% (*n*= 106)		Hurricane Ridge 5% (*n* = 5)			-------
Sample Differences	χ^2 (281, 1) = .03, p = .86, *ns*	t(218.18) = -3.28, **p = .001**	χ^2 (281, 1) = 1.11, p = .29, *ns*						
MORA Respondents (*n* = 411)	99% (*n* = 405)	*M*= 4.46, *SD* = 4.98	88% (*n* = 361) WA, OR	Nisqually Entrance 84% (n= 345)		Paradise 16% (*n* = 66)			58%
MORA Non-respondents (*n* = 292)	99.7% (*n* = 291)	*M* = 3.15, *SD*= 2.36	89% (*n* = 259) WA, OR	Nisqually Entrance 94% (*n* = 274)		Paradise 6% (*n* = 18)			-------
Sample Differences	χ^2 (702, 1) = 1.55, p = .21, *ns*	t(590.1) = -4.58, **p = .000**	χ^2 (702, 1) = .07, p = .79, *ns*						

[1]Survey respondents/ Total number of visitors contacted at the park.

Table 3.7. Employee Response Rate

	Employee Respondents	Employee Non-respondents[1]	Response Rate
DEWA	*n* = 66	*n* = 60	52%
OLYM	*n* =85	*n* = 130	40%
MORA[2]	*n* = 100	*n* = 163	38%

[1]In some cases, employees were not able to receive the email such as in the following scenarios: (1) having moved to a different park; (2) no email access due to seasonal status; (3) no longer affiliated with the NPS.
[2]Volunteer response rate for MORA= 163/238= 68%

Benefits and drawbacks of Internet surveys

Choosing to disseminate the survey on the Internet, rather than through a more traditional mail, telephone, or face-to-face channel, offered several benefits. Most simply, Internet surveys are efficient, in that once respondents provide information, the data is stored in electronic form, thus eliminating the need to digitize spoken or hand-written responses. The flexibility of the online interface also allows for complex question "branching patterns," user interactivity, experimental conditions, and graphical design that would be difficult to implement in paper-and-pencil formats (Couper & Miller, 2008; Sexton, Miller, & Dietsch, 2011). With postage and paper eliminated, the online format usually provides significant savings for researchers, as costs are reduced to programming and web hosting (Kaplowitz, Hadlock, & Levine, 2004); implementation is also simplified, as the researcher can send survey invitations and reminders quickly via email (Vaske, 2011). Similarly, with the proliferation of Internet-equipped smart phones, laptops, and tablets, online surveys can be expedient for many respondents, allowing them to complete the survey at their convenience, and saving them the trouble of visiting a post office.

Despite these benefits, scholars have been quick to point to potential drawbacks of Internet-based surveys. A primary argument *against* using Internet surveys centers on the concept of sample validity, or the representativeness of the sample elicited to the general population studied (e.g., Baxter & Babbie, 2003; Couper & Miller, 2008; Duda & Nobile, 2010). As Duda and Nobile (2010) note, the equivalent of random-digit dialing, a method of ensuring a representative sample of the general public, does not exist for email addresses. For those without access to computers or broadband Internet—or for individuals less comfortable with using this technology—completing an Internet survey can be challenging, or even impossible. As populations without Internet access and/or technological proficiency tend to fall into particular demographic groups (e.g., older, lower SES, rural residents) some researchers warn that Internet surveys can pose possible threats to validity by eliciting non-representative samples (e.g., Graefe, Mowen, Covelli, & Trauntvein, 2011; Smyth, Dillman, Christian, & O'Neill, 2010; Vaske, 2011). Unfortunately, "weighting" the sample to counteract these deficiencies has not proven successful in empirical studies (e.g., Duda & Nobile, 2010; Vaske, Jacobs, Sijtsma, & Beaman, 2011). Similarly, online surveys posted without security controls, and/or on "public" websites introduce self-selection bias, as individuals with a vested interest in a topic may be compelled to complete the survey, or even to complete the survey multiple times (i.e., "poll-crashing"); without an identifying mechanism, such as a unique ID number assigned to each survey respondent, researchers will be unable to determine whether a given individual may have "posed" as another, and thus skewed the results (Duda & Nobile, 2010).

Other arguments against the use of Internet surveys point to the quantity and quality of the elicited results. Many researchers have reported that Internet surveys tend to produce poorer response rates than mailed surveys (e.g., Baxter & Babbie, 2003; Lesser, Yang, & Newton, 2011; Petchenik & Watermolen, 2011), especially if not paired with an additional contact, such as a pre-survey mailed invitation (Kaplowitz et al., 2004). When compared to a face-to-face survey format, others suggest that the online format may increase the degree of "satisficing" apparent in the data, such as an upsurge in non-response items and "don't know" responses, and less differentiation on scaled items (Heerwegh & Loosveldt, 2008).

With these drawbacks in mind, I designed the Internet survey methodology to counteract as many potential weaknesses as possible. These design characteristics included the following:

Secure survey and unique ID number. Hosted by SRI on a secure website, the survey was accessible only to individuals who had been contacted. In his or her email invitation to take the survey, each respondent received a unique number (e.g., see Sexton, Miller, & Dietsch, 2011). This number was then used to "track" the respondent, and could be linked to demographic variables recorded at the time of recruitment, such as the size of the individual's group, and where s/he was from; subsequently, I used this information to measure non-response bias (see Duda & Nobile, 2010) (see above).

Tracking refusals. When recruiting visitors, I recorded the number of individuals who refused to provide an email address; at the same time, I kept track of reasons provided, such as that the individual did not possess a computer and/or have Internet access. This information was then used to measure non-response bias, as well as to gauge the validity of the sample (see above).

Complete employee sampling frame. As explained above, the sampling frame used for employees represented individuals who were both currently employed by the park and also actively working during the research period.

Pre-survey notification. Both visitors and employees received some form of notification about the study prior to receiving the survey invitation. While I spoke with many park employees throughout the study period, all individuals received an email introducing the nature of my survey and other activities I would be involved in at the park. Upon contacting each park visitor at the recruitment locations, I handed each individual an attractive postcard with my contact information and a brief description of the study. While impossible to verify, it is possible that this face-to-face contact or "in person appeal" (Dillman et al., 2009), as well as the visible affiliation with Cornell University, bolstered the study's credibility, encouraging visitors to respond to the survey, as well as decreasing "satisficing" in the data (Heerwegh & Loosveldt, 2008).

Completion incentive. While Dillman et al. (2010) suggest that a token cash incentive, delivered with a pre-survey mail contact, can encourage subsequent online survey completion, my study offered an incentive upon completion of the survey (i.e., entry into a lottery to win a gift certificate).[12] I used my experience in each park, as well as input from the Chief Rangers, to select incentives most likely to appeal to the majority of visitors at each park.

Survey data analysis

The survey data were analyzed in SPSS Statistics (version 19.0) using both descriptive and inferential statistical approaches, such as t-tests, bivariate correlations, comparison of means, Chi-square analysis, and OLS regression.

In addition, several survey free-response questions were used in the analysis of the study hypotheses and research questions:

- [In response to respondent's self-reported level of preparedness for participating in an activity] *Why did you answer this way?*
- [In response to the visitor accident narrative] *What do you think caused this incident?*

[12] Based on anecdotal feedback received from park visitors, for some, the postcard served as an incentive as well. Several individuals commented on the attractiveness of the photographs, and some even asked for multiple copies (conceivably to use as souvenirs of their trip).

- [At the end of the survey] *Is there anything else you'd like us to know? Use this space for comments, feedback, etc.*

I chose to analyze these data based on a qualitative, grounded theory-based approach (Glaser & Strauss, 1967), which I explain in more depth with respect to coding interview data, below.

Interviews

To explore cultural theories of risk and perceptions of risk management, which relate to research questions 8 and 9, I conducted qualitative, in-depth interviews with NPS employees and volunteers. Rather than repeat the questions posed in the survey, these sessions provided an avenue to understanding additional dimensions of the interplay between attribution and risk perception theory, as it pertains to risk management in national parks. Moreover, providing participants the chance to respond to open-ended questions allowed for deeper understanding of topics that may otherwise have been overlooked in the survey.

Interview format

Between February and July 2011, I conducted in-depth interviews with a total of 57 employees and volunteers at MORA, OLYM, and DEWA. Interviews ranged from 14 to 85 minutes, with an average of 39 minutes. Most interviews took place at the respondent's place of work (e.g., an office or public meeting space within the park headquarters building) or private residence, though a small number (n =3) were conducted via telephone due to travel and scheduling constraints. While most individuals were interviewed one-on-one, a few respondents elected to be interviewed with another individual present. In these instances, the second individual represented a colleague (or in one case, a spouse) with a similar job description, and both individuals contributed equally to the conversation.

As Fontana and Frey (2000) point out, referring to a method simply as “interviewing” can be misleading, as interviews can exist in an array of formats, lengths, and even epistemological bases. For instance, the researcher may abide strictly by a prescribed set of questions, or may choose to follow an interviewee’s comment that, from a more “objectivist” perspective, might appear tangential. My interviews followed a semi-structured form, as I wished to shape the discussion towards my research interests (as outlined broadly in the interview guide), but remain flexible enough to adequately respond to respondents’ interpretations of ideas and events. Each interview explored several topical areas in similar depth (Rubin & Rubin, 1995), including (but not limited to): (1) biographical information about the respondent (e.g., his/her job description, tenure with NPS, etc.); (2) opinions on how to attribute responsibility for visitor safety (e.g., perception of the park’s role in keeping visitors safe, perception of the word “accident” with respect to park settings); (3) the nature and role of risk in national parks (e.g., the acceptability of certain risks in parks; the types of risks identified in their park); (4) communication in the park (e.g., ways in which visitors receive information, including risk information, and how information sources or channels might be changed/improved, etc); and (5) sense of place (e.g., the role of “wilderness” in park settings). I obtained voluntary informed consent to record each interview to ensure accurate data collection.

Depending on the interviewee’s job and background, certain topical areas became more or less relevant; therefore, I modified the questions and probes to best complement the participant’s biography. In the words of Rubin and Rubin (1995), the interview format often followed a “river and channel” approach; I followed alternative directions or “channels” as appropriate, based on “markers” (Weiss, 1994) I perceived as referring to “important events or feeling states” (Weiss, 1994, p. 77). While the interview topics tended to follow a particular pattern, since I attempted to follow the arc of the conversation, not all interviewees received questions in the same order. At the beginning of an interview, whenever appropriate, I referred to my past experiences volunteering, visiting, and working in national parks, so as to indicate my familiarity with the context. Likewise, my attempts at "small talk" often involved references to current events in the park, such as a road closure, a search and rescue event, or a bout of particularly inclement weather, so as to "ground" our conversation on mutually-recognized terms (see Weiss, 1994). (See Appendices J and K for the interview protocol and interview informed consent form).

Following each interview, a debriefing discussion allowed respondents to react to the experience, which often included asking questions about the study and my research interests more generally (Sieber, 1998). On my own, I also followed Lofland et al.'s (2006) advice to record my reaction to each interview, including how I felt psychologically after the experience, and my overall perception of the interaction. I revisited these "journal entries" when analyzing the interviews in order to paint a more complete picture of the data in the context of the social interaction.

Interview sampling

In addition to interviewing the individuals in management positions (e.g., Superintendent, Chief Ranger, Division Chief) at each park, I also consulted with each park's Chief Ranger for their recommendations of individuals whose job descriptions and/or history with the park (or NPS more generally) would allow them to comment on issues of visitor safety, communication, and risk management. In so doing, I encouraged each Chief Ranger to suggest individuals across park divisions and levels of tenure with the agency. In this regard, individuals were *purposively* (rather than randomly) selected based on their attributes and job experiences. I contacted potential respondents by email, phone, or face-to-face, and invited them to take part in an interview. In some cases, after being interviewed, respondents recommended additional individuals to contact, comprising a "snowball sampling" approach (Lofland et al., 2006). The resulting set of interview respondents represented an assortment of job descriptions and levels of experience with Park Service, ranging from approximately 1 year at NPS to over 40 years in the agency, with a mean and mode of 17 years.

In general, most researchers (qualitative or otherwise) are encouraged to study the largest samples possible (e.g., Mayring, 2007); in determining the number of interviews to conduct, however, I relied on principles of grounded theory (Glaser & Strauss, 1967). First, in each park, I conducted interviews until certain themes were repeated across multiple interviews, so-called "theoretical saturation" (Glaser & Strauss, 1967). Second, in order to ensure that these emergent themes were not simply a product of a certain "type" of NPS employee (e.g., holding a particular job position or tenure at the agency), I attempted to search for "disconfirming cases"—in particular, individuals who might have reason to express different opinions on the subject of the interview. A central tenet of the grounded theory approach, the search for disconfirming cases (as well as "maximized differences") (Glaser & Strauss, 1967) strengthens the validity of a qualitative study by allowing the researcher to "assess whether it is more plausible to retain or modify the conclusion, being aware of all of the pressures to ignore data that do not fit [the] conclusions" (Maxwell, 1996, p. 93). As Maxwell (1996) further explains, while quantitative researchers can employ tactics *before* the research begins to ensure the validity of the data (e.g., control groups, randomized sampling, etc.), qualitative researchers "must try to rule out most validity threats after the research has begun, using evidence collected during the research itself to make these alternative hypotheses implausible" (1996, p. 88).

Table 3.8. Generalized Job Descriptions of Interviewees by Park[1]

	MORA	OLYM	DEWA	TOTAL
Interpretation	*n* = 5	*n* = 3	*n* = 3	***n* = 11**
• Interpretive ranger • Exhibit/information design • Fee collection				
Maintenance	*n* = 1	---	*n* = 1	***n* = 2**
• Road maintenance • Grounds maintenance				
Natural & Cultural Resources	*n* = 3	*n* = 2	*n* =2	***n* = 7**
• Geologist • Wildlife biologist • Research coordinator • Natural resources program manager				
Occupational Health & Safety	*n* = 1	*n* = 1	*n* = 2	***n* = 4**
• Safety Officer • Water safety/lifeguard program				
Park Management	*n* = 4	*n* = 2	*n* = 4	***n* = 10**
• Chief Ranger • Superintendent/Deputy Superintendent • Division Chief				
Protection	*n* = 6	*n* = 3	*n* = 5	***n* = 14**
• Law enforcement ranger • Dispatch				
Public Affairs	---	*n* = 1	*n* = 1	***n* = 2**
• Public Affairs Officer • Volunteer Coordinator				
Trails and Wilderness	---	*n* = 2	*n* = 1	***n* = 3**
• Backcountry ranger • Wildland fire coordinator • Wilderness planner				
Volunteer	*n* = 4	----	----	***n* = 4**
• Volunteer backcountry ranger • Volunteer park photographer				
TOTAL	***n* = 24**	***n* = 14**	***n* = 19**	***n* = 57**

[1]Job description categories are mutually exclusive; each individual was assigned to only one category, even in instances of potential overlap.

Interview data analysis

I analyzed interview transcripts broadly following Glaser and Strauss' (1967) grounded theory approach, in that I began the interview portion of the project with general research questions, yet allowed the most salient themes to emerge throughout the data collection and analysis process. I attempted to follow the "constant comparative method" by analyzing my data as I conducted the research, and refined my interview guide to follow emerging areas of interest. I coded transcripts "line-by-line" Charmaz (2002) and, whenever possible, applied "in-vivo" codes (i.e., in the words of the interviewees) rather than codes pre-defined by my terminology, or supplied by the academic literature. After first coding by hand, I subsequently used Atlas.ti, one of several software packages used by qualitative researchers to analyze interview data. Using this program, I imported typed transcripts of the interviews, as well as the typed survey free-responses and coded each electronically. In the process, I re-assessed (in some cases, changing) the codes I had previously developed and recorded by hand. Using the software functions, I then merged and compiled quotations applying to each code, later exporting the created document into word processing software.

One minor deviation from line-by-line coding in the analysis process deserves mention. When coding interviewees' responses to the question "What is an accident?" I referred to Kouabenan (1998), who categorized his respondents' "naïve" definitions of an accident according to whether the emphasis was placed on one or more of the following:

- Causes or elements of the accident.
- Consequences of the accident.
- Circumstances of the accident.
- The nature of the accident or an example of an accident.
- Characterization of the accident.

- A fatalistic definition.
- A simplistic or off-hand judgment.

Since Kouabenan's (1998) sample, predominantly male citizens of the African Ivory Coast, many of whom held fatalistic beliefs, differed considerably from mine, I did not assume that such categories would necessarily be salient in the context of this study; therefore, rather than adopt them outright for use in this research, I instead relied on them as organizational "heuristics," useful for clarifying my interpretations of the data.

Validity and generalizability

Both Maxwell (1996) and Lofland et al. (2006) advise that researchers conduct "member checks" to increase the validity of qualitative findings. Although I did not formally check the full extent of my findings with all interview respondents, some elements were discussed informally and elaborated upon with NPS employees following the interviews. Moreover, while in the office, or during social events, my findings sometimes became the topic of informal conversation with park employees and volunteers. Whenever possible, I took this feedback into consideration as I approached my analysis. Such instances align with Trochim's (2006) suggestion that qualitative research should strive for "credibility"—the idea that findings should be viewed as credible in the eyes of the informants.

In considering the generalizability of the qualitative results, two additional concepts proposed by Trochim (2006) deserve mention. First, in order for qualitative research to be "transferable"—a concept loosely comparable to the quantitative concept of replicability—Trochim suggests that researchers keep readers abreast of the assumptions they have made, as well as the characteristics of the research context; this information, in turn, lets readers decide whether or not the results might be generalized to other settings and populations. More specifically, for qualitative research to be “dependable,” another one of Trochim’s terms, the researcher must account for (rather than ignore or suppress) attributes of the context in which it occurs—characteristics that may be dynamic rather than stable. In terms of this dissertation, several characteristics of the research context deserve mention, as they may influence efforts to generalize the findings more broadly, such as to other national park units. As will be discussed more in Chapter 7, the timing of the research, i.e., that it took place in winter/spring at two of the parks (MORA and OLYM), and during the summer at another (DEWA), may have influenced the types of visitors included in the survey sample, as well as the employees (e.g., number of seasonal employees vs. year-round employees on site). While I attempted to sample employees and volunteers broadly, it is possible that the research window at each park limited my access to a more diverse group of those willing and available to talk. Another aspect of the research context included the ambient political atmosphere, which can be critical to the functioning of a federal agency like the NPS. With the threat of a government shutdown looming, March and April 2011 represented particularly volatile months in the two national parks in which I worked (MORA and OLYM); it is possible that the anxiety and concern felt by many—for the future of their jobs, as well as that of the agency overall—may have influenced how employees in my sample responded to the interview questions.

Interpreting qualitative and quantitative data

The combination of qualitative and quantitative data took place in the final, interpretive phase of the research, and this combining took multiple forms. First, after analyzing the closed-ended (i.e., quantitative) questions, survey free-response (i.e., qualitative) questions were analyzed and compared to the quantitative results in order to shed more light upon the research questions and hypotheses. For instance, as will be discussed in Chapter 4, I explain the unexpected factor loadings of place meaning items on the survey with respondents' references to (and explanations of) sense of place in their free responses. The comparison of loadings from exploratory factor analysis with emergent interview themes follows Creswell's (2003) conception of "data transformation." In this sense, the qualitative survey data served to clarify and to suggest a potential meaning of the quantitative data. Second, during the interpretive phase I also compared the qualitative interview data with the quantitative and qualitative survey data. I purposively selected interview topics to overlap with the material presented on the survey, providing opportunity for triangulation. Interviewees' descriptions of the definition of an accident, as well as how they conceived of assigning causal responsibility, were compared to the causal attributions for the hypothetical accident (reported in the survey) as well as free-response explanations of the event. Moreover, interviewees often referred to the survey, including the hypothetical visitor accident scenario, in responding to interview questions; in these cases, I encouraged them to explain how they interpreted the scenario, including what made them answer the way they did. While Chapters 4, 5, and 6 each report on survey or interview data, in the final chapter (Chapter 7), I attempt to weave together findings from both of the methods in order to suggest larger themes and implications. Finally, the "nested" structure of this dissertation allowed for the examination of central phenomena (e.g., attribution of responsibility, perception of risk, etc.) at multiple levels (Creswell, 2003); the interviews with employees and volunteers provided opportunities to examine specific instances of more generalized concepts presented in the survey (e.g., visitor injuries/accidents), and among a distinct population.

As discussed earlier in this chapter, one potential drawback of mixed method research is the possibility that results gleaned from one "phase" or method will contradict those emerging from another. While this dissertation allowed ample opportunities for triangulation, it also relied on a primary method to answer questions related to a main dependent variable—that is, the survey emphasized causal attribution (i.e., attribution of responsibility for causing accidents), while the interviews emphasized prevention attribution (i.e., attribution of responsibility for preventing accidents/ensuring safety). Therefore, in many cases, answering research questions and hypotheses posed meant drawing most directly from one method. In the case that an "inconsistency" occurred, I attempted to explain the potential reasons for incompatible results, similar to what Tashakkori and Teddlie (1998, p. 70) refer to as an "inferential consistency audit." As Chapter 7 explains, for example, survey data would seem to suggest that employees see visitors as predominantly responsible for their own safety when in national parks; however, when interviewed, many employees emphasized the important role that they and their colleagues play in ensuring visitor safety. As I explain, in this case, the interview may have allowed and encouraged employees to express a more nuanced opinion; while many *do* tend to view visitors as more responsible than themselves and other NPS employees, they nonetheless recognize and respect the joint role that they play in preventing visitor injuries and accidents. Moreover, these opinions may have also reflected the specific job title and responsibilities of the respondents, which the survey data suggests may predict differences in attributions of responsibility.

CHAPTER 4.

ATTRIBUTION OF RESPONSIBILITY FOR CAUSING ACCIDENTS

Description of the Sample

Visitors

Of the visitors to the three park units (DEWA, *n* = 191; MORA; *n* = 411; OLYM, *n* = 171; total *n* = 773) who completed the survey, the majority were male (64%), U.S. residents (98%), White/Caucasian (88%) and highly educated; roughly one third of the sample (31%) reported completing a four-year college degree as the highest formal education level achieved, whereas almost forty percent (37%) reported completing post-graduate work (see Tables 4.1 and 4.2). Visitors' ages ranged from 19 to 87 (*M* = 46.56, *SD* = 13.42) and they hailed from 31 of the 50 U.S. states, with the five most-represented states reflecting the geographical location of the three park units: Washington (60%), New Jersey (8%), Pennsylvania (6%), New York (4%), and Oregon (2%). Though a substantial majority of visitors reported speaking English as a native language (92%), in addition to Spanish (2%), 19 additional first languages were reported, including Bengali, Punjabi, Turkish, and Korean. Because the NPS does not collect information on the demographic characteristics of its general visiting public, including age, sex, or race/ethnicity, the extent to which the survey sample is representative of the larger national park-visiting public remains somewhat unclear. In a recent random-digit dial phone survey of the American public (i.e., national park visitors and non-park visitors) gauging support for national park entrance fees, however, Ostergren, Solop, and Hagen (2005) found that, of the individuals reporting that they had visited an NPS park unit in the previous 24 months, 89% described themselves as White (including Hispanic), 53% were between the ages of 35-59, and 31% had completed a college degree. The clear similarities between the demographic characteristics of

Ostergren et al.'s (2005) sample and the present sample provide some evidence that the visitors who completed the online survey can be considered representative of the larger visiting public.

When asked about their traveling companions, visitors described their group sizes as ranging from one to 50 individuals (including themselves) (M = 4.37, SD = 4.92). Of these groups:

- 13% (n = 99) included at least one child age 5 or under.
- 20% (n = 149) included at least one child between the ages of 6-12.
- 15% (n = 112) included at least one child between the ages of 13-17.

The majority of visitors described their groups as comprised of family members (60%), but another third of the sample (30%) also reported having friends in their traveling group. A small minority of visitors (2%) reported being part of an organized tour group. Almost half of the visitors (48%) reported spending more than 4 hours in the park on their most recent visit, and 43% had been to the park between two and five times (including the most recent visit) in the last year. When asked how many other national parks they had visited (besides the surveyed park), visitors gave answers ranging from zero to 200 (M = 15.26, SD = 21.14).

During their most recent visit to the surveyed park, visitors reported engaging in a range of activities, including (in decreasing order of prevalence):

- Going to a visitor center, permitting office, or museum (60% of respondents, n = 456)
- Playing in the snow, sledding, or snowshoeing (57%, n = 432)
- Day hiking (43%, n = 322)
- Skiing or snowboarding (14%, n = 109)
- Swimming (11%, n = 82)
- Camping in an NPS campground (9%, n = 67)
- Mountaineering (9%, n = 67)

- Non-motorized boating (9%, n = 65)
- Attending a ranger-led program or hike (8%, n = 63)
- Backpacking in the backcountry (8%, n = 60)
- Biking (5%, n = 35)
- Fishing or hunting (4%, n = 32)
- Rock climbing (2%, n = 13)
- Motorized boating (2%, n = 11)
- Horseback riding (1%, n = 10)
- Snowmobiling (.1%, n = 1)

When asked to indicate the single activity that they spent the most time engaged in at the park, the most visitors reported playing in the snow (including sledding or snowshoeing) (34% of all respondents, n = 189), followed by day hiking (23%, n = 127), and skiing or snowboarding (9%, n = 48). Likewise, about a third of all visitors (31%, n = 118) described day hiking as their most *memorable* activity at the park, with about a quarter (24%, n = 94) choosing playing in the snow, and ten percent (n = 38) reporting skiing or snowboarding. Because visitors in two out of the three park units (i.e., MORA and OLYM) were surveyed during the winter or early spring, the overall prevalence of snow-related recreational activities, as well as the salience of these activities to visitors in this sample, is unsurprising. Upon rating their level of preparedness on a scale of 1-5 for their most memorable activity, the majority of respondents ranked themselves as "completely prepared" (53%, n = 395), compared to a very small minority who perceived themselves as "not at all prepared" (.7%, n = 5); mean preparedness was 4.33 (SD = .84). (See below for further discussion on visitor preparedness).

Table 4.1. Formal Education Level of Survey Respondents

	N (%) ALL EMPLOYEES (*n* = 251)	N (%) ALL VOLUNTEERS (*n* = 163)	N (%) ALL VISITORS (*n* = 773)
Less than high school	0 (0%)	0 (0%)	3 (.4%)
High school graduate	14 (6%)	2 (1%)	34 (5%)
Trade or technical school	8 (3%)	6 (4%)	31 (4%)
Some college	36 (15%)	14 (9%)	84 (12%)
2 year college graduate	22 (9%)	13 (8%)	80 (11%)
4 year college graduate	94 (38%)	40 (26%)	215 (31%)
Post-graduate work	71 (29%)	79 (51%)	257 (37%)
Mean education[1]	*M*= 5.58 (*SD*= 1.42)	*M*= 6.08, *SD*= 1.23)	*M*= 5.67, *SD*= 1.46)

[1]Measured on a 7-point scale, where 1= "less than high school"; 2= "high school graduate"; 3= "trade or technical school"; 4= "some college"; 5= "2-year college graduate"; 6= "4-year college graduate; and 7= "post graduate work."

Table 4.2. Race/Ethnicity of Survey Respondents

	N (%) ALL EMPLOYEES (*n* = 251)	N (%) ALL VOLUNTEERS (*n* = 163)	N (%) ALL VISITORS (*n* = 773)
White/Caucasian	222 (92%)	137 (91%)	615 (88%)
Black/African American	1 (.4%)	0 (0%)	0 (0%)
Asian	2 (.8%)	6 (4.0%)	40 (6%)
American Indian or Alaska native	4 (2%)	2 (1%)	3 (.4%)
Native Hawaiian or other Pacific Islander	0 (0%)	0 (0%)	1 (.1%)
Hispanic or Latino	3 (1%)	2 (1%)	26 (4%)
Other (including multi-ethnic and/or multi-racial)	10 (4%)	4 (3%)	15 (2%)

Employees

The NPS employee survey respondents (*n* = 251) were predominantly male (58%), White/Caucasian (92%), and 4-year college graduates (38%). The vast majority spoke English as a first language (99%), and age ranged from 22 to 70 years old (*M* = 47.02, *SD* = 11.29). While most respondents (86%) worked at the park year-round, as opposed to on a seasonal basis, the division in which individuals were employed varied. For the purposes of this analysis, I coded respondents' self-reported park division affiliations into five general categories (presented in decreasing order of prevalence):

- **Visitor and Resource Protection**: positions involving law enforcement, communications/dispatch, and fee collection inside the park (29%, *n* = 67).
- **Administration:** positions in, for instance, the Superintendent's Office, human resources technology support, and planning and program management (22%, *n* = 49).
- **Maintenance and Trails**: positions that might include utility work, management of sewage/septic systems, building maintenance, and road/trail construction and maintenance (20%, *n* = 46).
- **Natural and Cultural Resources:** positions in, for instance, biological and geological research, wildlife management, archaeology, and fire management (18%, *n* = 40).
- **Interpretation and Education:** positions related to interpretive programming in the park, and/or community outreach and the volunteer program (11%, *n* = 26).

(See Table 4.3 for example position titles). Employees reported having worked in the park between less than a year and 44 years (*M* = 11.19, *SD* = 9.65), and in the NPS more broadly between less than a year and 52 years (*M* = 15.86, *SD* =10.58).

Table 4.3. Example Park Employee Position Titles by Category

	Example park staff position
Visitor and Resource Protection	• Law enforcement ranger • Backcountry ranger • Dispatcher • Entrance fee collector
Administration	• Budget Officer • Superintendent • Concessions Management
Maintenance and Trails	• Trail crew • Snow removal crew • Electrician
Natural and Cultural Resources	• Geologist • Plant re-vegetation team • Landscape architect
Interpretation and Education	• Interpretive Ranger • Volunteer Coordinator • Public Information Officer

Volunteers

As described in Chapter 3, volunteer respondents were recruited only from MORA. Of these individuals (*n* = 163), the majority were male (53%), White/Caucasian (91%), and had completed post-graduate work (51%). Almost all reported English as a first language (98%). Age ranged widely, from 20 to 87 years old (*M* = 55.91, *SD* = 15.11). Similar to the categorization process described above, I coded volunteers' self-reported work descriptions into three broad categories (presented in order of prevalence; note that not all individuals provided a description of their duties):

- **Visitor and Resource Protection:** positions involving assisting park staff with visitor safety efforts (e.g., search and rescue) and/or in enforcing park regulations (64%, *n* = 87).
- **Interpretation and Education:** positions related to interpretive programming in the park, and/or working with school children (21%, *n* = 30).

- **Natural and Cultural Resources:** positions involving assisting park staff with biological or cultural research in the park, such as citizen science efforts to catalogue flora and fauna (14%, n = 21).

(See Table 4.4 for example volunteer tasks in each of these categories). Volunteers reported having volunteered for an average of about five years in the surveyed park (M = 4.68, SD = 5.59) and five years with the NPS more generally (M = 5.09, SD = 6.02).

Table 4.4. Example Volunteer Tasks by Category

	Example volunteer task
Natural and Cultural Resources	• Participant in a citizen science project (e.g., amphibian survey) • Seed collection; re-vegetation • Historical re-enactment • Photography, videography
Interpretation and Education	• Participates in the NPS "Teacher-Ranger-Teacher" program • Leads interpretive walks/hikes or other programs • Staffs the Wilderness Information Center
Visitor and Resource Protection	• Meadow Rover • Nordic ski patrol/snowshoe patrol • Campground host • Search and rescue participant • Offers roadside assistance for visitor vehicles

Hypothesis 1: Causal Attributions of Employees vs. Visitors

Measurement

H1 stated that employees' causal attributions of visitor accidents would differ from those of visitors. Addressing this hypothesis involved analyzing respondents' causal attributions related to a hypothetical scenario in which a visitor is injured while recreating in a national park. As explained in Chapter 3, all employees and volunteers received one version of the scenario (Hellroaring Creek); visitors, on the other hand, received *either* the Hellroaring Creek *or* the Mammoth Hot Springs scenario, depending on which activity (or activities) they reported participating in during their most recent park visit. Because of this design, the majority of respondents, including visitors, employees, and volunteers, read and responded to the

Hellroaring Creek scenario (*n* = 856), as compared to those who read the Mammoth Hot Springs scenario (*n* = 289, *visitors only*). Though respondents answered the same set of survey questions across both scenarios, as explained in Chapter 3, the scenarios varied in their description of the circumstances leading to the hypothetical victim's injury; whereas "Roger Ellison" was taking part in a solo, three-day backpacking trip in the Hellroaring Creek scenario, he was a member of a NPS ranger-led one-mile nature walk in the Mammoth Hot Springs scenario. Despite these distinctions, for two identified causal factors presented to survey respondents, I found no differences in mean response by scenario with regard to: (1) challenging environmental conditions at the park (e.g., uneven terrain) (q17a); and (2) lack of park rules, or lack of enforcement of existing park rules (q17c). For the six additional causal factors presented as potentially contributing to Ellison's injury, however, differences existed in responses between individuals who read one or the other scenario. These factors included: (1) lack of safety infrastructure ($t(1097) = -3.01$, $p = .003$); (2) poor decisions or actions of park employees ($t(396.38) = -3.57$, $p = .000$); (3) Mr. Ellison's excessive risk-taking ($t(387.40) = 19.35$, $p = .000$); (4) Mr. Ellison's unpreparedness for the activity ($t(1094) = 3.85$, $p = .000$); (5) Mr. Ellison's overestimation of his abilities ($t(381.27) = 8.86$, $p = .000$) and; (6) Bad luck, fate, chance, etc. ($t(478.39) = -8.4$, $p = .000$).

As shown in Table 4.5, a comparison in means between those who read the Hellroaring Creek scenario and those who read the Mammoth Hot Springs scenario sheds some light on all survey respondents' interpretation of the hypothetical circumstances provided. First, comparing visitors, employees, and volunteers who read the Hellroaring Creek scenario, a significant post-hoc comparison of means (utilizing Hochberg's GT2 test to account for unequal sample sizes) revealed significant differences in means among these three groups on two items: (1) seeing the accident as the result of challenging environmental conditions, and (2) seeing the accident as the result of bad luck. More specifically, employees were significantly more likely than volunteers ($p = .035$) or visitors ($p = .000$) to rate challenging conditions as an important cause of the accident. On the other hand, visitors were more likely than employees ($p = .003$) and volunteers were more likely than employees ($p = .035$) to rate bad luck as an important causal factor.

Comparing all survey respondents, those who read about Mr. Ellison as a member of a guided hike in the Mammoth Hot Springs scenario were *more* likely than those who read the Hellroaring Creek scenario to view lack of safety infrastructure, NPS employee actions, and bad luck as contributing to Mr. Ellison's incident. On the other hand, compared to the Mammoth Hot Springs readers, those who read about Mr. Ellison as a solo backpacker engaged in nature photography in the Hellroaring Creek scenario were *more* likely to view the visitor's incident as precipitated by his excessive risk taking, unpreparedness, and overestimation of his abilities. As will be discussed further in the sections below, respondents' comments on a free-response question further clarified these distinctions between the scenarios, with Hellroaring Creek recipients tending to view Mr. Ellison as irresponsible, and risking his safety by hiking alone. Interestingly, although the scenario did not specify whether or not Mr. Ellison had left the established park trail, many respondents inferred that the visitor had, in fact, gone off-trail to photograph a plant. In turn, these respondents tended to see Ellison as consciously ignoring established rules in order to achieve a desired end. Free-response comments from Mammoth Hot Springs readers were more likely to characterize Roger Ellison as the victim of bad luck, or to question the responsibility of the park ranger to warn visitors about potential hazards on the hike. Based on these observed differences in interpretation, in order to best compare employees' and visitors' causal attributions, in the analyses that follow, I exclude visitors who had received the

Mammoth scenario. Cases in which Mammoth Hot Springs readers are included, however, will be indicated in the text.

Table 4.5. Comparison of Means for Causal Attribution Variables: Employees, Volunteers, and Visitors

		Challenging conditions	Safety Infrastruct.	Park Rules	Employee Actions	Visitor Risk-Taking	Unprepared	Overest. Abilities	Bad Luck
Employees	Mean	3.87	1.86	1.70	1.41	4.06	3.56	4.12	2.55
	N	246	243	244	241	243	242	244	240
	Std. Dev.	1.13	1.02	.96	.84	1.07	1.19	1.01	1.37
Volunteers	Mean	3.55	1.85	1.66	1.31	4.07	3.27	3.95	2.91
	N	159	159	158	159	160	157	159	159
	Std. Dev.	1.23	1.05	.96	.63	1.09	1.26	1.11	1.32
Visitors	Mean	3.36	1.81	1.71	1.35	4.03	3.39	3.99	2.92
(*HellroaringC*	N	440	437	437	434	440	437	438	438
***reek*)**	Std. Dev.	1.26	1.08	1.06	.78	1.42	1.32	1.18	1.42
Visitors	Mean	3.67	2.05	1.63	1.58	2.37	3.07	3.22	3.58
(*Mammoth*	N	260	260	259	260	260	260	259	259
***Hot Springs*)**	Std. Dev.	1.09	1.05	.89	.86	1.26	1.35	1.31	1.23

A factor analysis (varimax rotation) of the eight causal attribution variables linked to the scenario (i.e., q17a- q17h) suggested that the items loaded on three distinct factors. The first factor related to characteristics of the hypothetical victim, Roger Ellison, including his: (1) overestimation of ability, (2) unpreparedness, and (3) excessive risk-taking; together, these factor loadings created an Internal (Park Visitor) Causal Attribution Scale (Cronbach's alpha = .83). The second factor, by comparison, appeared to describe external causes that were, more specifically, characteristics of park management, and items loading highly on this factor included: (1) lack of park rules, (2) lack of safety infrastructure, and (3) poor decisions/actions of park employees. Together, the factor loadings of these three items became the External (NPS)

Causal Attribution Scale (Cronbach's alpha = .84) (see Table 4.6). Similar to the second factor, a third factor appeared to describe external or situational characteristics, including challenging environmental conditions (q17a) and bad luck (q17h); however, the low alpha obtained by combining these items (α = .16) indicated that they measured different constructs, and so, in the analyses that follow, they are analyzed as separate outcome variables.

Table 4.6. Internal Causal Attribution and External Causal Attribution Scales

Scale	Cronbach's alpha
Internal (Park Visitor) Causal Attribution	.83
Mr. Ellison's over-estimation of his abilities	
Mr. Ellison's unpreparedness for the activity	
Mr. Ellison's excessive risk-taking	
External (NPS) Causal Attribution	.84
Lack of park rules, or lack of enforcement of existing park rules	
Lack of park safety infrastructure (e.g., guard rails)	
Poor decisions or actions of park employees	

External causal factors

Park management. On average, visitors and park employees rated external causes related to park management (i.e., lack of park rules, lack of safety infrastructure, poor decisions/actions of park employees) at about the same level of importance in contributing to Mr. Ellison's injury (employees: M = 4.93, SD = 2.37; visitors: M = 4.84, SD = 2.61); this difference was not significant: $t(921)= -.73$, $p >.05$.

Based on the analysis of the open-ended question following the scenario, some individuals who mentioned park management qualified their answers by explaining that they needed additional information about whether the visitor had strayed from a park-maintained trail. In these circumstances, causal responsibility appeared dependent on the location of Ellison: on or off-trail. For instance:

- I need more information about the trail. I'm not sure if Roger was off-trail or not when snapping the photos. If the trail was, indeed, that close to the waterfall, I would hope there were guard rails or hazard signs posted **(Employee, OLYM**).[13]

- What is unclear is if he was off the established trail boundaries, if there were any warning signs regarding the danger of being that close to the waterfall and if there were any guardrails, etc. If none of these elements were present, the part has neglected their responsibility to educate and warn park visitors of hazards. If there elements were present and Ellison proceeded anyway, the responsibility is solely his own (**Volunteer, MORA**).

- The responsibility may or may not be shared between the park and the hiker depending on the specifics of the situation. Was the hiker ON the trail when he fell? If so, was this a frontcountry trail where a person would have an expectation of wide, smooth surfaces and guardrails next to steep drop offs? Or was this a primitive way trail, where one should expect less trail refinement, and greater skills needed by the hiker? Or did the hiker leave the trail? What information was provided by park employees? What information was available in park literature and bulletin boards? Was the trail maintained to standard for that particular type of trail? Was there ice on the trail?... Etc, etc, etc (**Employee, OLYM**).

Other respondents expressed ambivalence about the appropriateness of safety interventions in national park settings. Though recognizing the importance of routing trails away from known hazards, such as cliffs, or installing guard rails, some respondents also expressed wanting to limit infrastructure in order to preserve the undeveloped "wildness" of park settings. Quotations exemplifying this apparent tension between recognizing safety risks and appreciating wilderness included:

- …If it seems that this is some kind of 'turn out' that hikers are likely to step out on, it might be worth putting up a sign. However, such signs destroy the naturalness of the area. It's often a trade-off. It's hard to tell from this whether a guard rail would have been appropriate there or not (**Employee, DEWA).**

- Were signs posted? (Generally signs bother me as they detract from the natural beauty and people should be able to use common sense) (**Visitor, OLYM**).

[13] Unless otherwise noted, this and all other quotations are from individuals who responded to the Hellroaring Creek scenario.

Challenging environmental conditions. On average, employees viewed challenging environmental conditions at the park (an external causal attribution) as a more important factor in causing Mr. Ellison's injury (M = 3.87, SD = 1.13) than did visitors (M = 3.36, SD = 1.26). This difference was significant (t(556.08) = 5.27, p = .000).

Based on the qualitative analysis of open-ended survey responses, those who mentioned environmental conditions as causal factors appeared to fixate on the details provided in the narrative, such as the slippery rock surface, the trail topography, and the (assumed, but not specified in the scenario wording) wet weather. For example:

- Hazardous unpredictable conditions in a natural environment. Even if you are on established hiking trail, conditions such as rain/snow can make it hazardous (**Visitor, MORA**).
- Something as natural as moss or a wet rock can be perilous (**Visitor, DEWA**).
- Unstable (in this case, wet, slippery rock) area (**Employee, MORA**).
- Obviously the terrain itself (wet conditions, cliff face) and gravity is a factor (**Employee, DEWA**).
- The combination of slippery footing and water is UNFORGIVING (**Volunteer, MORA**).

As these quotations suggest, respondents pointed out that such physical conditions—irrespective of the behavior of Mr. Ellison or the NPS—could alone contribute to the incident.

Bad luck. On average, visitors saw "bad luck" (including "chance" or "fate") as a more important causal factor (M = 2.92, SD = 1.42) than did employees (M = 2.55 SD = 1.37). This difference was significant (t(676) = -3.30, p = .001).

Analyzing respondents' open-ended survey responses allows for insight into how both visitors *and* employees conceptualized bad luck as a causal factor. While some respondents referred directly to bad luck in their responses, others invoked the general view that "accidents happen," suggesting that events like the one described can—and will continue—to occur, regardless of any party's best intentions and preventative efforts. Moreover, in many of these responses, individuals seemed to indicate that accidents will happen irrespective of the surrounding environment—whether a paved road or a backcountry trail. Representative quotations include the following:

- Accidents happen. That's why they're called accidents! When you are in the backcountry there is no way to prevent every situation. Slips, falls, etc. cannot all be avoided (**Visitor, MORA**).
- This just sounds like an unfortunate accident where nothing (i.e. signs, railings, etc.) could have prevented it. Mr. Ellison was not out of bounds and appears to have not been doing anything wrong (**Visitor, MORA**).
- There are just times when accidents happen. When trails are built no one can anticipate every contortion a hiker will go through to get the perfect picture. I think the hiker leaned forward too far and when he slipped on the rock, there was no way to stop his forward momentum (**Volunteer, MORA**).

In addition, for some, perceiving this scenario as nothing more than an unfortunate "accident" meant the inability to assign responsibility for its cause. As one MORA volunteer summed up, "To me, this was just an accident and no one factor was to blame."

Internal causal factors

On average, employees saw internal causes (i.e., overestimation of ability, unpreparedness, and excessive risk-taking) as more important (M = 11.73, SD = 2.79) than visitors did (M = 11.40, SD = 3.11) in contributing to Mr. Ellison's injury; this difference was significant: $t(509.39) = 6.08$, $p < .05$.

An analysis of responses to the open-ended survey question provides further illustration of how respondents characterized internal causes. After coding all responses for examples that could be classified as internal causal factors, I further divided these factors into ten additional themes (see Table 4.7). In general, these ten themes fell into two main groups. Group one, which I refer to as "visitor attributes," included reasoning that related causes of the incident to characteristics of Roger Ellison. More specifically, respondents referred to the scenario protagonist as:

- Being “stupid” or being “ignorant” of park conditions.
- Lacking common sense about how to behave, given the physical surroundings.
- Being unprepared for the outdoor recreational activity in which he was participating.
- Lacking experience in similar settings, such as other national parks.

Though related to group one, the themes in group two, which I term “visitor decision-making,” focused more directly on Ellison’s frame of mind and behavioral decisions while in the park as contributing to his unfortunate fate. These themes included Ellison’s:

- Lack of “situational awareness” (i.e., attention to physical surroundings), possibly secondary to a photo opportunity.
- Poor judgment or (inappropriate) risk-taking (e.g., stepping on slippery rocks, choosing to hike alone).
- Decision to leave the established trail, and/or break park rules.
- Overconfidence in his abilities.

Table 4.7. Internal Causal Factors: Survey Free Responses

Theme	Representative Quotation
Visitor Attributes	
Being stupid or "ignorant" of park conditions	• If you are stupid enough to stand on the edge of a wet rock ledge and fall you got what you deserve. Hopefully he had to reimburse the park for the rescue effort (**Visitor, DEWA**). • Not being educated about park rules and safety and not being serious about safety (**Visitor, DEWA**).
Lacking common sense about how to behave, given the physical surroundings	• He lost his footing on a wet rock—this type of environment is expected in these areas and it requires that the visitor use common sense. No one needs to rope off the area and put up a sign that says slippery when wet, it is self-evident (**Visitor, DEWA**). • Visitor's lack of common sense. Rocks plus water equals SLIPPERY. Should have used a telephoto lens (**Employee, DEWA**).
Being unprepared for the outdoor recreational activity in which he was participating	• Hopefully he was wearing shoes that were appropriate for the conditions (**Employee, OLYM**). • The visitor could probably have taken more caution, use of a rope to secure himself may have prevented the fall (**Visitor, OLYM**).
Lacking experience in similar settings, such as other national parks	• He might have been new to the outdoor scene and just assumed if you had the right gear you'll be fine. It's hard to say because they don't mention how much experience he has in the outdoors. Some people believe what they see in pictures, that it's not hard or that it can be dangerous at times (**Visitor, MORA**). • I believe his inexperience to recognize the hazards of being on a cliff face without…technical equipment to be a primary cause of this accident (**Employee, DEWA**).
Visitor Decision-making	
Lack of "situational awareness"	• He obviously fell as a result of not paying close enough attention to his immediate surroundings. Had his awareness of his circumstances been more attentive, he probably would not have been injured or too close to disaster (**Employee, DEWA**). • Hiker focused on picture-taking not paying attention to his overall position and situation within the environment (**Employee, OLYM**). • I would think the cause was that the man was focused on his camera and not his surroundings (**Visitor, MORA**).
Poor judgment or (inappropriate) risk-taking	• An experienced backpacker should know walking on wet rocks so close to the edge of a waterfall is dangerous (**Visitor, DEWA**). • …I think Roger's better judgment may not have put him so close to the edge where a slip on wet rock would cause him to plummet 15 feet or more (**Employee, OLYM**). • Mr. Ellison's decision to take the risk of walking on wet slippery rocks upstream of a waterfall in order to take photographs (**Employee, DEWA**). • Negligent recklessness on the part of the park visitor— specifically, in climbing out into such a precarious location for a photograph, and in taking such risks while traveling solo (**Employee, MORA**).

Decision to leave the established trail, and/or break park rules	• It's his own fault for leaving the trail. Even thought it doesn't state that, you can be sure he was too close to the edge (**Employee, OLYM**). • Maybe he was off the trail, outside of the barriers, or failed to observe posted warnings (**Volunteer, MORA**).
Overconfidence in his abilities	• I think that the average park visitor has a little too much confidence in their own ability and most times think that this is a once in a lifetime opportunity and worth the extra risk (**Volunteer, MORA**). • Possibly, over-confidence. 'I've done this before, and I never got hurt.' I'll bet that plant was not the only one of its kind in the park or any other place for that matter. Bad decision making and no risk assessment. Not aware of his surroundings and how dangerous they are (**Visitor, MORA**).

Summary

To review, on the basis of both quantitative and qualitative survey data, there was partial support for Hypothesis 1. Although no statistically significant difference was evident between employees' and visitors' rating of external factors related to park management as causes of the hypothetical visitor accident, significant differences did occur for three other factors. First, employees rated challenging environmental conditions at the park (e.g., weather, terrain) as more important causal factors than did visitors. Second, visitors rated bad luck as more important than employees in causing the accident. Finally, employees rated internal causes related to the hypothetical victim (e.g., unpreparedness) as more important than did visitors. In spite of these quantitative differences between the two respondent groups, themes emerging from survey free responses suggest that employees and visitors explain their causal reasoning in similar ways. For instance, when making internal causal attributions, both employees and visitors referred to the hypothetical visitor victim as "lacking common sense" and being "ignorant" of park conditions. Moreover, both employees' and visitors' comments included the idea that sometimes "accidents happen" regardless of all preventive measures taken.

Hypothesis 2: Employees, Experience, and Self-Defensive Causal Attributions

The second hypothesis stated that employees' experience with the context would relate positively to self-defensive attributions of responsibility for causing accidents. To investigate H2, I conceptualized employees' experience with the context in several ways. First, experience included employees' tenure with the NPS, in terms of years worked in the current park unit and in other park units. Second, experience included employees' involvement in visitor safety incidents, such as assisting with a search and rescue effort, or administering first aid. Finally, I considered a third aspect of experience to be the salience of the incident described in the scenario—that is, whether or not the employee, or someone they knew, had been involved in a similar situation. I explain each of these three related concepts below.

Tenure with the NPS

I examined two-tailed Pearson correlations between the following variables: (1) years spent working in the park unit, (2) years spent working for the NPS, (3) score on the Internal (Park Visitor) Causal Attribution Scale, and (4) score on the External (NPS) Causal Attribution Scale. According to H2, individuals with *more* experience in the particular park and with the agency overall should tend to make more internal causal judgments—that is, reasoning that places causal responsibility with the visitor, rather than with employees or other external circumstances in the park, such as rules or safety infrastructure. No significant correlations were found. Contrary to expectation, there was a *negative*—though non-significant—correlation between years employed by NPS and viewing internal causes as important factors in a hypothetical visitor incident ($r = -.03$, $p = .68$, *ns*), and no correlation between years employed by NPS and seeing external causes as important. Additionally, a very small, positive, non-significant correlation existed between years employed by the park and seeing external causes as important ($r = .07$, $p = .31$, *ns*).

In order to simplify measurement in the regression models (discussed later in this chapter), I created an additional variable summing employees' years spent working in the park unit and years spent working for the NPS ("employee park experience"). No significant correlations were observed between this variable and the Internal and External Causal Attribution Scales.

Involvement in visitor safety incidents

The majority of employees (60%) reported having been involved in a visitor safety incident in the past year. Of these individuals, almost half (45%, n =184) reported involvement in less than ten incidents, while a smaller percentage (15%, n =59) described assisting in 10 or more incidents. Thus, to examine whether involvement in a visitor safety incident was related to attributional judgments, I classified employees in three groups: (1) those who reported *no involvement* in visitor safety incidents, (2) those who were involved in less than 10 incidents, and (3) those who were involved in 10 or more visitor safety incidents. I then created dichotomized versions of the Internal Causal Attribution Scale and the External Causal Attribution Scale by dividing each via a median split. That is, individuals whose responses to the Internal Causal Attribution Scale items summed to .139[14] (the mean) or lower were categorized into one group, and those reporting scores above .139 comprised a second group. Similarly, individuals whose responses to the External Causal Attribution Scale items summed to -.36 (the mean) or lower were considered together, and those scoring above -.36 comprised a second group. Results of chi-square analyses suggest that there is a significant relationship between involvement in a visitor safety incident and reporting internal causes above the median level. More specifically, of those employees who reported *not* being involved in any visitor safety incidents, 71% (n = 59) reported above median internal causal attributional judgments, compared to 59% of employees

[14] Note that this value reflects the score on the scale comprised of factor loadings, rather than simply summing the items.

who had been involved in less than 10 incidents, and 49% of employees who reported being involved in 10 or more incidents; this association was significant: $\chi^2 (2) = 6.67$, p = .036. In the case of external (NPS) causal attributional judgments, however, no differences were apparent based on involvement in visitor safety incidents ($\chi^2 (2) = 2.44$, p = .295).

Incident salience

When asked if an incident such as the one described in the hypothetical scenario had happened to them or someone they knew, half (50%, *n* = 123) of the employee sample reported affirmatively. A small percentage of employees (6%, *n* = 15) were unsure about their own, or a close other's, involvement in a similar incident. Another 44% (*n* =108) reported *not* having had a similar experience happen to them or a close other. To simplify measurement, I created a new dichotomous variable in which respondents who had experienced a similar incident or who were not sure of their (or a close other's) experience were considered as a single group, and those who reported no involvement as a second group. Using the dichotomized Internal and External Causal Attribution Scales (see above), I performed a chi-square analysis examining the relationship between one's past experience with an accident and attributional judgment. Of those employees reporting that a scenario like the one described had *never* before happened to them or someone they knew (*n* = 105), 69% reported median or *higher* judgments of internal causes of the hypothetical accident. In contrast, for those who reported that an incident had happened to them or someone they knew, or were unsure, (*n* = 130), responses were more divided, with 55% (*n* = 72) describing median or *higher* internal causal factors and 45% (*n* = 58) expressing median or *lower* internal causal factors. This relationship was significant: $\chi^2(1)= 4.26$, p= .039. There was no association between experience with a similar scenario and external (NPS) causal attributional judgments $\chi^2(1) = .69$, p = .405.

Summary

Based on the three measures of experience used—tenure with the NPS, involvement in visitor safety incidents at the park, and incident salience—H2 was not supported. First, no relationship was found between tenure with the NPS (or the particular park) and self-defensive attributions of responsibility. Second, opposite of my prediction, a significant association was found between *no* involvement in visitor safety incidents and reporting of above median internal causal attributional judgments. Finally, also contrary to my prediction, a significant association was found between those who had *never* experienced a similar incident and reporting of above median internal causal attributions. Based on these findings, it appears as though making internal causal attributions in the case of a visitor accident may be the "default" response for most employees. An employee's involvement in park visitor safety efforts, or the salience of a particular incident (based on personal experience), however, may serve to reduce or limit these internal attributional judgments.

Hypothesis Three: Visitors and Context

Positivity of park visit

The third hypothesis stated that visitors' experience with the context would relate positively to internal attributions of responsibility for causing accidents. Overall, the majority of visitors reported positive reactions to their most recent park visit. Using a 5-point semantic differential scale, most visitors agreed that their experiences in the park in which they were surveyed were: *remarkable* (rather than unremarkable) (55%; $M = 4.43$, $SD = .74$), *positive* (rather than negative) (65%; $M = 4.53$, $SD = .75$), and *unforgettable* (as opposed to "easy to forget") (54%; $M = 4.42$, $SD = .74$). Results of a factor analysis (varimax rotation) indicated that all three variables loaded onto a single factor, conceivably representing the "positivity" of one's park visit; the factor loadings were used to create a scale (Cronbach's alpha = .84).

No significant correlations were found between the reported positivity of the visitor's park experience and: (1) judging external (NPS) causes of accidents as important (2) judging internal (park visitor) causes of accidents as important; (3) judging bad luck as an important causal factor (4) judging challenging conditions as an important factor in causing a hypothetical incident.

Familiarity with national park unit

I conceptualized visitors' familiarity with the park unit in which they were surveyed as a second aspect of "experience." More specifically, I measured familiarity in two ways: (1) the number of visits to the park in the past year (i.e., once, 2-5 visits, 6-10 visits, more than 10 visits), and (2) the length of the park visit (i.e., half a day or less, more than half a day to one full day, more than one day). When considering all visitors together, there was a small, significant, negative correlation between reporting external (NPS) causes of the hypothetical visitor incident as important and the number of park visits the respondents had taken in the past year (r = -.18, p = .000). That is, the more times a visitor had been to the park, the *less* likely he or she was to view external (i.e., park-related) causes of the accident as important. The direction and relative size of this correlation held after considering respondents in different groups by scenario received (see Table 4.8). Conversely, among all visitors, a very small, significant, positive correlation existed between reporting internal causes of the visitor incident as important and the number of park visits in the past year (r = .08, p = .032). Though the directionality of this correlation remained consistent across both scenario groups, the correlation was not significant for those who read the Hellroaring Creek scenario (see Table 4.8).

In regard to the length of the most recent park visit, among all visitors, I observed a small, significant, negative correlation between reporting external (NPS) causes of the hypothetical visitor incident as important and the length of the visit (*r* = -.13, p = .001). That is, the longer visitors reported staying at the park during the most recent visit, the less likely they were to report external (NPS) causes as important factors in the visitor scenario. Though the directionality of this correlation remained the same across visitor groups, the correlation was not significant for those who read the Hellroaring Creek scenario. Finally, among all visitors, I observed a very small, significant correlation between reporting internal causes as important factors in the scenario and the length of the park visit (*r* = .07, p = .052); however, this correlation was not significant among the individual scenario groups (see Table 4.8).

Table 4.8. Correlations between Familiarity with Park and Causal Attribution

Visitor Group	Number of Park Visits and External Causal Attribution	Number of Park Visits and Internal Causal Attribution	Length of Park Visit and External Causal Attribution	Length of Park Visit and Internal Causal Attribution
All Visitors	***r* = -.18*****	***r* = .08***	***r* = -.13****	***r* = .07***
Read Hellroaring Creek scenario	***r* = -.16**** (*n* = 425)	*r* = .02, *ns* (*n* = 425)	*r* = -.09, *ns* (*n* = 425)	*r* = .02, *ns* (*n* = 425)
Read Mammoth Hot Springs scenario	***r* = -.19**** (*n* = 254)	***r* = .12*** (*n* = 254)	***r* = -.15*** (*n* = 255)	*r* = -.06, *ns* (*n* = 255)

Note. Two-tailed Pearson's correlations.
*p< .05;**p<.01; ***p<.001

Experience in other national park units

A final measure of "experience" involved asking respondents to approximate the total number of other national park units that he or she had ever visited to date. When considering all visitors together, I observed a small, significant negative correlation between reporting external (NPS) causes of the hypothetical visitor incident as important and the number of other national parks visited (besides the present park) (*r* = -.15, p = .000). That is, the more national parks respondents had visited, the less likely they were to report external (NPS) causes as important in explaining how the hypothetical incident occurred. The directionality of this correlation held across both scenario groups, and its size strengthened, especially among those visitors in the Mammoth Hot Springs group (see Table 4.9). Among all visitors, there appeared to be no correlation between reporting internal causes of the hypothetical scenario as important, and the number of other national parks visited. As explained above, the pattern of these correlations lend support to the idea that experience in national parks may provide visitors a perceived sense of control over their environment, making them less likely to see aspects of the managed environment, such as (lack of) rules or safety infrastructure, as contributors to an accident. Supporting this idea, a positive, significant correlation existed between the number of national parks visited and perceiving park-related risks as controllable (r = .12, p = .002). (Controllability of risk will be discussed further below). Perhaps running counter to this finding, however, among the Mammoth Hot Springs scenario readers, I found a positive correlation between the number of parks visited and viewing accidents as caused by bad luck (r = .17, p= .009). Since the individuals chosen to receive this scenario had participated in less "risky" recreational pursuits, it is conceivable that their patterns of activities also held in these other parks, and taking fewer recreational risks oneself may cause visitors to view bad luck as a more salient causal factor; however, further empirical study is necessary to test this speculation. .

In order to simplify measurement in the regression models (discussed later in the chapter), I created a new variable that summed the three measures of visitors' experience in a national park setting: (1) the length of time spent in the surveyed park, (2) the number of times the individual had been to the park in the past year, and (3) the number of other national parks the individual had visited. Since this variable was highly skewed (skewness = 3.77, kurtosis = 23.71), I performed a natural log transformation. The resulting variable had acceptable skewness and kurtosis levels (.21 and .46, respectively) and appeared to be normally distributed.

Table 4.9. Correlations between Experience in Other Parks and Causal Attribution

Visitor Group	Number of Other National Parks and External Causal Attribution	Number of Other National Parks and Internal Causal Attribution	Number of Other National Parks and Bad Luck
All Visitors	***r* = -.15*****	*r* = .00, ns	*r* = .02, *ns*
Read Hellroaring Creek scenario	***r* = -.11*** (*n* = 381)	*r* = -.01, *ns* (*n* = 381)	*r* = .00, *ns* (*n* = 388)
Read Mammoth Hot Springs scenario	***r* = -.24***** (*n* = 229)	*r* = -.09, *ns* (*n* = 229)	***r* = .17**** (*n* = 230)

Note. Two-tailed Pearson's correlations.
*p< .05;**p<.01; ***p<.001

Incident salience

When asked if an incident such as the one described in the hypothetical scenario had happened to them or someone they knew, one quarter (25%, *n* = 177) of the visitor sample reported affirmatively. A small percentage of visitors (6%, *n* = 45) were unsure about their own, or a close other's, involvement in a similar incident. Another 70% (*n* = 490) reported not having had a similar experience happen to them or a close other. Using the dichotomized Internal and External Causal Attribution Scales, I performed a chi-square analysis examining the relationship between one's past experience with an accident and attributional judgment. Of those visitors reporting that a scenario like the one described had *never* before happened to them or someone they knew (*n* = 465), about half (52%, *n* = 241) reported median or *lower* internal causes of the hypothetical accident. In contrast, for those who reported that an incident had happened to them or someone they knew, or were unsure if one had happened (*n* =218), *over half* (60%, *n* = 131) reported median or lower judgments of internal causal attribution. This relationship was significant: $\chi^2(1) = 4.09$, p = .043.

As described earlier in this chapter, employee perceptions illustrated the opposite effect, as individuals involved in similar incidents as well as those not involved reported median or *higher* internal causal attributions. While an optimistic bias may still be operating, as opposed to employees, visitors appear less willing to attribute responsibility to individuals who may, in some respects, resemble them. Thus, visitors' causal reasoning appears align Shaver's (1970) concept of "blame avoidance" based on the perceived similarity of the accident victim. It may also follow Crohn et al.'s (2008) analysis of residents of Western U.S. communities who hesitated to attribute any causal responsibility for a wildfire to their own actions, tending instead to see the acts of others (e.g., public agencies), or natural processes as more important factors.

Summary

Overall, partial support was found for H3. While no relationship was found between the positivity of the respondent's park visit and internal causal attribution, significant relationships were found for several other variables. First, for length of park visit, I found a small, significant negative correlation between reporting external causes of the hypothetical visitor incident as important and the length of the respondent's most recent visit. Second, a medium-sized, significant, negative correlation existed between reporting external causes of the hypothetical visitor incident as important and the number of park visits the visitors had taken in the past year. Finally, I found a small, significant negative correlation between reporting external causes of the hypothetical visitor incident as important and the number of other national parks visited (besides the present park). In terms of the salience of the hypothetical incident, visitors' causal attributional judgments appeared opposite those of employees (described in the previous section). Those who reported that an incident had happened to them or someone they knew, or were unsure if one had happened were more likely to report median or lower internal causal attributions, as opposed to those who had not been involved in an incident.

Research Question One: Sense of Place and Causal Attribution

Place meaning: Closed-ended responses

The first research question asked how place meaning and place attachment relate to attributions about the cause of accidents. Results of a factor analysis (varimax rotation) suggested that five of the eight place meaning-related survey items loaded highly on a single factor. These items appeared to describe both natural and cultural-based place meanings, including seeing the park as a wildlife habitat, a historical place, somewhere to be preserved for future enjoyment, a community of visitors and staff, and an unpredictable landscape (see Table 4.10); together, these loadings created the Place Meaning Scale (Cronbach's alpha = .70). While I had expected items related to Place Meaning to load onto two separate factors, one representing more "nature-based" place meanings, and a second to represent more "human-based" place meanings, I instead found a single-factor solution.

Table 4.10. Place Meaning and Place Attachment Scales

Scale	Cronbach's alpha
Place Meaning	.70
This park is a wildlife habitat.	
This park is a place with historical value.	
This park is a place to be preserved for future generations.	
This park is a community of visitors, employees, and volunteers.	
This park is an unpredictable landscape.	
Place Attachment	.77
This park means a lot to me.	
I identify strongly with this park.	
I feel that I can really be myself at this park.	

That both nature-based and human-based place meanings load jointly on a single factor may reflect how omnipresent information available to visitors in both physical (e.g., signs, pamphlets, NPS rangers) and virtual (e.g., NPS website) spaces characterizes national parks; from a communication-as-constitutive perspective (Carey, 1989), we can understand these meanings as created and re-created through information-sharing and dissemination. The central NPS website (http://www.nps.gov), from which websites for individual park units can be accessed, provides a useful illustration. Text and images on the website construct a view of nature as valuable, something contributing both to a biological and cultural legacy. According to the website, while we can interpret some of this value as emerging through the scenic, "untouched" elements of national park landscapes, nature also accrues and retains value through our participation in it, such as through scientific study. Paradoxically, the website also appears to construct nature as dangerous, with risk emerging as both human-caused, and also an inherent characteristic of a setting. Following the conclusions of Cox (2010) and others, the NPS website therefore provides contradictory images of the "meaning" of nature in national parks: desirable and dangerous, an entity to preserve away from humans, and a resource to provide reflection and recreation. Comparing levels of place meaning by each park's visitor population provides interesting contrasts; DEWA visitors, as a group, reported the lowest level of agreement with the place meaning scale (M = 20.68, SD = 2.68), whereas MORA visitors reported the highest (M = 22.02, SD = 2.67) (see Table 4.11). Anecdotal evidence supports this finding, as the majority of the MORA visitors contacted described themselves as residents of the Seattle-Tacoma metropolitan area, and spending a great deal of their free time in the park; such familiarity with the local context likely influenced their understanding of the park in terms of its natural and cultural meaning. Indeed, visitors to both OLYM and MORA were, more often than not, residents of surrounding communities, as tends to be a defining characteristic of winter park visitors.

For all respondents who received the Hellroaring Creek scenario (i.e., visitors, volunteers, and employees), results of bivariate Pearson correlations indicated small, significant, positive correlations between place meaning and: (1) judging internal causes of the hypothetical visitor incident as important ($r = .12$, $p = .001$); (2) viewing challenging environmental conditions as important causal factors in a hypothetical visitor accident ($r = .11$, $p = .002$) (see Table 4.11). In sum, the more an individual viewed the park as having natural and cultural meaning, the more he or she tended to view internal causes as important to a visitor accident; we might interpret this relationship to mean that supporting "preferred" (Hall, 2001) meanings of national parks, such as those established through park-related information, made an individual more likely to view visitors—rather than park managers—as responsible for causing a negative incident. Moreover, as individuals understood national parks as places with natural and cultural meaning, they also tended to view environmental conditions as contributing to the cause of a visitor accident. As illustrated by the factor analysis, natural and cultural park meanings encompassed the notion of parks as "unpredictable landscapes"; in following, viewing the park's environmental conditions, such as uneven terrain, as contributing to a visitor accident would appear to make logical sense. (See Table 4.11 for correlations between these variables for other sub-groups of the survey sample).

Table 4.11. Comparison of Mean Place Attachment and Place Meaning by Park: Visitors only

Group	Place Attachment	Place Meaning
DEWA visitors	*M* = 11.42, *SD* = 2.15 (*n* = 178)	*M* = 20.68, *SD* = 2.68 (*n* = 182)
MORA visitors	*M* = 12.44, *SD* = 2.00 (*n* = 405)	*M* = 22.02, *SD* = 2.67 (*n* = 405)
OLYM visitors	*M* = 12.18, *SD* = 2.25 (*n* = 170)	*M* = 21.74, *SD* = 2.48 (*n* = 168)
All visitors	*M* = 12.14, *SD* = 2.13 (*n* = 753)	*M* = 21.63 , *SD* = 2.69 (*n* = 755)

Table 4.12. Correlations between Place Meaning and Causal Attribution Variables

Group	Place Meaning and Internal Causal Attribution	Place Meaning and Environmental Conditions
All respondents: Hellroaring Creek	***r* = .12**** (*n* = 810)	***r* = .11**** (*n* = 833)
Visitors: Hellroaring Creek	***r* = .14**** (*n* = 425)	***r* = .14**** (*n* = 435)
Visitors: Mammoth Hot Springs	*r* = .07, *ns* (*n* = 256)	***r* = .12*** (*n* = 258)
All Volunteers	*r* = .06, *ns* (*n* = 152)	*r* = .12, *ns* (*n* = 157)
All Employees	*r* = .11, *ns* (*n* = 233)	*r* = -.02, *ns* (*n* = 241)

Note. Two-tailed Pearson's correlations.
*p< .05;**p<.01; ***p<.001

Place meaning: Free responses

Comments provided in response to an open question at the end of the survey provided additional evidence of how survey respondents understood the meaning of the three parks. While respondents were not prompted to comment on the significance of, or their relationship to, the park, many chose to do so. To some degree, these comments can help: (1) parse out the definition of “natural and cultural place meaning”; (2) investigate potential overlaps between visitors’ and “preferred” (i.e., NPS-intended) understandings of natural and cultural place meanings; and (3) illustrate how the place meaning may function with respect to the other variables of interest, including risk perception, causal attribution, and prevention attribution (attribution of responsibility for preventing accidents/ensuring safety). In particular, three emergent themes deserve attention, two related broadly to nature-based meanings, and one to culture-based meanings.

Park as wilderness. For many respondents, the park stood for “wilderness,” and thus represented the expression of many of the characteristics they attributed to such places, including physical challenge and inherent sources of risk. In this sense, comments echoed a broad theme of the NPS website which suggests environmental risk as intrinsic to many (if not most) park settings. Unlike the text of the NPS website, however, many survey respondents characterized the “riskiness” of park wilderness as serving distinct, often positive, functions. (More discussion of risk perception, including the desirability of risk, is provided below). For instance, one visitor used the concept of wilderness to describe the value of OLYM, noting, “We… need wilderness and wild places to recreate in, to test and challenge our spirits and keep us strong.” Noting the presence of this risk, other respondents stressed the importance of self-reliance, equating wilderness—and by extension, national parks—as places where preparation and self-preservation are necessary. As a different OLYM visitor suggested:

> Many of our parks include wilderness areas; the very word encompasses the word ‘wild.’ People should prepare themselves by studying the area and the risks, and then take actions to mitigate or reduce the risks before venturing out into the wilderness.

Just as some respondents defined the concept of wilderness, others pointed out how national park visitors can be unaware of what such characteristics may be, or what they may imply for ensuring one's safety. While one MORA volunteer described many visitors as "ignorant about nature" another noted that:

> Our ancestors were used to a wilderness experience. For our generation Rainier and other similar areas are strange territory.

Though these and other respondents appeared to equate wilderness experiences with taking personal responsibility for one's wellbeing, it is important to note that unfamiliarity with the context may render such actions difficult, or even impossible.

Nature & spirituality. Similar to the idea of wilderness, respondents also appeared to understand national parks as representations of "nature" writ large. Reminiscent of the NPS agency directive, the 1916 Organic Act, some respondents' comments characterized parks as sanctuaries, islands of flora and fauna purposefully set aside to exemplify a "natural" state. In the words of one MORA visitor:

> I can only hope that for many YEARS Mt. Rainier National Park and all its land stays kept safe and protected. For as we humans slowly destroy most of our world's wonders, let there be some place that hopefully will remind people of what we did have and inspire others.

This visitor's words echo the NPS website's indication of nature as scenic and untouched, as existing in the "pristine" landscapes of many parks (Oravec, 1996). Parks were also seen as places to visit non-human populations, as described by one OLYM visitor:

> Parks are not just for visitors. By the very word, we are guests. The park is a place for nature to continue its normal development as undisturbed as possible by humans… I am a visitor and not a resident of the park and should treat it with respect and reverence.

These and other survey respondents juxtaposed national parks with other more "controlled" nature experiences, such as those available at zoos or amusement parks. For them, much of the value of parks and other wilderness areas emerged from their "wildness," including the unpredictability of the physical landscape, the inevitability of risk, and the authenticity of a "real" nature experience. A MORA volunteer expressed this sentiment quite adamantly when commenting:

> National park wilderness areas are not Disneyland. They are as real as we can preserve them. Having spent a lifetime in the wilderness as a hunter, hiker, and backpacker, I've learned that Mother Nature doesn't give a rip about you and will as soon kill you as let you pass.

For some respondents, experiencing nature in a national park visit also meant creating a space for reflection, an idea that also garners some attention on the NPS website. In addition to the "awe" or "beauty" many described as experiencing in these places, some respondents emphasized that parks serve a spiritual role in their lives. One MORA visitor noted that, "Each time I visit the park I come away with my spirit lifted," while a MORA volunteer viewed parks as "a place for peace of mind and unique beauty." Reminiscent of transcendental philosophy, many of these comments seemed to convey a religious undercurrent, as exemplified by the words of a MORA visitor:

> I appreciate the Universe for the beautiful creation and feel lucky to visit [MORA]. It is like meditating in nature while walking and appreciating the beauty with the people I love.

Natural & cultural heritage. In addition to wilderness-related meanings, survey respondents also understood the parks in terms of cultural meanings. Most centrally, many respondents referred to parks as "national treasures," suggesting that these places occupy a central role in America's cultural heritage, a view central to NPS, and thus articulated in its official descriptions of many of its national park units. In describing the parks as such, several respondents praised the federal system in place to conserve these places, such as is reflected in one DEWA visitor's comment:

> USA is gifted with the most unique wonders of nature and the forefathers of this nation did very wisely to take good care to preserve this gift. It is an unenviable task of the

> National Park Service to preserve and protect the natural beauty so that future generations can continue to enjoy them.

In this same vein, many respondents lamented the limited funding available to the National Park Service, and expressed their support of the continued efforts of the NPS. In the words of one OLYM visitor:

> Do everything possible to add to and preserve our national parks, forests, and park lands. They are invaluable and irreplaceable resources that most purely and strongly represent our nation's character and nurture and sustain its collective psyche and soul.

As this quotation suggests, for some respondents, the importance of these physical spaces was not limited to facilitating ecological processes, but rather extended to supporting democratic ideals; national parks, in this sense, define not only what a "natural" area can (or should) be, but also what the United States can (or should) stand for. Because parks can, quite literally, "ground" such lofty principles, many respondents noted the importance of protecting and preserving them as a legacy for future generations, places that, as one MORA visitor expressed, "[I] hope my children and grandchildren will be able to [visit] as well."

Place attachment: Closed-ended responses

Results of a factor analysis (varimax rotation) suggested that the seven items pertaining to place attachment loaded onto two separate factors. The first factor appeared to describe strong place attachment, or the idea that the respondent felt a substantial connection to the park. A reliability analysis indicated that the Cronbach's alpha would be improved by omitting one item ("Few people know [park name] like I do."). The remaining three item factor-loadings created a place attachment scale (Cronbach's alpha= .77) (see Table 4.10). Of visitors to the three parks, those at MORA reported the strongest attachment to the park (*M* = 12.44, *SD* = 2.00), followed by OLYM (*M* = 12.18, *SD* = 2.25) (see Table 4.11). As explained above, MORA and OLYM visitors tended to be Seattle or Tacoma-area residents who visited the park on a regular basis, and who, anecdotally, often emphasized the centrality of the park to their recreational activities and their larger support for the preservation of the environment and open space.

When considering all respondents who read the Hellroaring Creek scenario, there was a very small, significant positive correlation between place attachment and (1) judging internal causal factors as important to a hypothetical visitor accident scenario (r = .09, p = .015); and (2) judging challenging environmental conditions as important causal factors (r = .09, p = .011). Unsurprisingly, place attachment was also positively correlated with visitors' experience with the park context (i.e., the sum of: (1) length of last visit, (2) number of park visits in the past year, and (3) number of other national parks visited) (r = .13, p= .001). As visitors become more familiar with—and attached to—the park setting, they appeared more likely to both hold the visitor responsible for causing an accident, and also to recognize the potential contribution of environmental conditions to such a fate. As seen in Table 4.13, the correlation between place attachment and internal causal attribution was most pronounced among visitors who read the Hellroaring Creek scenario (r = .13, p = .006), and not significant for visitors who read the Mammoth Hot Springs scenario, volunteers, or employees. Likewise, the strongest correlation between place attachment and judging environmental conditions as important causal factors existed among volunteers (r = .16, p = .046), followed by visitors who read the Hellroaring Creek scenario (r = .11, p = .021); for employees and visitors who read the Mammoth Hot Springs scenario, correlations were not significant.

Table 4.13 Correlations between Place Attachment and Causal Attribution Variables

Group	Place Attachment and Internal Causal Attribution	Place Attachment and Environmental Conditions
All respondents: Hellroaring Creek	***r* = .09*** (*n* = 826)	***r* = .09*** (*n* = 836)
Visitors: Hellroaring Creek	***r* = .13**** (*n* = 435)	***r* = .11*** (*n* = 438)
Visitors: Mammoth Hot Springs	*r* = .08, *ns* (*n* = 258)	*r* = .09, *ns* (*n* = 260)
All Volunteers	r= .15, *ns* (*n* = 154)	**r= .16*** (*n* = 156)
All Employees	*r* = -.01, *ns* (*n* = 237)	*r* = .01, *ns* (*n* = 242)

Note. Two-tailed Pearson's correlations.
*p< .05;**p<.01; ***p<.001

In a regression model predicting internal causal attribution (R^2 = .18, F(16, 925) = 9.30, p < .001), place attachment was positively related to the outcome variable (β = .09, p < .05). Place meaning emerged as a significant, negative predictor (β = -.07, p < .05) of seeing bad luck as an important causal factor in a regression model (R^2 = .12, F(16, 934) = 7.59, p < .001). In two additional regression models, one predicting seeing external (NPS-related) factors as important causal factors and the other predicting seeing challenging environmental conditions as an important causal factor, neither place meaning nor place attachment emerged as a significant predictor (see Tables 4.14 and 4.15).

Table 4.14. Regression Predicting Internal Causal Attribution: Sense of Place Variables

	Model 1	Model 2	Model 3	Model 4
Block 1: Demographics				
Age	**.11****	**.09****	**.10****	**.08***
Education	**-.11****	**-.10****	**-.10****	**-.09****
Gender (Female=1)	-.01	.00	-.00	-.02
Native English (Native English speaker = 1)	-.03	-.00	-.00	-.02
Asian	-.00	.02	.02	.02
Hispanic/Latino	.02	.03	.03	.03
Other	.04	.02	.02	.02
Inc. R^2 (%)				
Block 2: Respondent Type				
Volunteer		-.02	-.01	-.03
Employee		.02	.04	.03
Scenario (Mammoth Hot Springs = 1)		**-.35*****	**-.34*****	**-.33*****
DEWA		.05	.04	**.07***
OLYM		.02	.03	.03
Inc. R^2 (%)				
Block 3: Incident Salience (Experienced similar incident/Unsure = 1)			**-.11*****	**-.11****
Number of national parks visited			.02	.01
Inc. R^2 (%)				
Block 4: Sense of Place				
Place Meaning				.06
Place Attachment				**.09***
Inc. R^2 (%)				
Total R^2				.18
ANOVA				$F_{16, 925}$= 12.30***

Notes. *p< .05;**p<.01; ***p<.001
n = 942.
Cell entries for all models are standardized regression coefficients.

Table 4.15. Comparison of β values for Significant Predictors in Sense of Place Regression Models

Independent Variable (β)	Dependent Variable: Causal Attribution			
	Internal Causal Attribution (Park Visitor)	External Causal Attribution (Park Management)	Challenging Conditions (Park Environment)	Bad Luck
Age	**.08***	*ns*	*ns*	**-.14*****
Education	**-.09****	**-.11****	**-.11***	*ns*
Female	*ns*	**.13*****	**-.13****	*ns*
Native English Speaker	*ns*	**-.13****	**-.12****	*ns*
Asian	*ns*	**.16*****	**.16*****	*ns*
Volunteer	*ns*	**.07***	***ns***	*ns*
Employee	*ns*	**.10****	**.10****	**-.12****
Mammoth Hot Springs scenario	**-.33*****	**.14*****	**.14*****	**.20*****
DEWA	**.07***	**.10****	**.10****	**-.08***
Incident Salience	**-.11***	*ns*	**.07***	**.11*****
Place Meaning	*ns*	*ns*	*ns*	**-.07***
Place Attachment	**.09***	*ns*	*ns*	*ns*
Total R^2	**.18**	**.13**	**.06**	**.12**
ANOVA	$F_{16, 925} = 12.30$***	$F_{16, 925} = 8.84$***	$F_{16, 941} = 3.44$***	$F_{16, 934} = 7.59$***

Note. *p< .05;**p<.01; ***p<.001
Cell entries for all models are standardized regression coefficients.

Place attachment: Free responses

As was true for the concept of place meaning, open-ended comments on the survey revealed more about how respondents expressed place attachment. Many respondents described their connection to the park in terms of their own, or their family's, history with the geographical area. As one DEWA visitor described:

> I grew up farming the fields along the Delaware River within the park. It is a beautiful place, and I am thankful that the Park Service is dedicated to caring for the land and at the same time making it accessible to the people who appreciate it.

The ability to identify with the park—to define oneself by interactions with the very features of the landscape—also appeared to affect the way in which respondents chose to support the park, such as through volunteering or working for the NPS. For example, a MORA volunteer explained:

> I have spent a lifetime hiking and climbing in the Cascade and Olympic mountains. These areas, including [MORA], are very precious to me. It is right to try and give back something to an area/environment that has been a major part of my life.

For some, identifying with the park led to suspicion of those whose connection with the area was less established. An OLYM employee described frustration with a park management comprised largely of "outsiders":

> I was born here and I love this place that I grew up in. The people we have managing it now are not from here and they just don't have the love of the park like those who have gone before them. I don't know what the answer is but I do know that Olympic National Park is not the same place it used to be.

Similarly, for many respondents, especially those living close to a park, place attachment seemed to manifest in the perception of the park as "theirs": an ownership based jointly on knowledge, appreciation, and familiarity. According to one OLYM visitor:

> This park is probably the most special place to me and my family. I have travelled the world and nothing compares to its challenges and its beauty and its diversity.

Likewise, a MORA volunteer described herself as "proud to take visitors to Mt. Rainier." For these and other individuals, sense of place seemed to develop out of habit and routine. As a MORA visitor commented:

> I visit 1-2 national parks in a year that are outside WA state. Within WA state, I just love Mt. Rainier too much to visit many others and so I've been there about 10 times in the past 2 years!!

Similarly, one DEWA respondent described an annual father/son canoe trip in the park over Father's Day weekend that he had taken for the past 12 years, and another noted that she and her husband "camped [in DEWA] for many years when our children were younger"—experiences that motivated the family to purchase a home nearby.

Summary

Using both quantitative and qualitative data, this section explored the relationship between sense of place variables, place meaning and place attachment, and causal attributional judgments. Evidence from a factor analysis and survey free responses suggest that respondents envisioned the national parks studied as blending "nature" and "human"-based meanings. Moreover, I found significant, positive correlations between agreement with this "blended" place meaning and: (1) judging internal causes of the hypothetical visitor incident as important, and (2) viewing challenging environmental conditions as important causal factors. For many respondents, place attachment seemed to signify a sense of history and ownership with the place. Significant, positive correlations existed between place attachment and judging internal causal factors as important to a hypothetical visitor accident scenario and (2) judging challenging environmental conditions as important causal factors.

Research Question Two: Perception of Risk and Causal Attribution

Controllability and voluntariness of park risk

Research question two asked how perceptions of controllability, voluntariness, and desirability of park risks relate to attributions of responsibility for the cause of park accidents. I performed a factor analysis (varimax rotation) of six survey items (q21a- q21f), expecting these items to load onto two factors: one to represent voluntariness and the other, controllability of park-related risk. While the items, indeed, appeared to load onto two distinct factors, rather than representing voluntariness and controllability, they seemed instead to represent (1) visitors' perceived personal control over park risk; and (2) perceptions of the National Park Service's control over these risks. Because voluntariness and controllability appeared indistinguishable, I instead used the factor scores of the four items relating to visitors' perceived personal control/voluntariness to create a new scale (Cronbach's alpha = .67) (see Table 4.16).

Table 4.16. Controllability and Desirability of Risk Scales

Scale	Cronbach's alpha
Controllability of Risk	.67
People cannot control whether or not they are harmed by the hazards they face in the park.	
Whether or not a person is exposed to park hazards is not his or her choice.	
In the park, people cannot choose whether or not they are exposed to most hazards.	
If they are exposed to hazards in the park, people cannot prevent harm to themselves and others.	
Desirability of Risk	.85
Experience thrills.	
Have an adventure.	
Be challenged.	
Experience excitement.	

When considering all respondents who received the Hellroaring Creek scenario together, there was a small-medium sized, significant, negative correlation between perceived controllability of risk and seeing external causes of a hypothetical accident as important ($r = -.22$, $p < .001$). As respondents believed park-related risks to be controllable, they tended to view external causes of an incident as less relevant. Predictably, as respondents perceived risks as controllable, they also tended to see internal causes of a hypothetical accident (i.e., characteristics of the victim) as important ($r = .11$, $p < .01$). Also somewhat logically, respondents who viewed park risks as controllable were less likely to: (1) perceive challenging environmental conditions as important contributors to a visitor accident (r = -.08, p < .05); and (2) see bad luck as a causal factor (r = -.07, p < .05). (See Table 4.17 for these correlations classified by respondent group and scenario received).

Table 4.17. Correlations between Controllability of Risk and Causal Attribution Variables

Group	Controllability of Risk and Internal Causal Attribution	Controllability of Risk and External Causal Attribution	Controllability of Risk and Challenging Conditions	Controllability of Risk and Bad Luck
All respondents: Hellroaring	***r* = .11**** (*n* = 805)	***r* = -.22***** (*n* = 805)	***r* = -.08*** (*n* = 830)	***r* = -.07*** (*n* = 822)
Visitors: Hellroaring	***r* = .11*** (*n* = 423)	***r* = -.29***** (*n* = 423)	***r* = -.10*** (*n* = 434)	***r* = -.10*** (*n* = 432)
Visitors: Mammoth	***r* = .20**** (*n* = 254)	***r* = -.18**** (*n* = 255)	*r* = -.04, *ns* (*n* = 256)	*r* = -.07, *ns* (*n* = 255)
All Volunteers	*r* = .11, *ns* (*n* = 147)	*r* = -.07, *ns* (*n* = 147)	*r* = -.04, *ns* (*n* = 152)	*r* = -.12, *ns* (*n* = 152)
All Employees	***r* = .13*** (*n* = 235)	***r* = -.13*** (*n* = 235)	*r* = -.03, *ns* (*n* = 244)	*r* = -.00, *ns* (*n* = 238)

Note. Two-tailed Pearson's correlations.
*p< .05;**p<.01; ***p<.001

Desirability of park risk

I next performed a factor analysis (varimax rotation) of five survey items (q20a- q20e) related to the desirability of park-related risk. The solution indicated that all of the variables loaded onto a single factor, lending confidence to the assumption that these items measured the same concept. Based on a reliability analysis, I deleted one of the items ("to take risks"; q20a), as it reduced the overall alpha of the items; the factor loadings of the resulting items presented a Cronbach's alpha of .85 (see Table 4.16).

When all respondents who read the Hellroaring Creek scenario were considered together, there was a small, positive correlation between desirability of risk and: (1) seeing challenging environmental conditions as contributing to a hypothetical visitor incident ($r = .13$, $p < .001$); (2) viewing bad luck as a causal factor in the incident ($r = .12$, $p < .001$). In other words, individuals who described being in a national park as a means to take risks were more likely to attribute the accident causes to both environmental conditions at the park and bad luck. (See Table 4.18 for these correlations classified by respondent group and scenario received).

Table 4.18. Correlations between Desirability of Risk and Causal Attribution Variables

Group	Desirability of Risk and Challenging Conditions	Desirability of Risk and Bad Luck
All respondents: Hellroaring Creek	**$r = .13$***** ($n = 834$)	**$r = .12$***** ($n = 827$)
Visitors: Hellroaring Creek	**$r = .16$**** ($n = 438$)	**$r = .16$**** ($n = 436$)
Visitors: Mammoth Hot Springs	$r = -.05$, *ns* ($n = 258$)	$r = .11$, *ns* ($n = 257$)
All Volunteers	$r = .14$, *ns* ($n = 154$)	$r = .14$, *ns* ($n = 155$)
All Employees	$r = .08$, *ns* ($n = 242$)	$r = .04$, *ns* ($n = 236$)

Note. Two-tailed Pearson's correlations
*p< .05;**p<.01; ***p<.001

Danger/risk avoidance

A final, single item measured respondents' perception of danger, or degree of risk avoidance in the context of the national park: "If I thought I would be putting myself in danger, I would not visit [the park]" (q22a). Due to its kurtosis (-1.12), this variable was log transformed, resulting in more favorable skewness and kurtosis levels (-.57 and -.49, respectively).

When all respondents who read the Hellroaring Creek scenario were considered together, there were small, positive correlations between perception of danger/risk avoidance and: (1) internal causal attribution ($r = .08$, $p < .05$); and (2) external (NPS) causal attribution ($r = .18$, $p < .001$). Moreover, negative correlations existed between perception of danger/risk avoidance and: (1) seeing bad luck as a cause of a hypothetical accident (*r* = -.13, p < .001) and; (2) viewing risk as desirable in a national park (*r* = -.26, p < .001). For the most part, these correlations follow the same direction in the other sub-groups of respondents (see Table 4.19), though sizes vary. Interestingly, correlations between perception of danger and seeing challenging conditions as causal factors in a hypothetical accident varied widely, with significant correlations occurring among visitors who read the Hellroaring Creek scenario (*r* = .15, p < .001) and volunteers (*r* = -.19, p < .05).

Table 4.19. Correlations between Danger/Risk Avoidance and Causal Attribution Variables

Group	Danger[1] and Internal Causal Attribution	Danger and External Causal Attribution	Danger and Challenging Conditions	Danger and Bad Luck	Danger and Desirability of Risk
All respondents: Hellroaring	***r* = .07*** (*n* = 809)	***r* = .18***** (*n* = 809)	*r* = .03, *ns* (*n* = 833)	***r* = -.13***** (*n* = 825)	***r* = -.26***** (*n* = 833)
Visitors: Hellroaring	***r* = .12*** (*n* = 424)	***r* = .17***** (*n* = 424)	***r* = .15**** (*n* = 435)	***r* = -.11*** (*n* = 433)	***r* = -.32***** (*n* = 437)
Visitors: Mammoth	*r* = .10, *ns* (*n* = 254)	***r* = .21**** (*n* = 254)	*r* = .05, *ns* (*n* = 256)	*r* = -.04, *ns* (*n* = 255)	***r* = -.29***** (*n* = 260)
All Volunteers	*r* = -.04, *ns* (*n* = 150)	***r* = .19*** (*n* = 150)	***r* = -.19*** (*n* = 155)	***r* = -.20*** (*n* = 155)	***r* = -.24**** (*n* = 155)
All Employees	*r* = .01, *ns* (*n* = 235)	***r* = .18**** (*n* = 235)	***r* = -.05, *ns*** (*n* = 243)	***r* = -.16*** (*n* = 237)	***r* = -.14** (*n* = 241)

Note. Two-tailed Pearson's correlations

*p< .05;**p<.01; ***p<.001

[1]Survcy wording: "If I thought I would be putting myself into danger, I would not visit [the park]."

In a regression model predicting internal causal attribution (R^2 = .18, $F(17, 927)$ = 12.24 p < .001), controllability of risk reached significance (β = .15, p < .001); other significant predictors included the respondent's age (β= .08, $p < .05$), education level (β= -.08, $p < .01$), receiving the Mammoth Hot Springs accident scenario (β = -.33, $p < .001$), and the salience of the described hypothetical incident (β = -.10, $p < .01$) (see Table 4.20). The risk perception-related variables also emerged as significant in three additional regression models (see Table 4.21). First, in a regression model predicting external (NPS) causal attribution ($R^2 = .17$, $F(17, 927) = 11.06$ $p < .001$), significant predictors included controllability of risk (β = -.14, $p < .001$) and perceived danger/risk avoidance (β = .14, $p < .001$). Second, in a regression model predicting seeing challenging environmental conditions as important causal factors ($R^2 = .06$, $F(17, 941) = 3.50$ $p < .001$), perceived desirability of risk was a significant predictor (β = .11, $p < .01$). Finally, in a third regression model predicting seeing bad luck as an important causal factor ($R^2 = .12$, $F(17, 935) = 7.62$ $p < .001$), all three risk perception-related variables measured were significant: controllability (β = -.06, $p < .05$), desirability (β = .06, $p < .05$) and perceived danger (β = -.07, $p < .05$).

Table 4.20. Regression Predicting Internal Causal Attribution: Risk Perception Variables

	Model 1	Model 2	Model 3	Model 4
Block 1: Demographics				
Age	**.10****	**.09****	**.09****	**.08***
Education	**-.10****	**-.09****	**-.09****	**-.08****
Gender (Female=1)	-.01	-.00	-.01	.00
Native English (Native English speaker= 1)	-.02	.01	.01	-.00
Asian	.00	.03	.03	.03
Hispanic/Latino	.03	.03	.03	.03
Other	.04	.01	.02	.03
Inc. R^2 *(%)*	2.1			
Block 2: Respondent Type				
Volunteer		-.02	-.01	-.00
Employee		.01	.04	.05
Scenario (Mammoth Hot Springs= 1)		**-.35*****	**-.34*****	**-.33*****
DEWA		.05	.04	.05
OLYM		.02	.02	.02
Inc. R^2 *(%)*		12.7		
Block 3: Incident Salience (Experienced similar incident/Unsure= 1)			**-.11*****	**-.10****
Number of national parks visited			.01	.01
Inc. R^2 *(%)*			1.0	
Block 4: Risk Perception				
Controllability				**.15*****
Desirability				.05
Danger				.05
Inc. R^2 *(%)*				2.5
Total R^2				.18
ANOVA				$F_{17, 927}$= 12.24***

Notes. *p< .05;**p<.01; ***p<.001
n = 945.
Cell entries for all models are standardized regression coefficients.

Table 4.21. Comparison of β values for Significant Predictors in Risk Perception Regression Models

Independent Variable (β)	Dependent Variable: Causal Attribution			
	Internal Causal Attribution (Park Visitor)	**External Causal Attribution (Park Management)**	**Challenging Conditions (Park Environment)**	**Bad Luck**
Age	**.08***	*ns*	**.08***	**-.10****
Education	**-.08****	**-.09***	*ns*	*ns*
Female	*ns*	**.10****	*ns*	*ns*
Native English Speaker	*ns*	**-.09***	*ns*	*ns*
Asian	*ns*	**.15****	*ns*	*ns*
Hispanic/Latino	*ns*	**.07***	*ns*	*ns*
Employee	*ns*	**.10***	**.19*****	**-.12****
Mammoth Hot Springs scenario	**-.33*****	**.10****	**.09***	**.20*****
DEWA	*ns*	**.09****	**.07***	*ns*
Incident Salience	**-.10****	*ns*	*ns*	**.11****
Controllability of Risk	**.15*****	**-.14*****	*ns*	**-.06***
Desirability of Risk	*ns*	*ns*	**.11****	**.06***
Danger Avoidance	*ns*	**.14*****	*ns*	**-.07***
Total R^2	**.18**	**.17**	**.06**	**.12**
ANOVA	$F_{17,927} = 12.24$***	$F_{17,927} = 11.06$***	$F_{17,941} = 3.50$***	$F_{17,935} = 7.62$***

Note. *p< .05;**p<.01; ***p<.001
Cell entries for all models are standardized regression coefficients.

Risk as inherent to park settings

While the quantitative measures described above provided one lens through which we can understand respondents' perceptions of risk within the park setting, responses to the open-ended survey item about the hypothetical incident provided additional insight. In commenting about the Hellroaring Creek incident, many respondents noted that hazards, such as steep cliffs or slippery surfaces, are both inherent to national park settings, and also important traits that distinguish these places from other locales, such as amusement or city parks. For some respondents, such inherent "dangers" made personal vigilance an unquestionable necessity in national parks, even when developed safety infrastructure exists. As respondents wrote:

- It is my humble opinion that many people do not truly appreciate the dangers of a natural setting because so much of their life is removed from these settings. Our 'civilized' lives have many 'built in' safety features not often found in the natural world. Also in most of our daily lives we are not the far from emergency services. Much of this changes in a natural setting and is not often considered. Many people assume that a National Park is as safe as an amusement park or city park (**Employee, MORA**).

- …Hiking in wilderness areas is inherently dangerous, even with a well marked, well signed, well maintained trail people, even well trained rangers, can lose their footing (**Employee, OLYM**).

- People need to remember where they are, the wilderness. It's life and death out there (**Volunteer, MORA)**.

- I think that many now grow up in a built environment where many hazards have been removed (schools, malls, and public spaces). As a result people are not learning to watch out for hazardous situations. In addition people are not being trained to take responsibility for their own safety. We have built a culture of seat belts, air bags, bike helmets and reflective clothes that make one think that equipment will keep them safe. I think that Ellison had not developed a sufficient personal awareness of dangers (**Employee, OLYM**).

(The idea of inherent risk will be explored further in the analysis of employee and volunteer in-depth interviews in Chapter 6). Furthermore, some respondents argued that these inherent hazards are not necessarily negative, or to be avoided, but rather unique characteristics that render national parks worth visiting and preserving for future generations. Representative quotations included:

- …Putting oneself at risk is part of the attraction of wilderness areas (**Visitor, OLYM**).

- Please leave national parks wild, if some people are too stupid not to fall down waterfalls let them fall and don't ruin the waterfall for everyone else by putting a fence around it. It is wilderness not a museum (**Visitor, OLYM**).

- The park can't put guardrails everywhere. It takes away from the experience (**Employee,**

MORA).

- To paraphrase a quote in the spirit of Ed Abbey – 'we should all have the freedom to get lost and risk death in the wilderness if we want to' (**Employee, DEWA**).

(I return to the idea of risk as a desirable attribute of national parks, including wilderness areas, in the analysis of in-depth interviews of employees and volunteers; see Chapter 6).

Summary

Qualitative and quantitative survey data helped to illuminate the relationships between the nature and context of park-related risk and causal attribution about a hypothetical visitor accident. According to an exploratory factor analysis, items related controllability and voluntariness of risk loaded on a single factor; therefore, the present analysis considered only controllability. Findings indicated a significant negative correlation between perceived controllability of risk and: (1) judging external (NPS-related) causes of a hypothetical accident as important, (2) judging challenging environmental conditions as important, and, (3) judging bad luck as an important causal factor. Moreover, a significant positive correlation existed between perceived controllability of risk and seeing internal causes of a hypothetical accident as important.

Significant positive correlations were found between perceived desirability of risk and: (1) judging challenging environmental conditions as causal factors contributing to a hypothetical visitor incident, and (2) viewing bad luck as a causal factor in the incident. Respondents' free responses indicated that, while they saw risk as inherent to many national park settings, such risk was not necessarily a negative characteristic, but rather could be a draw to such locations.

Finally, I found significant positive correlations between intending to avoid the park due to perceived danger (q22a) and: (1) attributing the cause of the hypothetical accident to internal factors, and (2) attributing the cause of the accident to external (NPS-related) factors. On the other hand, negative correlations were found between perception of danger/park avoidance and: (1) attributing the cause of the accident to bad luck, and (2) viewing risk as desirable in national parks.

Research Question Three: Risk Communication and Causal Attribution

Reliance on information sources

Research question three asked how exposure to formal/informal and official/unofficial risk communication relates to attributions of responsibility for the cause of accidents. In order to compare visitors' reliance on NPS versus non-NPS sources of information, I divided the list of information sources into official and unofficial. Official information included the following six listed sources: (1) NPS interpretive programs; (2) NPS brochures; (3) NPS website; (4) signs, exhibits, or movies; (5) the National Park Service's Traveler Information System (TIS) AM radio station; (6) interactions with NPS staff. Unofficial information included: (1) Guidebooks (e.g., hiking guide); (2) Visiting a local chamber of commerce, private business, or visitor center outside of the park; (3) Interacting with climbing guides, boating guides, or other recreational trip leaders; (4) Interacting with staff at restaurants, gift shops, or hotels in the park; and (5) Interacting with other park visitors, family members, or friends. The following sources, presenting in descending order from most to least, represent those that visitors reported relying on for park-related information, using a scale of 1-4, where 1 is "not at all," 2 is "very little," 3 is "some" and 4 is "a lot":

- **NPS website** (M = 3.18, SD = 1.0).
- **NPS brochures** (M = 2.99, SD = .93).
- **Interacting with NPS staff** (M = 2.80, SD = .96).
- **Signs, exhibits, movies** (M = 2.76, SD = .97).

- **Guidebooks (e.g., hiking guide)** (*M* = 2.72, *SD* = 1.09).
- **Interacting with other park visitors, family members, or friends** (*M* = 2.64, *SD* = .10).
- **Interacting with staff at restaurants, gift shops, or hotels in the park** (*M* = 1.93, *SD* = .98).
- **NPS interpretive programs** (*M* = 1.79, *SD* = 1.0).
- **Interacting with climbing guides, boating guides, or other recreational trip leaders** (*M* = 1.77, *SD* = 1.02).
- **TIS (NPS in-park AM radio station)** (*M* = 1.64, *SD* = .93).
- **Visiting local chamber of commerce, private business, or visitor center outside of the park** (*M* = 1.52, *SD* = .84).

By summing all of the information source variables in each category, official and unofficial, I created two new variables, the first reflecting the visitor's reliance on official information sources, and the second on unofficial information sources. Next, the sum of all 11 official and unofficial information variables was used to create a new variable that captured the total reported reliance on *all* park-related information.

Among visitors who received the Hellroaring Creek scenario, there were several small, positive, significant correlations between information reliance and attributional judgment. First, a significant positive correlation existed between the degree of reliance on official information sources and tendency to make internal causal attributional judgments ($r = .13$, $p < .01$). Second, I observed a significant positive correlation between the total reliance on all information sources listed (official and unofficial) and internal causal attributional judgments ($r = .15$, $p < .01$); however, in a regression model predicting reporting of challenging environmental conditions as important causal factors in a hypothetical visitor incident, reliance on official information failed to reach significance in the model (see Table 4.22). Since NPS information emphasizes both the local hazards of the park environment (e.g., geohazards in MORA, Lyme disease at DEWA) and the behaviors one can take to *avoid* such hazards, exposure to official information may increase the visitor's tendency to see himself as responsible for causing an accident.

Type of safety information received

When asked how much information they received about the a list of safety-related topics (on a scale of 1-4, where 1 is "none," 2 is "very little," 3 is "some," and 4 is "a lot")," visitors reported receiving the most information about weather conditions (M = 3.03, SD = 1.0), followed by road conditions/closures (M = 2.94, SD = 1.04), park hazards, such as wildlife, drowning, earthquakes or rockslides (M = 2.58, SD = 1.01), and finally, park regulations, such as boating or swimming restrictions (M = 2.52, SD = .99). By summing these four variables, a new variable was created to capture the total reported *amount* of safety information visitors received. Among visitors who read the Mammoth Hot Springs scenario, there was a small, positive, significant correlation between the total amount of safety information received, and the tendency to see challenging conditions as causal factors in a hypothetical visitor incident (r = .13, $p < .05$) (see Table 4.22). As mentioned above, this correlation makes intuitive sense, as park information tends to emphasize environmental hazards that can compromise visitor safety.

Table 4.22 Correlations between Information Reliance/Exposure and Causal Attribution Variables

Group	Official Info and Internal Causal Attribution	Official Info and Challenging Conditions	All Info Sources[1] and Internal Causal Attribution	All Info Sources and Challenging Conditions	All Safety Info[2] and Challenging Conditions
All Visitors	***r* = .13**** (*n* = 505)	*r* = .05, *ns* (*n* = 514)	***r* = .15**** (*n* = 483)	*r* = .06, *ns* (*n* = 490)	*r* = .06, *ns* (*n* = 490)
Visitors: Hellroaring	***r* = .11*** (*n* = 323)	***r* = .12*** (*n* = 331)	***r* = .13*** (*n* = 311)	***r* = .12*** (*n* = 317)	*r* = .04, *ns* (*n* = 427)
Visitors: Mammoth	*r* = .10, *ns* (*n* = 182)	*r* = -.04, *ns* (*n* = 183)	*r* = .10, *ns* (*n* = 172)	*r* = -.02, *ns* (*n* = 173)	***r* = .13*** (*n* = 254)

Notes.
*p< .05;**p<.01; ***p<.001
[1]All info sources= Sum of all information sources listed, i.e.,: NPS Interpretive program**;** NPS brochures; NPS website; signs, exhibits, movies; Traveler Information Systems (AM radio station); **i**nteracting with NPS staff (e.g., rangers); guidebooks (e.g., hiking guide); visiting local chamber of commerce, private business, or visitor center outside of the park; interacting with climbing guides, boating guides, or other recreational trip leaders; interacting with staff at restaurants, gift shops, or hotels in the park; and interacting with other park visitors, family members, or friends.
2 All safety info= Sum of the amount of information received about four safety topics listed, i.e., park hazards, park regulations, weather conditions, and road conditions/closures.

In a regression model predicting viewing challenging environmental conditions as important causal factors in a hypothetical visitor incident ($R^2 = .11$, $F(15, 398) = 3.12$, $p < .001$), amount of safety information emerged as a significant predictor (β = .23, p < .001); other significant predictors included: being female (β = .10, p < .05), being Asian (β = .14, p < .05), reading the Mammoth Hot Springs scenario (β = .10, p < .05), being affiliated with Delaware Water Gap (i.e., visitor or employee) (β = .23, p < .001), and incident salience (β= .12, p < .05) (see Table 4.23). As shown in Table 4.24, variables related to information failed to reach significance in any of the other regression models.

Table 4.23. Regression Predicting Challenging Conditions as Important Causal Attribution Factor: ***Visitors only***

	Model 1	**Model 2**	**Model 3**	**Model 4**
Block 1: Demographics				
Age	.03	.02	.03	.00
Education	**.10***	**.10***	.09	**.10***
Gender (Female=1)	.09	.08	.09	.09
Native English (Native English speaker= 1)	.12	.11	.11	**.12***
Asian	**.13***	**.12***	**.13***	**.14***
Hispanic/Latino	**.11***	.09	.10	.07
Other	.01	.02	.01	.01
Inc. R^2 (%)	3.1			
Block 2: Respondent Type				
Scenario (Mammoth Hot Springs= 1)		**.10***	.08	**.10***
DEWA		**.10***	**.10***	**.23*****
OLYM		.05	.05	.06
Inc. R^2 (%)		1.8		
Block 3: Incident Salience (Experienced similar incident/Unsure= 1)			**.12***	**.12***
Experience in park context			-.04	-.07
Inc. R^2 (%)			1.6	
Block 4: Information				
Official Info Reliance				.01
All Info Reliance				.01
Amount Safety Info				**.23*****
Inc. R^2 (%)				4.0
Total R^2				.11
ANOVA				$F_{15, 395}$= 5.19***

Notes. *p< .05;**p<.01; ***p<.001
n = 411.
Cell entries for all models are standardized regression coefficients.

Table 4.24. Comparison of Significant β values for Significant Predictors in Information Regression Models

Independent Variable (β)	Dependent Variable: Causal Attribution			
	Internal Causal Attribution (Park Visitor)	External Causal Attribution (Park Management)	Challenging Conditions (Park Environment)	Bad Luck
Female	*ns*	**.19*** **	**.10***	**-.12***
Asian	*ns*	**.25*** **	**.14***	*ns*
Native English Speaker	*ns*	*ns*	**.12***	*ns*
Hispanic/Latino	*ns*	**.12***	*ns*	*ns*
Mammoth Hot Springs scenario	**-.34*** **	**.15** **	**.10***	**.29*** **
Experience in park context	*ns*	**-.12***	*ns*	*ns*
DEWA	*ns*	*ns*	**.23*** **	*ns*
Incident Salience	**-.10***	*ns*	**.12***	*ns*
Total Safety Info	*ns*	*ns*	**.23*** **	*ns*
Total R^2	**.16**	**.23**	**.11**	**.13**
ANOVA	$F_{15,395} = 5.19$***	$F_{15,395} = 7.66$***	$F_{15,398} = 3.12$***	$F_{15,398} = 4.01$***

Note. *p< .05;**p<.01; ***p<.001
Cell entries for all models are standardized regression coefficients.

Summary

Using quantitative survey data, this section explored the relationships between reliance on, and exposure to, park-related information and causal attribution. Results indicated a significant, positive correlation between reliance on official information sources (e.g., park brochures, park staff, signs, etc.) and tendency to make internal causal attributional judgments with respect to a hypothetical visitor incident. Moreover, a significant positive correlation existed between total reliance on all information sources (formal and informal) and internal causal attributional judgments. Among visitors who read the Hellroaring Creek scenario, there was an additional positive correlation between total reliance on all information sources and judging challenging environmental conditions as important causal factors in the hypothetical incident. Finally, among visitors who read the Mammoth Hot Springs scenario, there was a significant positive correlation between the total amount of safety information received (i.e., in regard to topics including park hazards, regulations, weather conditions, and road conditions/closures), and the tendency to judge challenging conditions as important causal factors in a hypothetical visitor incident.

Chapter Summary

Using a hypothetical visitor accident scenario as a prompt, Chapter 4 explored the relationships between causal attribution, sense of place, perception of risk, and reliance on park-related information. Table 4.25 summarizes the results of the hypotheses and research questions investigated in this chapter, which I elaborate briefly in turn.

H1 was supported in that employees' causal attributions of the visitor accident described in the scenario did, in fact, differ from those of visitors. Whereas employees tended to view internal causal factors (i.e., related to characteristics of the victim, Roger Ellison) and environmental conditions (e.g., uneven terrain) as more important than did visitors, visitors tended to rate bad luck as a more important causal factor than did employees. Overall, employees tended to make self-defensive attributions, in that they held the visitor more responsible for causing the accident than other NPS-related external factors, such as park rules or infrastructure; however, these judgments were not related to their degree of experience (1) with the NPS; (2) with visitor safety incidents in general; or (3) with an incident like the one described. Therefore, H2 was not supported. With regard to H3, visitors' experience with the park context did, in fact relate positively to internal attributions of responsibility for accident causation. For instance, I observed a medium-sized, significant, negative correlation between reporting external causes of the visitor accident as important and the number of park visits the visitors had made in the past year.

Answers to the three research questions posed in this chapter provide further elaboration of the relationships between the causal attribution variables and other variables of interest. First, with regard to RQ1, there appears to be a positive relationship between perceiving natural and cultural-based place meanings related to the national park and: (1) internal causal attribution; and (2) viewing challenging environmental conditions as important causal factors. Likewise, I found positive correlations between feeling attached to the park and (1) internal causal attribution; and (2) judging challenging environmental conditions as important causal factors.

RQ2 investigated the relationships between three risk perception-related variables and causal attribution. There appears to be a negative relationship between perceiving park-based risk to be controllable and: (1) external (NPS-related) causal attribution; (2) internal causal attribution; (3) seeing challenging environmental conditions as important; and (4) seeing bad luck as an important causal factor. With regard to the desirability of risk, I found positive correlations with: (1) seeing challenging environmental conditions as important causal factors, and; (2) viewing bad luck as a causal factor. A third risk-related variable, avoiding visiting park due to perceived danger, was positively correlated with internal causal attribution and external causal attribution, as well as negatively correlated with seeing bad luck as a causal factor.

Finally, RQ3 examined the relationship between causal attribution and visitors' reliance on and exposure to park-related information. Significant correlations suggest a positive relationship between reliance on official (i.e., NPS) information sources and internal causal attribution. Moreover, among some visitor groups, there was a positive correlation between the total amount of safety information received, and the tendency to see challenging conditions as important causal factors.

Table 4.25. Summary of Hypotheses and Research Questions: Chapter 4

Hypothesis/Research Question	Findings
H1: Employees' causal attributions of visitor accidents will differ from visitors' causal attributions of accidents.	**Partially supported:** • No difference was found between employees' and visitors' judgments of external causal factors related to park management. • Employees saw internal causal factors related to the hypothetical visitor as more important than did visitors. • Employees saw challenging environmental conditions as a more important causal factor than did visitors. • Visitors saw bad luck as a more important causal factor than did employees.
H2: Employees' experience with the context will relate positively to self-defensive attributions of responsibility for causing accidents.	**Not supported:** • No relationship was found between tenure with the NPS (or the particular park) and self-defensive attributions of responsibility. • A significant association was found between *no* involvement in visitor safety incidents and reporting of above median internal causal attributional judgments. • A significant association was found between those who had *never* experienced a similar incident and reporting of above median internal causal attributions.
H3: Visitors' experience with the context will relate positively to internal attributions of responsibility for causing accidents.	**Partially supported**: • No relationship found between positivity of park visit and attributional judgment. • Medium-sized, significant, negative correlation between reporting external causes of the hypothetical visitor incident as important and the number of park visits the visitors had taken in the past year. • Small, significant negative correlation between reporting external causes of the hypothetical visitor incident as important and the length of the respondent's most recent visit. • Small, significant negative correlation between reporting external causes of the hypothetical visitor incident as important and the number of other national parks visited (besides the present park). • Those who reported that an incident had happened to them or someone they knew, or were unsure if one had happened, were more likely to report median or lower judgments of internal causal attribution than those who had not been involved in an incident.
RQ1: How do sense of place and place attachment relate to attributions about the cause of accidents?	*Place meaning:* • Small, significant, positive correlations between place meaning and: (1) judging internal causes of the hypothetical visitor incident as important; and (2) viewing challenging environmental conditions as important causal factors. *Place attachment:* • Small, significant, positive correlation between place attachment and judging internal causal factors as important to a hypothetical visitor accident scenario; and (2) judging challenging environmental conditions as important causal factors.
RQ2: How do perceptions of controllability, voluntariness, and desirability of park risks relate to attributions of responsibility for the cause of accidents?	*Controllability* • Small-medium sized, significant, negative correlation between perceived controllability of risk and seeing external causes of a hypothetical accident as important • Small, significant, positive correlation between perceived controllability of risk and seeing internal causes of a hypothetical accident as important. • Very small, significant, negative correlation between perceived controllability of risk and seeing challenging environmental conditions as important contributors to a visitor accident. • Very small, significant, negative correlation between perceived controllability of risk and seeing see bad luck as an important causal factor.

RQ2: How do perceptions of controllability, voluntariness, and desirability of park risks relate to attributions of responsibility for the cause of accidents? (continued)	*Desirability* • Small, significant, positive correlation between desirability of risk and seeing challenging environmental conditions as causal factors contributing to a hypothetical visitor incident. • Small, significant, positive correlation between desirability of risk and viewing bad luck as a causal factor in the incident. *Danger/risk avoidance* • Small, significant, positive correlation between perception of danger and internal causal attribution. • Small, significant, positive correlation between perception of danger and external causal attribution. • Small, significant, negative correlations between perception of danger and seeing bad luck as a cause of a hypothetical accident. • Medium-sized, significant, negative correlation between perception of danger and viewing risk as desirable in a national park.
RQ3: How does exposure to formal/informal and official/unofficial risk communication relate to attributions of responsibility for the cause of accidents?	*Official information* • Small, significant, positive correlation between reliance on official information sources and tendency to make internal causal attributional judgments with respect to a hypothetical visitor incident. *All information* • Small, significant, positive correlation between total reliance on all information sources listed and internal causal attributional judgments • (*Among some groups*) Small, significant, positive correlation between total reliance on all information sources listed and judging challenging environmental conditions as important causal factors. *Amount of Safety Information* • (*Among some groups*) Small, significant, positive correlation between the total amount of safety information received, and the tendency to see challenging conditions as causal factors in a hypothetical visitor incident.

In addition to these correlational analyses, OLS regression analyses predicting causal attribution also demonstrated these relationships between variables, as well as the role of several significant covariates. When considering all of the variables of interest examined in this chapter (i.e., sense of place, risk perception, and information-related), based on standardized Beta coefficients, two of the risk perception variables, controllability and perceived danger/risk avoidance, appeared to contribute most to predicting causal attribution-related outcome variables (see Tables 4.26 and 4.27). Within the regression models presented in this chapter, several covariates emerged as significant, including: age, sex, race/ethnicity (specifically, identifying as Asian or Hispanic/Latino), being a native English speaker, park (specifically, DEWA), education level, participant type (i.e., visitor, volunteer, or employee), experience in the park context, salience of the hypothetical incident, and which scenario the respondent read.

Table 4.26. Overall Regression Predicting External Causal Attribution: *Visitors only*

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Block 1: Demographics						
Age	.00	-.01	.00	.00	.01	.02
Education	-.06	-.06	-.05	-.05	-.05	-.04
Gender (Female=1)	**.22*****	**.20*****	**.18*****	**.18*****	**.13****	**.13****
Native English (Native English speaker= 1)	-.07	-.09	-.08	-.09	-.06	-.04
Asian	**.27*****	**.26*****	**.24*****	**.24*****	**.21*****	**.21*****
Hispanic/Latino	**.13****	**.11***	.09	.09	.09	.09
Other	-.05	-.04	-.05	-.05	-.05	-.05
Inc. R^2 (%)	15.8					
Block 2: Respondent Type (Mammoth Hot Springs= 1)		**.18*****	**.17*****	**.16****	**.14****	**.15****
DEWA		.08	.07	.06	.04	.03
OLYM		-.06	-.06	-.06	-.05	-.06
Inc. R^2 (%)		4.4				
Block 3: Incident Salience (Experienced similar incident/Unsure= 1)			-.02	-.02	-.02	-.02
Experience with context			**-.13****	**-.13****	**-.10***	**-.10***
Inc. R^2 (%)			1.5			
Block 4: Park Information Official Info				.12	.12	.14
All Info				-.07	-.09	-.11
Total Safety Info				-.03	-.03	-.02
Inc. R^2 (%)				.3		
Block 5: Risk Perception						
Controllability					**-.16****	**-.16****
Desirability					.03	.04
Danger					**.13***	**.14****
Inc. R^2 (%)					3.5	
Block 6: Sense of Place						
Place Meaning						-.08
Place Attachment						-.00
Inc. R^2 (%)						.6
Total R^2 (%)						.26
ANOVA						$F_{20, 385}$= 6.79

Notes. *p< .05;**p<.01; ***p<.001
n= 406
Cell entries for all models are standardized regression coefficients

Table 4.27. Comparison of β values for Significant Predictors in Regression Models Incorporating All Predictor Variables

Independent Variable (β)	Dependent Variable: Causal Attribution			
	Internal Causal Attribution (Park Visitor)	External Causal Attribution (Park Management)	Challenging Conditions (Park Environment)	Bad Luck
Female	*ns*	**.13****	*ns*	*ns*
Asian	*ns*	**.21*****	**.13***	*ns*
Education	*ns*	*ns*	**.10***	*ns*
Mammoth Hot Springs scenario	**-.33*****	**.15****	*ns*	**.28*****
DEWA	*ns*	*ns*	**.22*****	*ns*
Incident Salience	*ns*	*ns*	**.12***	*ns*
Experience in park context	*ns*	**-.10***	*ns*	*ns*
Total Safety Info	*ns*	*ns*	**.22*****	*ns*
Desirability of Risk	*ns*	*ns*	*ns*	*ns*
Controllability of Risk	**.13****	**-.16****	*ns*	*ns*
Danger Avoidance	**.17****	**.14****	**.19*****	*ns*
Total R^2	**.21**	**.26**	**.15**	**.15**
ANOVA	$F_{20, 385}$= 5.18***	$F_{20, 385}$ = 6.79***	$F_{20, 388}$= 3.46***	$F_{20, 388}$ =3.54***

Note. *p< .05;**p<.01; ***p<.001
Cell entries for all models are standardized regression coefficients

CHAPTER 5.

ATTRIBUTION OF RESPONSIBILITY FOR PREVENTING ACCIDENTS

Using quantitative and qualitative survey data, this chapter reports on the results of hypotheses and research questions related to what I refer to as prevention attribution: the attribution of responsibility for preventing visitor accidents, or, alternatively, for ensuring visitor safety in the park. Like Chapter 4, this chapter explores a dependent variable, prevention attribution, with respect to several independent variables of interest, including place meaning and attachment, perception of risk, and reliance on/exposure to park communication. In so doing, differences between the three respondent types, visitors, volunteers, and employees, are also explored.

Measurement and Descriptive Statistics

This section details measurement of the chapter's main dependent variable, prevention attribution, as well as compares employees,' volunteers,' and visitors' perceived appropriateness of the NPS response in the hypothetical scenario presented in the survey.

External responsibility: Perceived responsibility of NPS

Seven survey items (q22a- q22g) related to the perceived responsibility of the NPS to prevent visitor injury in park settings. The solution of a factor analysis (varimax rotation) of these items indicated that five of the variables loaded together, and appeared to describe external responsibility (i.e., responsibility of NPS); factor loadings created an External Responsibility Scale (Cronbach's alpha = .63)(see Table 5.1). Since the combination of these items was exploratory—i.e., they were adapted from measures used by Espiner (2000) and Tuler and Golding (2002)—the low observed alpha, though not ideal, may be somewhat expected. In addition, in order to create a dichotomous measure of external responsibility, I used a median split to divide the variable into two groups: (1) median or lower level of expressed support for NPS' responsibility to prevent visitor injury; and (2) higher than median expressed support for the NPS' responsibility. (This variable will be discussed further below).

Table 5.1. External Responsibility Scale

Survey Item	Cronbach's alpha
It is the responsibility of the NPS to prevent visitors from undertaking activities that may pose a serious risk to them, no matter how popular the activities are.	.63
Besides providing appropriate safety information and warnings, the NPS should not limit or prohibit activities that may pose serious risks to the participants. *(reverse coded)*	
NPS management should not prevent access to areas that might be dangerous. *(reverse coded)*	
While visitors are at the park, their safety is the responsibility of those who manage the area.	
Those who manage the park have an obligation to inform visitors about all things that might affect their safety.	

Appropriateness of NPS response

The majority of survey respondents viewed the park's response to the hypothetical visitor accident scenario as appropriate, with 57% of all respondents reporting that the park's actions, as described in the news brief, were "extremely appropriate," i.e., a 5 on a 5-point scale, where 1 is "not at all appropriate" and 5 is "extremely appropriate." Of those who read the Hellroaring Creek scenario, volunteers found the park's response most appropriate (M = 4.62, SD = .55), followed by employees (M = 4.51, SD = .65) and visitors (M = 4.47, SD = .67). Indeed, according to a post-hoc test (Hochberg's T2) comparing all individuals who received the Hellroaring Creek scenario (i.e., employees, volunteers, and visitors), there was a significant difference between the mean level of perceived appropriateness between visitors and volunteers ($p = .037$), with volunteers perceiving the park's response as more appropriate than did visitors. Mean differences between employees and visitors ($p = .856$), and employees and volunteers ($p = .238$), however, were not significant.

Mean levels of perceived appropriateness of park actions also appeared to vary according to which scenario respondents received. Results of an independent samples t-test indicated that, on average, those who read the Mammoth Hot Springs accident scenario perceived the park's response as *less* appropriate ($M = 4.38$, $SD = .69$) than those who read the Hellroaring Creek scenario ($M = 4.51$, $SD = .64$); this difference was significant ($t(1101) = 2.81$, $p = .005$).

Hypothesis Four: Voluntary Risk-Taking and Prevention Attribution

High-risk activities and prevention attribution

Hypothesis four stated that visitors' voluntary risk-taking would relate positively to internal attributions of responsibility for preventing injury. Results of a factor analysis (varimax rotation) indicated that mountaineering, rock climbing, skiing/snowboarding, and backpacking in the backcountry loaded onto a single factor, and this loading also aligned with the "high risk" classification of recreational activities used by Rickard, Scherer, and Newman (2011). Measuring level of objective risk associated with a recreational activity is somewhat problematic, as activities appearing "safer" may, in fact, contribute to more injuries and deaths than activities that are seemingly "riskier." Interestingly, the specialized equipment and know-how needed to engage in the activities listed above tends to inhibit a wider base of visitor participation. Activities like swimming or walking on trails, on the other hand, tend to be more accessible to a broader range of the visiting public, thus paradoxically leading to more injuries and deaths simply due to increased participation. Recognizing this problematic (and perhaps artificial) distinction between "risky" and "safe" activities, I nonetheless see value in grouping mountaineering, rock climbing, skiing/snowboarding, and backpacking together, in that these activities likely attract a certain type of park visitor—for instance, an individual interested in recreating in less developed, more remote areas of the park.

Of the visitors who participated in at least one "risky" (by this definition) recreational activity (see Table 5.2), about two-thirds (68%; n = 111) expressed median or *lower* support for external (i.e., NPS) responsibility for visitor safety, as compared to less than half (44%; n = 224) of visitors who had not participated in any of these activities; this relationship was significant (χ^2 (1, N = 679) = 29.12, p = .000). That is, visitors who participated in high-risk recreation appeared to assign the NPS less responsibility for preventing their injury/ensuring their safety, and instead, we can surmise, accepted this responsibility themselves, thus supporting H4. Moreover, I observed a medium-sized, negative, significant correlation between the number of high-risk activities that the visitor reported participating in (i.e., backpacking, mountaineering, rock climbing, and skiing or snowboarding) and support for external (i.e., NPS) responsibility for ensuring safety (r = -.23, p = .000), providing further support for this hypothesis. This pattern of attributing less responsibility given participation in certain recreational pursuits follows the conclusions of Rickard et al. (2011) in their sample of MORA park visitors.

Table 5.2. Visitor Participation in "High Risk" Recreational Activities by Park Unit

		DEWA	MORA	OLYM	TOTAL
Backpacking	*Number visitors*	5	42	13	**60**
	% in-park respondents	3%	10%	8%	**8%** (all visitors)
Mountaineering	*Number visitors*	8	46	13	**67**
	% in-park respondents	4%	11%	8%	**9%** (all visitors)
Rock climbing	Number visitors	3	5	5	**13**
	% in-park respondents	2%	1%	3%	**2%** (all visitors)
Skiing/Snowboarding	Number visitors	7	52	50	**109**
	% in-park respondents	4%	13%	29%	**14%** (all visitors)

Preparedness

Though visitors were not asked to rate the risk they may have perceived as associated with their recreational pursuits, self-reported levels of preparedness for the main activity appear to tell part of the story. (Recall from Chapter 4 that about half of the visitor sample, 53%, rated themselves as "completely prepared" for their main activity). For instance, of those visitors who took part in mountaineering, 65% reported being "completely prepared," as opposed to 52% of visitors who did not participate in mountaineering; this difference was statistically significant (χ^2 (1, N = 746) = 4.33, p = .038). Likewise, of the visitors who reported skiing or snowboarding, 65% perceived themselves as "completely prepared," compared to 51% of those who did not ski or snowboard, also a significant association (χ^2 (1, N = 746) = 7.14, p = .008). To some extent, these results are not surprising. As opposed to driving through a park or touring a visitor center, taking part in mountaineering or skiing/snowboarding require that an individual have specialized clothing and equipment (e.g., skis, crampons, ice axes, plastic boots) just in order to perform the activity itself. To a certain extent, these activities, by their very nature, require a higher degree of visitor preparedness from the start.

While visitors' judgments of their preparedness are illuminating, the self-report nature of the measure does not allow us to judge whether, for instance, individuals may have exaggerated their readiness to participate in an activity, just as they may have underestimated their personal risk (i.e., optimistic bias). Nonetheless, one avenue to better understanding visitors' perceptions is through analyzing their responses to an open-ended survey item asking for an explanation of their reported preparedness. Considering only those respondents who viewed themselves as "completely prepared" for their chosen activity (i.e., reported "5" on the 1-5 Likert scale), explanations for being prepared seemed to follow four major lines of reasoning. First, visitors explained their preparedness as having the equipment and supplies they deemed appropriate for the circumstances, such as the "ten essentials"—a list of common items, such as extra clothing and water, that the NPS promotes as necessary for a safe hike. As one MORA visitor explained:

> I felt we had everything we needed in case things went wrong: extra food, extra clothes, flashlights, knives, first aid kit, matches, as well as good synthetic/waterproof/breathable clothing, sunglasses, sunscreen, and sufficient water.

Also "prepared" for a park activity, though in a very different context, a DEWA visitor noted: "Just had to jump in the river—no preparation except a bathing suit…" A second, common explanation for seeing oneself as prepared was having the (perceived) necessary knowledge of or experience in the national park and its environs. An OLYM visitor described that s/he "[lives] near the park and [has] been skiing at Hurricane Ridge for 30 years" and a DEWA visitor commented that s/he "[has] been canoeing dozens of times through this area." Similarly, a third explanation for judging oneself prepared surrounded having already participated in the activity in question, including having been through pertinent trainings. An OLYM visitor explained that s/he and her group "have done this for years and my son is certified with Kitsap Search and Rescue," while a MORA visitor justified his/her preparedness as such:

> We have backcountry skied at Mount Rainier many times (as well as other places) and have all the safety and other gear we need, we are with a trusted group of experienced

> friends, we know where we are going and we have backup plans if that doesn't work out because of the weather or avalanche danger. We have taken an avalanche class.

Finally, some respondents explained their "complete" preparedness as emanating from their trip planning and preparation, including both prior to and during their park visit. Such preparation often involved gathering information central to their recreational pursuits from sources both outside of the park (e.g., websites, park phone lines, etc.) and within the park (e.g., park staff, brochures, signs, etc.). As one MORA visitor described, "Prior to going backcountry skiing I consult the weather telemetry, forecast, avalanche conditions and maps to decide on my touring route." And in the words of a less experienced MORA visitor:

> I have called the park to ask questions and have gone online to check weather, and road conditions and for general information about the trails, etc. We are fairly new at hiking and don't want to make rookie mistakes that could cause us to be in danger or trouble...

Of the visitors who perceived themselves as less than "completely prepared" for their activity (i.e., answered 1-4 on the Likert scale), explanations of preparedness tended to feature different elements. First, some respondents explained that they had taken a spontaneous trip to the park that involved no pre-planning, such as the DEWA visitor who described being "in the area for a wedding and decided to do this as an extra activity on a whim." Unfortunately, such spur-of-the-moment trips can sometimes leave visitors lacking the equipment necessary for the climate and environment, as one OLYM visitor's explanation illustrates:

> We came to the park on short notice, because of the weather. We didn't even stop to think that there would be snow. But, it was nice enough out that the snow wasn't a real issue. However, we weren't really prepared for it.

Other visitors described needing more experience with the activity or knowledge of the park environment in general; for instance, a MORA visitor commented that, "As a beginner showshoer, I am still learning what to bring/carry in order to be better prepared" and a DEWA visitor described him/herself as "new to the Gap and did not know where to retrieve much of the information for hiking." Likewise, other respondents explained their lack of preparedness as due to their failure to account for the conditions at the park, whether the difficulty of trails, or the availability of amenities. According to an OLYM visitor, "We were unaware that the food shop was closed when we left to go to Hurricane Ridge, thus bringing no food, " while a MORA visitor noted, " We didn't realize the trail would be so snowy and not everyone in our party was dressed appropriately, or had the right kind of shoes." As the previous comment (and others before it) suggest, several respondents described lacking what they perceived as equipment and supplies necessary for their activity, whether snowshoes or snacks. As a MORA visitor put it: "Needed eye protection goggles from bright white snow and sun."

While the explanations presented thus far have, to a great extent, emphasized characteristics of the individual, such as lacking sufficient information or equipment, other reasons for not feeling "completely prepared" referenced the larger visitor group. Respondents described group members not physically prepared for engaging in the activity, such as a MORA visitor's comment that, "Most of the people I was with were too out of shape to go very far." Others explained that obligations to care for children or elderly members of their groups constrained their park experiences, and often in unanticipated ways. For instance, a DEWA visitor suggested that the "kids did not help rowing and we had to tow their raft with our canoe," while another DEWA visitor described taking her 93 year-old mother to see the falls and not expecting the extended walk. A MORA visitor's comment illustrates the difficulties of traveling with small children, compounded by the challenging terrain and environmental conditions of the park:

> We went on a two-mile hike in February, with six kids, two were three years old, one was six years old, the others were eight and eleven, with eight adults. We hiked down hill to a waterfall and took nothing with us. The walk back was bad. The kids had played on the way down and were cold and wet. The wind came up and it was a very steep hike back up that took a long time to do. We rotated on carrying the little ones who cried most of the way back up… Two miles didn't seem far at the time, but boy o boy, when it's all uphill

with snow, it's hard.

Summary

To review, analysis of quantitative survey data suggested support for H4, in that visitors who participated in certain "risky" recreational activities (e.g., mountaineering, skiing/snowboarding) were less likely to view the NPS as responsible for preventing their potential injury or ensuring their safety while at the park. Of the visitors who participated in at least one "risky" recreational activity, about two-thirds expressed median or lower support for external responsibility for visitor safety, as compared to less than half of visitors who had not participated in any of these activities. Moreover, a significant negative correlation existed between the number of risky activities that the visitor reported participating in and support for external responsibility. Examining respondents' self-reports of preparedness for their recreational activities at the park revealed that those participating in risky activities (e.g., mountaineering) viewed themselves as more prepared than those who did not. Qualitative, free-response data provided a window into understanding these perceptions of preparedness, and many visitors seemed to equate being prepared with having the necessary equipment, experience, information, preparation, and know-to perform the activity in the unique park environment.

Hypothesis Five: Employees and Prevention Attribution

Internal attribution: Individual responsibility for preventing the hypothetical scenario

Hypothesis five stated that employees will be more likely to report internal attributions of responsibility for ensuring safety (i.e., individual responsibility) than external (i.e., NPS) or shared attributions of responsibility. After reading the Hellroaring Creek scenario, roughly half of the employees surveyed (54%; n = 133) reported that responsibility for preventing the incident rested *entirely* with Mr. Ellison, the injured visitor. By comparison, only 5% of the sample (n =

13) viewed Mr. Ellison and the NPS as equally responsible for injury prevention. Interestingly, an additional 6% of employees (*n* = 15) either did not assign responsibility to one party, or did not view the incident as preventable. These frequencies illustrate that employees in the sample were more likely to report internal attributions of responsibility for the hypothetical visitor injury incident than external or shared attributions of responsibility; thus, H5 is supported.

Like employees, volunteers and visitors, for the most part, also expressed more support for internal attributions of responsibility for preventing the accident than external or shared attributions. Of the visitors who read the Hellroaring Creek scenario, the majority (60%, *n* = 264) saw Mr. Ellison as entirely responsible for the prevention of his injury (57% of volunteers, *n* = 91). As was true for the employee sample, only 6% of visitors (*n* = 24) and 7% of volunteers (*n* = 11) reported Ellison and the NPS as equally responsible. In addition, 12% (*n* = 53) of visitors (5%, *n* = 8 of volunteers) either did not assign responsibility or did not view the incident as preventable (see Figure 5.1). While these percentages appear quite similar across the three groups, results of a chi-square test suggest that the slight differences are, in fact, significant (χ^2 (10, N = 844) = 23.96, p = .008). For instance, examining the proportions of respondents across categories in each of the three groups, visitors were most likely to: (1) see Mr. Ellison as entirely responsible for causing the accident, (2) view the accident as neither Mr. Ellison nor the park's responsibility, or (3) to view the incident as unpreventable (see Table 5.3).

Figure 5.1. Perception of Responsibility to Prevent a Hypothetical Visitor Accident by Respondent Type

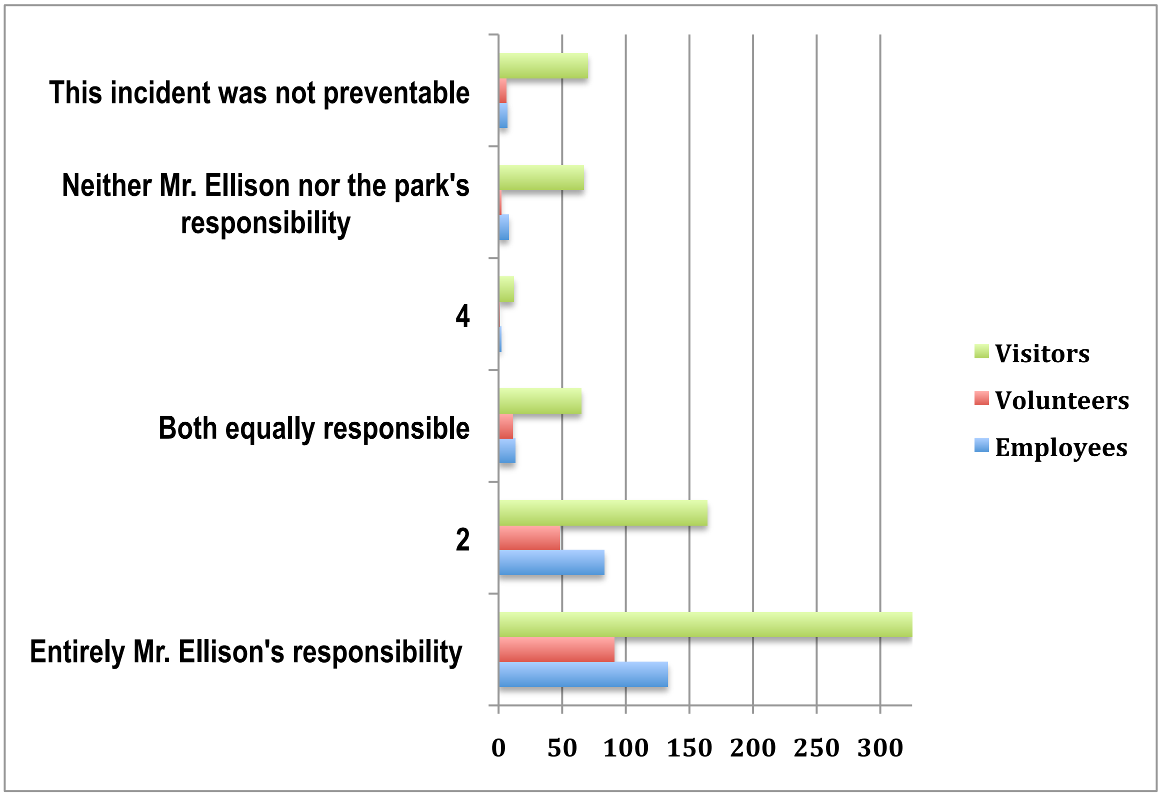


Table 5.3. Prevention Attribution for a Hypothetical Visitor Accident

	Employees (*n*, % within participant group)	**Volunteers** (*n*, % within participant group)	**Visitors** (*n*, % within participant group)	**Total** (*n*, % all survey respondents receiving Hellroaring Creek scenario)
Entirely Mr. Ellison's responsibility	133 (54%)	91 (57%)	264 (60%)	488 (58%)
2	83 (34%)	48 (30%)	92 (21%)	233 (26%)
Both equally responsible	13 (5%)	11 (7%)	24 (6%)	48 (6%)
4	2 (.8%)	1 (.6%)	6 (1%)	9 (1%)
Neither Mr. Ellison's nor the park's responsibility	8 (3%)	2 (1%)	26 (6%)	36 (4%)
This incident was not preventable	7 (3%)	6 (4%)	27 (6%)	40 (5%)
Total	246 (100%)	159 (100%)	439 (100%)	844 (100%)

Internal attribution: Visitors should accept responsibility

A second survey item measured respondents' perceptions of internal prevention attribution, and can also be used to test H5. When asked to report their level of agreement with the statement, "If visitors will not accept responsibility for their own safety, they should not visit [park name]" (q22e), about one third of employees (32%, *n* = 80) strongly agreed (i.e., "5" on a 1-5 Likert scale), while nearly half (46%) agreed. An additional 14% (*n* = 34) expressed a neutral stance, 5% disagreed (*n* = 13) and a scant 2% (*n* = 4) strongly disagreed. Based on these frequencies, nearly 80% of the employee sample expressed some level of agreement with the idea that visitors should accept responsibility for their own safety, lending even more support to H5.

It is worth noting that, as indicated by the frequencies reported above for employee respondents, item q22e elicited skewed responses, with the majority falling into the "agree" or "strongly agree" categories; when considering *all* survey respondents, for instance, 43% (*n* = 511) strongly agreed, while an additional 36% (*n* = 428) agreed. To account for this skewness, I dichotomized variable q22e, creating a new variable with two response categories: (1) those who "strongly agreed" that "if visitors will not accept responsibility for their own safety, they should not visit [park name]"; and (2) those who chose any other response category (i.e., agree, neutral, disagree, strongly disagree). While 52% of visitors expressed strong agreement (*n* = 365), only 42% of volunteers (*n* = 66) and 33% of employees (*n* = 80) fell into the same category. According to the results of a chi-square analysis, there appears to be a significant association between survey participant type and expressing strong support for internal prevention attribution (χ^2 (2, N = 1104) = 29.32, p = .000).

Moreover, as illustrated in the previous section, comparing employees' responses to item q22e to those of volunteers and visitors can illuminate potential differences in perceived internal attribution of responsibility for preventing injury/ensuring visitor safety. Based on an independent samples t-test, a significant difference in means existed between visitors ($M = 4.37$, $SD = .79$) and employees ($M= 4.03$, $SD = .91$) on the degree to which they agreed that visitors need to accept responsibility for their safety in a park ($t(945)= -5.55$, $p= .000$). Though visitors, considered as a group, were *more* likely to see visitors as responsible for their own safety than were employees, comparing visitors by park provides evidence of differences *within* the visitor population. While OLYM visitors expressed the most support for internal prevention attribution ($M = 4.40$, $SD = .76$), DEWA visitors expressed the least ($M = 4.30$, $SD = .83$), with MORA visitors falling in the middle ($M = 4.39$, $SD = .78$); a post-hoc comparison of means (Hochberg T2), however, suggested that these mean differences were not statistically significant. With OLYM and MORA both classified as "backcountry" parks, and DEWA, with its preponderance of frontcountry picnic areas and lifeguarded beaches, less so, this pattern of responses appears to follow Tuler and Golding's (2002) finding that attributions of responsibility may vary by park "type."

Summary

To review, the majority of employees surveyed reported that responsibility for preventing the hypothetical visitor accident described in the survey scenario rested entirely with the injured visitor himself, with only a very small minority (i.e., 5% of the sample) viewing the NPS and the visitor as equally responsible for preventing the accident; thus, H5 is supported. On a second survey item, nearly 80% of the employee sample expressed some level of agreement with the idea that visitors should accept responsibility for their own safety (or else not visit a national park), lending even more support to H5.

Hypothesis Six: Visitors and Prevention Attribution

As described below, I found partial support for Hypothesis 6, which stated that visitors' attributions of responsibility for ensuring safety (i.e., preventing injury) will vary by: (1) age; (2) sex; and (3) country of origin.

Age

No significant correlation existed between visitors' age and their support for external responsibility or for internal responsibility. As will be demonstrated later in this chapter, however, in several regression models predicting support for external (i.e., NPS) responsibility, however, age did emerge as a positive, significant predictor variable.

Sex

Whereas 54% of male visitors (n = 236) expressed median or lower levels of support for external (i.e., NPS) responsibility for preventing visitor injuries, 41% of female visitors (n = 99) fell into the same category. Results of a chi-square analysis suggested a significant association between gender and expressed support for external responsibility (χ^2 (1, N = 678) = 10.88, p = .001). In other words, women visitors in the sample appeared more likely to express median or higher levels of support for NPS responsibility. (Respondents' sex also emerges as a significant predictor variable in several regression models presented later in this chapter).

Country of origin and native language

Support for external responsibility did not vary by U.S. residency (i.e., whether or not the individual reported being a current U.S. resident) (χ^2 (1, N = 676) = 1.87, p = .171). (It is important to note that a large majority of the visitor sample, i.e., 98%, resided in the U.S.).

Interestingly, however, support for external responsibility *did* vary by native language. Those who reported being non-native English speakers were *more* likely to express more support for external (i.e., NPS) responsibility. Whereas 79% of non-native speakers (*n* = 41) expressed median or higher levels of support for external responsibility, only 48% of native speakers (*n* = 301) fell into the same category; this association was statistically significant (χ^2 (1, N = 677) = 18.08, p = .000). (Native language also emerges as a significant predictor variable in several regression models presented later in this chapter).

Summary

This section provided evidence of partial support for H6. No significant correlations existed between age and support for external or internal prevention attribution. Whereas over half (54%) of male visitors expressed median or lower levels of support for external responsibility, only 41% of females were in the same category; this relationship was significant. Moreover, as evidenced in several regression models predicting external responsibility, women expressed more support for external responsibility than did men. Prevention attribution did not vary by country of origin; however, though not hypothesized, those who reported being non-native English speakers were *more* likely to express more support for external responsibility.

Hypothesis Seven: Occupational Position and Prevention Attribution

Hypothesis 7 stated that employees' attributions of responsibility for ensuring safety would vary by occupational position and level in the agency. Table 5.4 provides a comparison of mean scores on the External Responsibility Scale by employee division in the park. When considered as a group, employees in the Visitor & Resource Protection division expressed the *most* agreement with the park's responsibility to prevent visitor injury than any of the other park divisions (*M* = 16.03, *SD* = 2.83), and employees in the Natural & Cultural Resources Division

(NCR) expressed the least (*M* = 14.85, *SD* = 2.47). According to the results of a post-hoc comparison of means (Dunnett's C), there were significant mean differences ($p < .05$) in attributing external (i.e., NPS) responsibility between NCR employees and two other employee groups: (1) Interpretation and Education, and (2) Maintenance & Trails. Whether or not the individual was employed on a year-round or seasonal basis did not affect support for external responsibility (χ^2 (1, N = 236) = .000, p = 1.00).

Table 5.4. Employees' Mean Scores on External Responsibility Scale by Park Division

Park Division	Mean	N	Std. Deviation
Administration	15.81	48	3.01
Natural & Cultural Resources	14.85	40	2.47
Maintenance & Trails	15.96	46	2.84
Visitor & Resource Protection	16.03	67	2.83
Interpretation & Education	15.64	25	2.16
Total	15.72	226	2.75

When considered in a regression model predicting support for external responsibility (R^2 = .36, F(20, 154) = 3.54, p < .001), occupational position also appeared to be a significant contributing variable, providing partial support for H7. More specifically, employees who worked in Administration (β = -.24, p < .01) and in NCR (β = -.22, p < .05) expressed *less support,* as compared to employees in Visitor and Resource Protection (the reference group), for the responsibility of the NPS to prevent visitor injury/ensure safety (see Table 5.5). A regression model predicting internal (visitor) responsibility for ensuring safety was not significant: (*F(*24, 154) = 1.28, p = .188).

Table 5.5. Regression Predicting Support for External (NPS) Responsibility: *Employees*

	Model 1	Model 2	Model 3	Model 4	Model 5
Block 1: Demographics					
Age	.06	.16	.13	.14	.14
Education	-.04	-.01	-.06	-.07	-.03
Sex (Female =1)	.11	.15	.11	.12	.10
Native English (Nat. speaker = 1)	-.07	-.09	.01	.00	.01
Asian	.03	.03	.07	.05	.01
Hispanic/Latino	-.09	-.03	-.01	-.01	.01
Other	.08	.08	.02	.02	.01
Inc. R^2 (%)	3.4				
Block 2: Park Experience					
DEWA		.11	.08	.05	.05
OLYM		-.07	-.05	-.07	-.05
Experience in park		-.15	-.15	**-.18***	-.17
Park division: (Admin= 1)		**-.21***	**-.20***	**-.21***	**-.24****
Park Division: (N&C Resources =1)		**-.25****	**-.21***	**-.21***	**-.22***
Park Division: (Maint. & Trails= 1)		.01	-.00	-.01	-.03
Park Division: (Interp= 1)		-.01	-.02	-.02	-.01
Seasonal		.04	.04	.06	.05
Inc. R^2 (%)		11.6			
Block 3: Risk Perception					
Controllability			**-.36*****	**-.36*****	**-.34*****
Desirability			-.01	-.01	.01
Danger would deter visit			**.26*****	**.27*****	**.25*****
Inc. R^2 (%)			16.4		
Block 4: Sense of Place					
Place Meaning				-.09	-.05
Place Attachment				.11	.10
Inc. R^2 (%)				.9	
Block 5: Causal Attribution					
External (NPS)					**.18***
Internal (Visitor)					.01
Bad luck					.00
Challenging conditions					.09
Inc. R^2 (%)					3.2
Total R^2 (%)					.36
ANOVA					$F_{24, 154}$= 3.54***

Notes. *p< .05;**p<.01; ***p<.001
n = 181
Cell entries for all models are standardized regression coefficients.

How might we explain these differences in prevention attribution by park division? An explanation perhaps requires some knowledge of the nature of these occupational positions. That employees in NCR appeared to differ from employees in the other park divisions may be attributable to their relatively short tenure with the park and with the NPS more generally, as compared other employees. As shown in Table 5.6, employees in NCR reported the lowest mean years spent working for the NPS (M = 11.57, SD = 8.78) as compared to the four other divisions. Likewise, those in NCR reported the second lowest mean years spent in the current park (M = 8.87, SD = 6.56); although employees in Interpretation and Education reported a lower average of years spent in the current park (M = 6.40, SD = 6.40), these positions are often seasonal and interpretive rangers will routinely move between parks on a yearly basis. Because NCR employees have spent less time in their current park and in other national parks than most other employees, it is possible that these individuals are less familiar with the culture of the Park Service with respect to visitor risk management—an area in which most of them are not directly involved. As scientists and researchers, these individuals may have had additional or even more experience in settings other than parks, such as other government agencies (e.g., U.S. Fish & Wildlife Service) or universities: places in which public risk management may be a less visible (or salient) institutional concern. While individuals in Administration had, on average, spent the most time working for the NPS, like the employees in Natural and Cultural Resources, most participate very little—if at all—in visitor safety-related activities. In charge of hiring, budgets, and other critical operational tasks, many of these individuals spend limited (or no) time interacting with park visitors.

Table 5.6. Tenure with NPS by Park Division

	Years Worked for NPS		
Park Division	Mean	N	Std. Deviation
Administration	20.96	45	11.72
Natural & Cultural Resources	11.57	40	8.77
Maintenance & Trails	18.95	40	11.27
Visitor & Resource Protection	13.89	64	9.75
Interpretation & Education	14.25	24	8.95
Total	15.94	213	10.73

Summary

To review, this section provided evidence of partial support for H7. Results of a post-hoc comparison of means as well as a regression model indicated significant differences between employees in some, although not all, of the different park divisions; however, whether or not the individual was employed on a year-round or seasonal basis did not affect support for external responsibility. In explaining these differences between park divisions, we may consider the typical responsibilities associated with jobs in each division (e.g., whether or not they include visitor contacts), the typical background of an employee (e.g., whether or not s/he has had considerable experience in other institutions, such as universities or other government agencies), and the typical employee's overall tenure with the park and the agency.

Research Question Four: Sense of Place and Prevention Attribution

Research Question 4 asked how place meaning and attachment relate to attributions of responsibility for preventing visitor accidents. I observed a small, significant, negative correlation between place attachment and support for external responsibility (r = -.11, p = .000); no significant correlations existed between agreement with the Place Meaning Scale and any of the prevention attribution variables (see Chapter 4). Results of a regression model predicting external responsibility (R^2 = .12, F(15, 944) = 8.57, p < .001), further clarify these relationships.

Agreement with “blended” place meaning was significantly, positively related to support for external responsibility (β = .10, p < .01), whereas place attachment was significantly, negatively related (β = -.13, p < .001). Other significant predictors included the respondent’s age (β = .08, p < .05), education level (β = -.09, p < .01), being female (β = .11, p < .001), being a Native English speaker (β = -.15, p <.001), being Asian (β = .13, p < .001), and being affiliated with DEWA (β = .11, p < .01) (see Table 5.7). In a regression model predicting internal responsibility (R^2 = .05, F(15, 951) = 3.64, p < .001), neither of the sense of place variables reached significance (see Table 5.8).

Table 5.7. Regression Predicting External Responsibility: Sense of Place Variables

	Model 1	Model 2	Model 3	Model 4
Block 1: Demographics				
Age	**.08****	**.08***	**.08***	**.08***
Education	**-.10****	**-.10****	**-.09****	**-.09****
Gender (Female=1)	**.13*****	**.12*****	**.12*****	**.11*****
Native English (Native English speaker= 1)	**-.15*****	**-.15*****	**-.15*****	**-.15*****
Asian	**.13*****	**.14*****	**.14*****	**.13*****
Hispanic/Latino	.01	-.00	-.00	-.00
Other	.01	.01	.01	.01
Inc. R^2 (%)	8.2			
Block 2: Respondent Type				
Volunteer		**.11****	.02	.04
Visitor		-.05	.06	.06
DEWA		.02	**.11****	**.11****
OLYM		.03	-.05	-.05
Inc. R^2 (%)		1.8		
Block 3: Incident Salience (Experienced similar incident/Unsure = 1)			-.05	-.05
Number of national parks visited			-.04	-.04
Inc. R^2 (%)			.4	
Block 4: Sense of Place				
Place Attachment				**-.10****
Place Meaning				**-.13*****
Inc. R^2 (%)				1.5
Total R^2 (%)				.12
ANOVA				$F_{15, 944}$= 8.57***

Notes. *p< .05;**p<.01; ***p<.001
n = 960
Cell entries for all models are standardized regression coefficients.

Table 5.8. Comparison of β values for Significant Predictors in Sense of Place Regression Models

Independent Variable (β)	Dependent Variable: Causal Attribution	
	External (NPS) Responsibility	**Internal (Visitor) Responsibility**
Age	**.08***	*ns*
Education	**-.09****	*ns*
Female	**.11*****	*ns*
Native English Speaker	**-.15*****	*ns*
Asian	**.13*****	*ns*
Hispanic/Latino	*ns*	**-.09****
DEWA	.11**	*ns*
Volunteer	*ns*	**-.10*****
Employee	*ns*	**-.21*****
Place Attachment	**-.13*****	*ns*
Place Meaning	.10**	*ns*
Total R^2	**.12**	**.05**
ANOVA	$F_{15, 944} = 8.57$***	$F_{15, 951} = 3.64$***

Note. *p< .05;**p<.01; ***p<.001
Cell entries for all models are standardized regression coefficients.

Summary

To review, no significant correlations were observed between agreement with "blended" place meaning and prevention attribution; in a regression model, however, there was a significant, positive relationship between agreement with place meaning and support for external responsibility. I observed a significant, negative correlation between place attachment and support for external responsibility; this relationship also held in a regression model.

Research Question Five: Relationship between Prevention and Causal Attribution

Research question five asked how attributions of responsibility for preventing accidents relate to causal attributions about a hypothetical visitor accident. In order to answer this question, I first investigated two-tailed Pearson's correlations using four variables related to causal attribution: (1) the Internal (i.e., park visitor) Causal Attribution Scale, (2) the External (i.e., NPS) Causal Attribution Scale, (3) seeing the hypothetical visitor incident as the result of bad luck, and (4) seeing the visitor incident as the result of challenging environmental conditions (see Chapter 4). These variables were compared to two variables related to attribution of responsibility for preventing visitor injury/ensuring safety: (1) the External Responsibility Scale, and, (2) viewing the visitor as responsible for ensuring his/her safety (q22e). (Only visitors who had received the Hellroaring Creek scenario were considered in this analysis). As shown in Table 5.9, several significant correlations existed, including between external responsibility and:

- Seeing the visitor as responsible for his/her safety (r = -.13, $p < .001$)
- Attributing the cause of a hypothetical accident to external (i.e., NPS-related) factors (r = .44, $p < .001$)
- Attributing the cause of a hypothetical accident to challenging park conditions (r = .12, $p < .01$).

In addition, significant correlations were observed between viewing the visitor as responsible for preventing injury/ensuring his/her own safety and:

- Attributing the cause of an accident to internal factors (r = .11, $p < .01$)
- Attributing the cause of an accident to external (i.e., NPS-related) factors (r = -.13, $p < .001$)

Table 5.9. Correlations Between Prevention Attribution and Causal Attribution: ***All survey respondents who read the Hellroaring Creek scenario***

	Ex Resp	Vis Resp	Internal Causal	External Causal	Challenging Conditions
External Responsibility Scale	1	**-.13****** (n = 833)	.01, *ns* (n = 804)	**.44****** (n = 811)	**.12***** (n = 826)
Visitor responsible for own safety[1] **(q22e)**		1	**.11***** (n = 808)	**-.13***** (n = 833)	-.02, *ns* (n = 833)

Note. Significant Pearson correlations are in bold.
***Correlation is significant at the .001 level (2-tailed). **Correlation is significant at the .01 level (2-tailed).
*Correlation is significant at the .05 level (2-tailed).
[1]Survey item wording: "If visitors will not accept responsibility for their own safety, they should not visit the park."

Results from a regression model predicting external responsibility ($R^2 = .20$, $F(16, 711) = 11.25$, $p < .001$) further clarify these relationships. External causal attribution was significantly, positively related to support for external (i.e., NPS) responsibility (β = .33, p < .001); however, internal causal attribution and viewing challenging environmental conditions as factors contributing to a hypothetical visitor incident did not significantly predict external responsibility (see Table 5.10). In a second regression model, in this case predicting internal responsibility (i.e., seeing visitors as responsible for their own safety) ($R^2 = .08$, $F(16, 713) = 3.71$, $p < .001$), relationships between causal attribution variables and prevention attribution variables followed suit; external causal attribution was a negatively related to support for internal (i.e., visitor) responsibility (β = -.12, p < .01) and internal causal attribution was positively related to the outcome variable (β = .12, p < .001) (see Table 5.11).

Table 5.10. Regression Predicting Support for External Responsibility: *Hellroaring Creek scenario only*

	Model 1	Model 2	Model 3	Model 4
Block 1: Demographics				
Age	.06	.03	.04	.05
Education	**-.07***	**-.07***	-.07	-.04
Gender (Female=1)	**.09***	.06	.06	.03
Native English (Native English speaker= 1)	**-.15*****	**-.16*****	**-.16*****	**-.12****
Asian	**.12****	**.12****	**.12****	.06
Hispanic/Latino	.02	.01	.01	-.01
Other	.02	.02	.02	.02
Inc. R^2 (%)	6.6			
Block 2: Respondent Type				
Volunteer		.07	.07	.04
Employee		**.08***	**.10***	.05
DEWA		**.14****	**.13****	**.09***
OLYM		-.06	-.06	-.04
Inc. R^2 (%)		3.1		
Block 3: Incident Salience (Experienced similar incident/Unsure = 1)			-.04	-.03
Number of national parks visited			-.03	-.02
Inc. R^2 (%)			.2	
Block 4: Causal Attribution				
Internal Causal				-.01
External Causal				**.33*****
Challenging Conditions				.06
Inc. R^2 (%)				10.3
Total R^2 (%)				.20
ANOVA				$F_{16, 711}$= 11.25***

Notes. *p< .05;**p<.01; ***p<.001
n = 728
Cell entries for all models are standardized regression coefficients.

Table 5.11. Comparison of β values for Significant Predictors in Causal Attribution Regression Models

Independent Variable (β)	Dependent Variable: Causal Attribution	
	External (NPS) Responsibility	Internal (Visitor) Responsibility
Native English Speaker	**-.12****	*ns*
Hispanic/Latino	*ns*	**-.07***
Volunteer	*ns*	**-.10***
Employee	*ns*	**-.21*****
DEWA	**.09***	*ns*
External Causal Attribution	**.33*****	**-.12****
Internal Causal Attribution	*ns*	**.12****
Total R^2	**.20**	**.08**
ANOVA	$F_{16,711} = 11.25$***	$F_{16,713} = 3.71$***

Note. *p< .05;**p<.01; ***p<.001
Cell entries for all models are standardized regression coefficients.

Summary

This section explored relationships between causal and prevention attribution variables using both Pearson's correlations and regression. These correlations and β values followed expected patterns; for instance, support for external (i.e., NPS) responsibility was positively correlated with attributing the cause of the hypothetical visitor accident to external (i.e., NPS) factors and seeing the visitor as responsible for his/her own safety was positively correlated with attributing the cause of the accident to internal (i.e., visitor-related) factors. While these relationships follow the expected directions, it is important to note that the small to moderate size of the correlations indicate that prevention and causal attribution, while related, are, in fact, separate constructs. (Further discussion on the implications of the relationship between causal and prevention attribution is provided in Chapter 7).

Research Question Six: Risk Perception and Prevention Attribution

Research Question 6 asked how perceptions of controllability, voluntariness, and desirability of park risks relate to attributions of responsibility for preventing injury/ensuring safety. In order to answer this question, I first investigated two-tailed Pearson's correlations using three variables related to risk perception: (1) Risk Desirability Scale (see Chapter 4); (2) Risk Controllability Scale (see Chapter 4) and; (3) survey item q22a: "If I thought I would be putting myself in danger, I would not visit [the park]." These variables were compared to two variables related to prevention attribution: (1) the External Responsibility Scale, and; (2) viewing the visitor as responsible for ensuring his/her safety (q22e) (see Table 5.12). First, results indicated a small, significant negative correlation between desirability of risk and support for external responsibility (r = -.15, p = .000). Perhaps unsurprisingly, as risk seeking becomes a goal of park visits, support for park management (i.e., possible limiting) of potential hazards decreases. Second, perceived controllability of park risk was significantly, negatively correlated with perceived external responsibility (r = -.40, p = .000), suggesting that the more one perceives park risk as controllable, the less responsibility he places with the NPS to manage it. Next, I found a medium-sized, positive correlation between perceived danger and external responsibility (r = .29, p= .000); that is, the more individuals agreed that they would not visit a park if their safety were in danger, the more likely they were to hold the park responsible for keeping them safe. Finally, I found small, significant, positive correlations between agreeing that, "If visitors will not accept responsibility for their own safety, they should not visit the park" (q22e) and: (1) desirability of risk (r = .10, p= .000); and (2) controllability of risk (r = .14, p= .000). We can interpret these correlations to mean that as one concedes personal responsibility as necessary for visiting a national park, he or she also may, to some extent, find park-related risk as both desirable and under his or her control.

Table 5.12. Correlations Between Prevention Attribution and Risk Perception Variables

	Ex Resp	Vis Resp	Desire Risk	Control Risk	Danger
External Responsibility Scale	1	***r* = -.12***** (*n* = 1093)	***r* = -.15**** (*n* = 1085)	***r* = -.40***** (*n* = 1090)	***r* = .29***** (*n* = 1092)
Visitor responsible for own safety[1] (q22e)		1	***r* = .10**** (*n* = 1094)	***r* = .14***** (*n* = 1096)	*r* = .03, *ns* (*n* = 1103)

Note. Significant Pearson correlations are in bold.
**Correlation is significant at the .01 level (2-tailed).
[1]Survey item wording: "If visitors will not accept responsibility for their own safety, they should not visit [the park]."
[2]Survey item wording: "If I thought I would be putting myself in danger, I would not visit [the park]."

Results from a regression model predicting support for external (i.e., NPS) responsibility support these trends ($R^2 = .27$, $F(16, 943) = 21.53$ $p < .001$). Contrary to expectations, desirability of risk was not a significant predictor in the regression model; however, perception of danger as a park deterrent (q22a) was strongly, positively related to support for external responsibility ($\beta = .22$, $p < .001$), and perceived controllability of risk was strongly, negatively related to the outcome variable ($\beta = -.36$, $p < .001$) (see Table 5.13). In a second regression model, in this case measuring internal responsibility for ensuring safety ($R^2 = .08$, $F(16, 950) = 4.98$, $p < .001$), however, perceived danger failed to reach significance while perceived controllability of risk ($\beta = .14$, $p < .05$) and desirability of risk ($\beta = .10$, $p < .001$) did (see Table 5.14).

Table 5.13. Regression Predicting Support for External Responsibility: Risk Perception Variables

	Model 1	Model 2	Model 3	Model 4
Block 1: Demographics				
Age	**.08***	**.07***	**.08***	.06
Education	**-.10****	**-.10****	**-.09****	**-.09****
Gender (Female=1)	**.13*****	**.11*****	**.11*****	.05
Native English (Native English speaker= 1)	**-.15*****	**-.15*****	**-.15*****	**-.07***
Asian	**.14*****	**.14*****	**.14*****	**.11****
Hispanic/Latino	.01	-.00	-.00	.01
Other	.01	.00	.00	-.02
Inc. R^2 *(%)*	8.1			
Block 2: Respondent Type				
Volunteer		.01	.02	.05
Employee		.03	.06	.06
DEWA		**.11****	**.11***	**.06***
OLYM		.03	-.04	-.03
Inc. R^2 *(%)*		1.7		
Block 3: Incident Salience (Experienced similar incident/Unsure = 1)			-.05	-.05
Number of national parks visited			-.05	-.00
Inc. R^2 *(%)*			.5	
Block 4: Risk Perception				
Controllability				**-.36*****
Desirability				-.00
Danger				**.22*****
Inc. R^2 *(%)*				10.4
Total R^2 (%)				.27
ANOVA				$F_{16, 948}$= 21.53***

Notes. *p< .05;**p<.01; ***p<.001
n = 965
Cell entries for all models are standardized regression coefficients.

Table 5.14. Comparison of β values for Significant Predictors in Risk Perception Regression Models

Independent Variable (β)	Dependent Variable: Causal Attribution	
	External (NPS) Responsibility	Internal (Visitor) Responsibility
Education	**-.09****	*ns*
Native English Speaker	**-.07***	*ns*
Asian	**.11****	*ns*
Volunteer	*ns*	**-.08***
Employee	*ns*	**-.18*****
Hispanic/Latino	*ns*	**-.08***
DEWA	**.06***	*ns*
Controllability of Risk	**-.36*****	**.14*****
Desirability of Risk	*ns*	**.10****
Danger/Risk Avoidance	.**22*****	*ns*
Total R^2	**.27**	**.08**
ANOVA	$F_{16, 948} = 21.53$***	$F_{16, 950} =$ 4.98***

Note. p < .05;*p <.01; ***p <.001
Cell entries for all models are standardized regression coefficients.

Summary

This section explored relationships between three risk perception-related variables, controllability, desirability, and perceived danger, and the prevention attribution variables. Results indicated a significant negative correlation between perceived controllability of risk and support for external responsibility, as well as between perceived desirability of risk and support for external responsibility. On the other hand, a significant positive correlation existed between perceiving danger as a deterrent to visiting a national park and support for external responsibility. These relationships begin to explain how one's perception and valuation of risk in a setting may influence how s/he perceives the responsibility for its management, a theme that will be explored in more depth in Chapters 6 and 7.

Research Question Seven: Risk Communication and Prevention Attribution

Research Question 7 asked how exposure to and reliance on formal/informal and official/unofficial risk communication relates to attributions of responsibility for preventing accidents. In order to answer this question, I first investigated two-tailed Pearson's correlations using five variables related to risk communication (see Chapter 4): (1) Reliance on Official Information, (2) Reliance on Official, Formal Information, (3) Reliance on Unofficial Information, (4) Reliance on Unofficial, Formal Information, and (5) Amount of Safety Information Received. These variables were compared to two variables related to attribution of responsibility for preventing injury: (1) the External Responsibility Scale, and; (2) viewing the visitor as responsible for ensuring his/her safety (q22e). Significant correlations existed between support for external responsibility and:

- Reliance on official (i.e., NPS) information sources (r =. 09, p = .045).
- Reliance on official, formal (i.e., NPS and "scripted") information sources (r = .11, p = .014).
- Amount of safety information received (r = -.08, p = .037)

That is, the more visitors reported relying on official information sources about the park, the more they viewed the Park Service as responsible for ensuring visitor safety; yet, at the same time, the more safety information visitors received, the less likely they were to hold the NPS responsible. Additionally, I found a small, significant, positive correlation between agreeing that the visitor is responsible for his own safety and the amount of safety information received (r = .09, p= .022). Stated differently, the more information about park hazards, park regulations, weather conditions, and road conditions visitors reported receiving, the more they viewed themselves as responsible for ensuring their own safety. None of these variables reached significance in regression models (see Tables 5.15 and 5.16).

Table 5.15. Correlations Between Prevention Attribution and Park Information Variables

	Ex Resp	Vis Resp	Official Info	Official Formal Info	Amount Safety Info
External Responsibility Scale	1	***r* = -.15*** (*n* = 694)**	***r* = .09* (*n* = 510)**	***r* = .11* (*n* = 512)**	***r* = -.08*** (*n* = 673)
Visitor responsible for own safety[1]		1	*r* = .00, *ns* (*n* = 514)	*r* = .02, *ns* (*n* = 516)	***r* = .09*** (*n* = 679)

Note. Significant Pearson correlations are in bold.
**Correlation is significant at the .01 level (2-tailed).
[1]Survey item wording: "If visitors will not accept responsibility for their own safety, they should not visit [the park]."

Table 5.16. Regression Predicting Support for External Responsibility: ***Visitors only***

	Model 1	Model 2	Model 3
Block 1: Demographics			
Age	.13**	.14**	.13**
Education	-.12**	-.09*	-.09*
Gender (Female=1)	.18***	.15*	.15**
Native English (Native English speaker= 1)	-.17**	-.17**	-.17**
Asian	.15*	.13*	.12*
Hispanic/Latino	.05	.01	.00
Other	.01	.00	-.00
Inc. R^2 (%)	12.4		
Block 2: Respondent Type			
DEWA		.05	.05
OLYM		-.07	-.07
Experience w/ context		-.15**	-.16**
Incident Salience		-.07	
Inc. R^2 (%)		3.6	
Block 3:			.08
Information			
Official Formal Info			
Safety info Amount			.00
Inc. R^2 (%)			.6
Total R^2 (%)			.17
ANOVA			$F_{13, 421}$= 6.44***

Notes. *p< .05;**p<.01; ***p<.001
n = 435
Cell entries for all models are standardized regression coefficients.

Summary

In sum, I found some, although limited, evidence of the relationship between exposure to (and reliance on) park communication and prevention attribution. Positive correlations existed between reliance on official information sources and support for external responsibility. At the same time, the amount of safety information a respondent received was positively correlated with agreeing that a visitor is responsible for his/her safety when in the park, and negatively correlated with attributing responsibility for ensuring safety to the NPS. Though modest, these relationships provide some indication that the type of information one receives may be related to how one envisions responsibility in park settings, a topic I return to in Chapter 7.

Chapter Summary

To better understand how employees, volunteers, and visitors attribute responsibility for preventing visitor injury/ensuring safety, Chapter 5 examined relationships between prevention attribution and several variables of interest, including those related to sense of place, perception of risk, and reliance on park-related information. Table 5.17 summarizes the results of the research questions and hypotheses investigated in this chapter, which I describe below.

H4 was supported, as visitors who participated in "risky" recreational activities (e.g., mountaineering, skiing/snowboarding) were less likely to express support for external (i.e., NPS) responsibility for preventing injury/ensuring safety. Because most employees in the sample expressed support for internal attributions of responsibility—both in general, and with regard to the hypothetical visitor accident scenario—rather than shared or external responsibility, I also found support for H5. H6 hypothesized that attributions of responsibility would vary by age, sex, and country of origin, a hypothesis that received partial support. Whereas age and sex (specifically, being female) emerged as significantly related to support for external responsibility in several regression models, country of origin did not; however, being a non-native English speaker did appear to predict support for external responsibility in several models. Though not hypothesized, respondents' amount of formal education, and race/ethnicity (specifically, identifying as Asian or as Hispanic/Latino) also emerged as significant predictors of prevention attribution. Finally, H7 received partial support, as a post-hoc analysis of means and regression models demonstrated that employees working in certain park divisions (e.g., Natural & Cultural

Resources) appeared to be less supportive of external attribution of responsibility, when compared to those who worked in other divisions (e.g., Interpretation & Education).

A series of research questions also provided additional understanding of the relationships between prevention attribution, other variables of interest, and a series of covariates. With regard to RQ4, I observed negative relationships between both place meaning and place attachment and support for external attribution of responsibility for preventing injury/ensuring safety. RQ5 considered the relationship between prevention attribution and the causal attribution variables. In addition to a number of significant correlations between the causal attribution and prevention attribution variables, in a regression model, external causal attribution was significantly, positively related to support for external responsibility; however, internal causal attribution, and viewing challenging environmental conditions as contributing to a hypothetical visitor incident did not significantly predict support for external responsibility.

With regard to risk perception, the focus of RQ6, positive correlations existed between perceived controllability of risk and internal attribution of responsibility, as well as between desirability of risk and internal attribution of responsibility. In contrast, I observed negative correlations between external attribution of responsibility, and (1) perceived desirability of risk, and (2) perceived controllability of risk. In addition, a positive correlation existed between perceiving danger as a deterrent to visiting the park and external attribution of responsibility. For the most part, these relationships held in two regression models. Finally, RQ7 examined relationships between park-related information and prevention attribution, revealing positive correlations between support for external responsibility and (1) reliance on official information sources; and (2) reliance on official, formal information sources. In addition, there was a positive correlation between the amount of safety information the visitor received and internal attribution of responsibility, as well as a negative correlation with external attribution of responsibility. Unfortunately, none of the information-related variables reached significance in the regression models.

Table 5.17. Summary of Hypotheses and Research Questions: Chapter 5

Hypothesis/RQ	Findings
H4: Visitors' voluntary risk-taking will relate positively to internal attributions of responsibility for ensuring safety.	**Supported** • Of the visitors who participated in at least one "risky" recreational activity, about two-thirds expressed median or lower support for external responsibility for visitor safety, as compared to less than half of visitors who had not participated in any of these activities; this relationship was significant. • A medium-sized, negative, significant correlation between the number of high-risk activities that the visitor reported participating in and support for external responsibility for ensuring safety.
H5: Employees will be more likely to report internal attributions of responsibility for ensuring safety than external or shared attributions of responsibility.	**Supported** • After reading the scenario, the majority of employees surveyed (54%) reported that responsibility for preventing the incident rested *entirely* with the injured visitor. Only 5% of the sample viewed the visitor and the NPS as equally responsible for injury prevention. • When asked to report their level of agreement with the statement, "If visitors will not accept responsibility for their own safety, they should not visit [park name]", about one third of employees (32%) strongly agreed, while nearly half (46%) agreed. An additional 14% expressed a neutral stance, 5% disagreed and 2% strongly disagreed.
H6: Visitors' attributions of responsibility for ensuring safety will vary by: (1) age; (2) sex; and (3) country of origin.	**Partial support** • As evidenced in several regression models predicting support for external (NPS) responsibility, **age** was positively related to support for external responsibility; however, no significant correlation existed between age and support for external (or internal) responsibility. • Whereas over half (54%) of male visitors expressed median or lower levels of support for external responsibility, only 41% of females were in the same category; this relationship was significant. Moreover, as evidenced in several regression models predicting external responsibility, **women** expressed more support for external responsibility than did men. • Though not hypothesized, respondents' amount of **formal education** also emerged as a significant, negative predictor of support for external responsibility. • Though not hypothesized, respondents' **race/ethnicity** also emerged as a significant predictor of external responsibility in several of the regression models. As compared to White/Caucasian respondents, Asian respondents expressed more support for external responsibility. Additionally, in regression models predicting support for visitor responsibility, reporting oneself as Hispanic/Latino was a significant negative predictor. • Though not hypothesized, those who reported being **non-native English speakers** were *more* likely to express more support for external responsibility; this association was statistically significant by chi-square test and also found in several regression models. • Attributions of responsibility did not appear to vary by country of origin.
H7: Employees' attributions of responsibility for ensuring safety will vary by occupational position and level in the agency.	**Partial support** • When considered as a group, employees in the Visitor & Resource Protection division expressed the *most* agreement with the park's responsibility to prevent visitor injury than any of the other park and employees in the Natural & Cultural Resources Division (NCR) expressed the least. • A post-hoc comparison of means indicated significant differences between employees in NCR and: (1) Interpretation and Education, and (2) Maintenance and Trails. • When considered in regression models, employees who worked in Administration and in NCR were *less supportive* of external responsibility, compared to those who worked in Visitor and Resource Protection (as a reference group).
RQ4: How do place meaning and place attachment relate to attributions of responsibility for preventing accidents?	*Place Meaning* • No significant correlations were observed between place meaning and prevention attribution; in a regression model, however, there was a significant, positive relationship. *Place Attachment* • Small, significant, negative correlation between place attachment and support for external responsibility; this relationship also held in a regression model.

RQ5: How do attributions of responsibility for safety relate to attributions about the cause of accidents?	• A small, significant, negative correlation existed between external responsibility and seeing the visitor as responsible for his/her safety. • A medium-size, significant, positive correlation existed between external responsibility and attributing the cause of a hypothetical accident to external factors. • A small, significant, positive correlation existed between external responsibility and attributing the cause of a hypothetical accident to challenging park conditions. • A small, significant, positive correlation existed between viewing the visitor as responsible for his/her own safety and attributing the cause of an accident to internal factors. • A small, significant, negative correlation existed between viewing the visitor as responsible and attributing the cause of an accident to external factors. • In a regression model, external causal attribution was significantly, positively related to external responsibility; however, internal causal attribution, and viewing the challenging environmental as a factor of a hypothetical visitor incident did not significantly predict external responsibility.
RQ6: How do perceptions of controllability, voluntariness, and desirability of park risks relate to attributions of responsibility for preventing accidents?	*Controllability* • A small, significant, positive correlation was found between agreeing that, "If visitors will not accept responsibility for their own safety, they should not visit the park" and controllability of risk. • A medium-sized, negative correlation existed between controllability of risk and external attribution of responsibility. *Desirability* • A small, significant negative correlation was found between desirability of risk and support for external responsibility • A small, significant, positive correlation was found between agreeing that, "If visitors will not accept responsibility for their own safety, they should not visit the park" and desirability of risk. • When predicting internal responsibility in a regression model, desirability of risk was positively related to the outcome variable, as was controllability of risk; perceived danger was not a significant predictor (see Model 7). *Perceived Danger* • A medium-sized, positive correlation between perceived danger as a deterrent to visiting the park and external responsibility. • In a regression model, perception of danger as a deterrent to visiting the park was strongly, positively related to support for external responsibility, and controllability of risk was strongly negatively related to the outcome variable; however, desirability of risk was not a significant predictor.
RQ7: How does exposure to formal/informal and official/unofficial risk communication relate to attributions of responsibility for preventing accidents?	*Official Information* • A small, significant, positive correlation was found between support for external responsibility and reliance on official information sources • A small, significant, positive correlation was found between support for external responsibility and reliance on official, formal information sources. *Amount of Safety Information* • A small, significant, positive correlation was found between agreeing that the visitor is responsible for his/her own safety and the amount of safety information received. • A small, significant, negative correlation was found between external attribution of responsibility and amount of safety information received. • None of the information-related variables reached significance in the regression models.

When considering all the variables of interest explored in this chapter, in an overall regression model (visitors only) predicting external prevention attribution (see Table 5.18), variables related to perceived risk (controllability: $\beta = -.38$, $p < .001$; perceived danger as park deterrent: $\beta = .23$, $p < .001$), sense of place ("blended" place meaning: $\beta = .11$, $p < .05$); place attachment: $\beta = -.17$, $p < .01$), and causal attribution (external causal attribution: $\beta = .31$, $p < .001$) emerged as the strongest predictors. While a few demographic variables, such as age, sex, and identifying as Asian, emerged as significant in earlier models, interestingly they failed to reach significance in the final iteration. As was true for the regression models predicting causal attribution, the risk-related variables (with the exception of perceived desirability of risk) seemed to bring the most explanatory value to the prevention attribution models. When considering employees (see Table 5.19), the risk-related (controllability of risk: $\beta = -.34$, $p < .001$; perceived danger as deterrent to park visit: $\beta = .25$, $p < .001$) and causal attribution (external causal attribution: $\beta = .17$, $p < .05$) variables were likewise important predictors of prevention attribution; however, the sense of place variables failed to reach significance in these models. As discussed earlier in this chapter (and directly relevant to H7), employees' park division appeared to matter in judgments of responsibility, as being in Administration ($\beta = -.22$, $p < .01$) or Natural and Cultural Resources ($\beta = -.20$, $p < .05$) emerged as significant, negative predictors of support for external (i.e., NPS) responsibility for preventing visitor injury.

Table 5.18. Overall Regression Predicting Support for External Responsibility: *Visitors only*

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Block 1: Demographics						
Age	.09	**.14***	.09	.09	**.11***	.10
Education	-.03	-.04	-.06	-.07	-.08	-.08
Sex (Female=1)	**.18****	**.18****	.08	.09	.04	.04
Native English (Native speaker = 1)	-.09	-.09	-.06	-.08	-.08	-.07
Asian	**.19****	**.15***	.07	.06	-.01	-.00
Hispanic/Latino	.07	.02	.00	.00	-.04	-.04
Other	-.03	-.03	-.02	-.03	-.01	-.02
Inc. R^2 *(%)*	9.4					
Block 2: Group Characteristics						
Large group		.08	.07	.06	.07	.06
Children (1= child under 18 in group)		.06	.03	.03	.01	.01
DEWA		.04	-.05	-.06	-.06	-.02
OLYM		.02	-.01	-.01	.01	.01
Experience in park context		-.12	-.06	-.04	-.01	-.02
Preparedness (1= "completely prepared")		-.10	-.09	-.08	-.06	-.06
Inc. R^2 *(%)*		4.2				
Block 3: Risk Perception						
Controllability			**-.43*****	**-.42*****	**-.38*****	**-.38*****
Desirability			.04	.05	.02	.01
Danger would deter visit			**.29*****	**.27*****	**.23*****	**.23*****
Inc. R^2 *(%)*			22.6			
Block 4: Sense of Place						
Place Meaning				**.11***	**.12***	**.11***
Place Attachment				**-.15***	**-.16****	**-.17****
Inc. R^2 *(%)*				2.0		
Block 5: Causal Attribution External (NPS) Causal Attribution					**.31*****	**.31*****
Inc. R^2 *(%)*					7.5	
Block 6: Information						
Official Formal Info						-.01
Total Safety Info						.10
Inc. R^2 *(%)*						.7
Total R^2 (%)						.46
ANOVA						$F_{21, 228}$= 9.28***

Notes. *p< .05;**p<.01; ***p<.001
n = 250
Cell entries for all models are standardized regression coefficients.

Table 5.19. Overall Regression Predicting Support for External Responsibility: *Employees only*

	Model 1	Model 2	Model 3	Model 4	Model 5
Block 1: Demographics					
Age	.07	.17	.14	.15	.15
Education	-.02	.01	-.04	-.05	-.04
Gender (Female=1)	.11	.15	.11	.12	.11
Native English (Native English speaker= 1)	-.07	-.09	.01	.00	.01
Asian	.03	.03	.07	.06	.03
Hispanic/Latino	-.08	-.02	-.00	-.00	.00
Other	.09	.08	.02	.03	.03
Inc. R^2 (%)	3.4				
Block 2: Park context					
DEWA		.13	.09	.07	.05
OLYM		-.06	-.05	-.06	-.06
Experience in park context		-.14	-.15	**-.18***	-.16
Park division: (Admin= 1)		**-.19***	**-.18***	**-.18***	**-.22****
Park Division: (N&C Resources =1)		**-.24****	**-.19***	**-.20***	**-.20***
Park Division: (Maint. & Trails= 1)		.03	.01	-.00	-.02
Park Division: (Interp= 1)		.01	-.00	.00	.00
Inc. R^2 (%)		11.4			
Block 3: Risk Perception					
Controllability			**-.36*****	**-.36*****	**-.34*****
Desirability			-.02	-.02	-.01
Danger would deter visit			**.26*****	**.27*****	**.25*****
Inc. R^2 (%)			16.8		
Block 4: Sense of Place					
Place Meaning				-.08	-.05
Place Attachment				.09	.08
Inc. R^2 (%)				.7	
Block 5: Causal Attribution					**.17***
External (NPS)					
Inc. R^2 (%)					2.2
Total R^2 (%)					.35
ANOVA					$F_{20, 163}$= 4.31***

Notes. *p< .05;**p<.01; ***p<.001
n = 184
Cell entries for all models are standardized regression coefficients.

CHAPTER 6.

RISK MANAGEMENT AND CULTURAL THEORIES OF RISK

In this chapter, I turn to qualitative data from in-depth interviews with employees and volunteers to explore research questions 8 and 9 (and sub-questions). Under the broad purview of risk management and cultural theories of risk, these questions asked how employees understand risk management in relation to the "mission" of the NPS, and what risk(s) they may consider to be acceptable or unacceptable in park settings. Instead of answering each of these questions sequentially, as was done in previous chapters, I instead present the results thematically. More aligned with a grounded theory approach (Glaser & Strauss, 1967), presenting the findings as such highlights the emergent quality of the themes, and also allows more flexibility for demonstrating their relationships and interconnections.

Risk as a Value: The Multidimensionality of Risk in National Parks

> There are certain risks that are intrinsic to the sort of, what makes the place a national park, so attractive. Like windy roads with cliffs. What attracts people to those places is that ruggedness of the landscape. And so, you just can't smooth all of those hazards out of it (MORA7).

As individuals who live in work these unique environments, interviewees were quick to recognize the sources of risk inherent in the landscapes around them. From falling trees to falling water, risks to human health and safety abound in the diverse physical ecosystems encompassing DEWA, MORA, and OLYM. Instead of focusing solely on risks as threats, however, interviewees also recognized risks as attractions—valuable attributes of "wild" places that imbued places with the potential to teach people about themselves and their surroundings.

Risk as inherent

When prompted to speak about managing risk in national parks, interviewees emphasized that the sources of risk encountered in these places were both inherent, and in some cases, unmanageable. Referring to Mount Rainier, one interpretive ranger summed up this belief by stating, “You can’t take a volcano and make it safe!” (MORA4). At the same time, interviewees were quick to recognize the uniqueness of each park as an environment hosting hazards both “natural” and “manufactured” by people, and in varying quantities. One MORA interpretive ranger who had worked at President Lyndon B. Johnson’s ranch, a historical park consisting primarily of Texas grassland and pasture, contrasted the inherent risks of these two NPS park units, including their recreational offerings, as such:

> Every park is different… If you’re going to go to LBJ’s ranch, you’re really not expecting a whole lot of risk. You’re going to get on a bus, you’re going to drive around, and [the ranger is] going to tell you the cows are behind the fence… But if you’re coming to a mountain [and] you’re planning to climb it, there *is* some inherent risk (MORA16).

But exposure to inherent risk was not understood as limited to those visitors choosing to embark in “adventure recreation,” (e.g., Ewer & Hollenhurst, 1989) such as climbing Mount Rainier. Because many national parks, including DEWA, MORA, and OLYM, preserve areas free of development, simply visiting these places means accepting the effects of ecological processes that may be uncontrollable. Describing how many visitors choose to remain in their vehicles to take in the park scenery, a MORA ranger explained that they are nonetheless exposed to the hazards around them, such as an eroding hillside adjacent to a road:

> There’s just some things you *can’t do anything about*. I mean, those people driving up the road and having rocks come off the hill and hit their car… There’s going to be some inherent risk being out in the middle of 230,000 acres of wilderness on the side of this active volcano (MORA3).

In the words of a DEWA Natural & Cultural Resources Division employee, when entering a national park, no matter the distance from a paved road, humans are no longer “at the top of the food chain” (DEWA4).

From eroding hillsides to hungry carnivores, interviewees pointed out that sources of risk in national park settings were both innate and omnipresent. Perhaps less obvious, however, was their observation that the dynamic quality of these risks distinguishes them from those most often encountered outside of the park. Temperature, wind speed, precipitation, snowmelt, and seismic activity, among other factors, change daily and even hourly within the alpine, forest, and coastal ecosystems of MORA, OLYM, and DEWA. These shifting park conditions could make the relative safety of participating in even the most popular activities unpredictable. In the case of the Delaware River, for instance, an interpretive ranger described how swimming conditions, even in high-use areas, could vary daily depending on a variety of physical processes:

> …[The river] changes. It's not just static; this is a great hole to jump in today, but it doesn't mean that a couple days ago, a log didn't snarl up in there… a bunch of silt come in and fill it (DEWA2).

As this ranger explained, visitors more accustomed to swimming in a pool or lake may not expect such dynamic change, especially when aspects of the physical environment—restrooms, a lifeguard, a beach area—seem suggestive of a more developed tourist area. MORA and OLYM interviewees routinely spoke of changing weather conditions transforming high-altitude, alpine environments in the course of hours or less; a sunny, clear morning on top of a ridge might turn dark and hailing by afternoon. The fog, rain, ice, snow, or reduced visibility could catch any traveler off-guard and "socked in" (MORA20)—even the most experienced outdoorsperson or, at times, an NPS employee or volunteer. Dynamic risks can also be unpredictable, as interviewees emphasized in their descriptions of conditions at their parks. While weather forecasts, avalanche reports, and precipitation records, among other information, assist employees and volunteers in assessing their own and visitors' potential exposure to risk, many interviewees suggested that this expertise had its limits; as a DEWA Natural & Cultural Resources employee put it, "I mean, it's nature. You don't know, you can't predict it" (DEWA14).

Risk as desirable

While some park-related risk may, by its nature, resist attempts to manage or minimize it, some interviews felt that some risk *should not* be managed in the first place. For many interviewees, risk was seen as an integral part of a national park experience: something to be desired, rather than to be avoided (Machlis & Rosa, 1990). Importantly, though, the perceived acceptability, as well as the desirability of risk depended at least in part on its origin and the circumstances with which it was encountered. National park land, including portions of DEWA, OLYM, and MORA, conserve over half of the nation's wilderness areas: parcels designated by the 1964 Wilderness Act as areas where "earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain" (16 U.S. C. 1131-1136). Meant to preserve "primeval character" and "without permanent improvements or human habitation," such as roads, commercial businesses, or the use of motorized equipment, wilderness areas are deliberately primitive. Indeed, one of the stated goals of preserving such areas is to allow "outstanding areas for solitude" and an "unconfined type of recreation." Though such a connection is not stated explicitly in the legislation itself, many interviewees viewed "wilderness" as synonymous with desirable risk. When individuals *chose* to visit wilderness areas, interviewees saw risk-taking as both expected and advantageous, as opposed to in developed or frontcountry areas. As one MORA law enforcement ranger explained:

> I don't think it's desirable that we have risk on a *road* because that's not really the *point*. As a place for people to take risks, and challenge themselves and have an adventure, climb the mountain, where there are certain objective hazards—absolutely totally appropriate for the national parks (MORA7).

Discussing encountering risk in backcountry wilderness areas within the park, a DEWA law enforcement ranger echoed:

> … My personal expectation is, if I'm going hiking and I'm leaving the trailhead and I'm

> not going to a visitor center boardwalk hike… that there would be an opportunity to get too close to a cliff face, even near a trail, and that that should be reasonable (DEWA17).

The following sections explore the notion of risk as a value; as interviewees explained, voluntary exposure to risk in places like wilderness areas can achieve the kind of learning, challenge, and elevated experience rarely found in everyday life.

Tolerance and voluntariness. Whether on the job, or during their leisure time, some interviewees described risk-taking as part and parcel of life. Yet, whether crossing a glacier, using a chainsaw, or fording a river, they realized that the assessment and acceptance of such risks likely differed between themselves and other individuals, depending on personal biography and preferences. As a MORA law enforcement ranger stated:

> …Risk assessment can be a very individual thing and I think how *you* live *your* life and what risk that's acceptable to you… does not necessarily hold true for everybody. The risk you choose to take is not necessarily a risk that this person should be taking, or even wants to take (MORA5).

Interestingly, though risks in national parks may be perceived as inherent and unavoidable, as this quotations suggests, interviewees also seemed to describe a clear voluntariness in the way that they—and some visitors—tend to seek out certain sources of risk. That recreational goals of visitors and employees in a single national park can vary considerably can be understood as reflecting both personal tolerance of risk as well as individual experience and skill level. Illustrating this point, an OLYM law enforcement ranger referred to the highly publicized story of Aron Ralston, a solo hiker forced to amputate his arm to free himself from underneath a boulder in a Utah canyon in 2003. (Ralston's case has since been popularized further in the 2010 film *127 Hours*). He explained:

> The guy who got his arm caught and cut it off? Some people would say what he was doing was stupid. He was on a cross-country backcountry hike by himself. He didn't tell anyone where he was going, etc. *But*, many people, myself included, I've hiked slot canyons by myself. And I tend to be careful when I do that, to think more about it, but I

> guess my take on that is what he was doing in some people's world was perfectly reasonable… (OLYM3).

Because they play a critical role in managing the park experience, interviewees did recognize their responsibility to acknowledge the variability of risk tolerance. As an OLYM Visitor & Resource protection employee put it, "…Not everyone wants risk… There's just a… wide spectrum of people's interests and desires when it comes to going into a wilderness area (OLYM2)"; however, managing such areas according to the wishes of a diverse visiting public, and for the sustainability of the physical landscape, becomes understandably complex: a juggling act of competing values. As a DEWA Natural & Cultural Resources employee explained, in the case of the Delaware River:

> If we took the rapids out, it wouldn't be as fun … A certain element of the population likes that thrill … Our mission says that we'll provide these opportunities, but who are we to judge what one person's recreation is compared to another's [?] (DEWA11).

Paradoxically, parks must allow opportunities for visitors to engage with risk, just as they provide interventions to protect them from it. (Forms of risk management will be discussed in further depth below).

Challenge and elevated experience. Part of the desirability of risk may be that it affords individuals the type of physical and psychological challenges that intensify an out-of-doors experience. In addition to preserving and protecting land from human development, the Wilderness Act may simultaneously support this end, as some interviewees, such as an OLYM Natural & Cultural Resources employee, pointed out:

> The Wilderness Act talks about opportunities for solitude and unconfined recreation. And that's really where the whole risk and challenge idea comes from… Being able to go out and experience this naturalness, like crossing a stream versus on a bridge. Not having a bridge there—that would make it more natural, so your experience as a result would have higher risk and challenge… (OLYM13).

As this individual's comment suggests, exposure to "natural" conditions—crossing a stream on foot versus on a bridge—contribute to more risk, but also to an authenticity that elevates the experience to a higher level of importance. These experiences, some interviewees argued, subsequently become highly valuable endeavors, rather than run-of-the-mill occurrences. Recounting of a group of young adults and their parents whom he led on a hike in the park, a MORA administrator described how traveling through an unmanaged environment challenged a middle-aged woman beyond her comfort zone. He recalled:

> … [I] had a mother… came up with her daughter and this group. She was trying to be strong. She had never been in a national park. She was *scared to death*. And I said, 'Well, I planned a little adventure for the 16 year-olds. We're going to cross a stream.'… It was the most adventure she'd ever had… She had to suck it up and not cry because she wanted to be strong for her kid… For her it was just a profound experience (MORA8).

Anecdotes such as this led to this individual's belief that risk exposure contributes to all visitors' experiences, regardless of their activity or skill level. Consequently, "… the less mitigation and the more risk and the more uniqueness there is to that experience… that's what I think fulfills [visitors] in the end" (MORA8). Whether falling in a river or in a crevasse, part of the worth of such wilderness experiences, interviewees suggested, was making individuals even more aware of the (very real) possibility of their own mortality. Comparing backcountry, wilderness settings in national parks to more managed amusement parks or zoos, a MORA law enforcement ranger suggested that:

> …Some of the risk is *good*, in that there aren't many places left in this country or even in this world, where you can be out hiking and you'll see a mountain lion or a bear, which could hurt you… I think that raises that experience to a level that you can't get when you go to a zoo… And, in an amusement park-type setting, things have been so engineered that, unless you *try* to get hurt or try to do something really risky, you're not going to suffer consequences… (MORA5).

While interviewees in no way wished injury or illness upon visitors, they did suggest that "suffering consequences" could come with the territory; accompanying the breathtaking scenery on a wilderness hike, for instance, could be a pair of skinned knees. Given that visitors understood the potential consequences of their recreational choices, from skinned knees to severe hypothermia, some interviewees felt comfortable leaving visitors to their own devices, with potential injury a reasonable consequence of the "unconfined recreation" promised by a wilderness area. As a MORA interpretive ranger summed up, "*…let [visitors] go for it*. Let them go suffer a bit, because that challenge, that experience, that *potential* risk—it's part of the experience (MORA3).

Learning and self-development. With challenge and intensified experience, interviewees argued, could emerge the type of learning that fosters skill-building and personal development. Some interviewees spoke of their experiences in wilderness settings as enabling them to build the type of skills necessary for future engagement in their recreational activity of choice, such as hiking or skiing. Though highly trained and experienced in outdoor pursuits, two OLYM employees suggested that their experiences in park wilderness settings allowed them further learning:

> I'm glad there are places that challenge *my* skill level. And I'm glad, as are a lot of users, those hardcore people out there who are like, '*I'm going to do a 50 day hike!*' …There's not too many places you can do that (OLYM6).
>
> …So you get to this river and you have to *ford it*. I mean, that's a whole other skill set that I'd never, ever had to use in the past. So, [risk] *is* desirable--you kind of push yourself a little bit (OLYM9).

While honing skills for future recreational or on-the-job experiences is one benefit to maintaining wilderness areas, interviewees suggested that being in these places also helps one develop as a person. Being exposed to risk, interviewees suggested, could confer less concrete benefits, such as developing an individual's self-reliance, or their sense of personal responsibility. In making this argument, interviewees echoed Joseph Sax's (1980) “preservationist” perspective: the idea that national parks can play a role in providing visitors with a “moral education,” such as through teaching the self-reliance necessary to travel in inherently risky environments. By providing opportunities for “reflective recreation,” Sax argued, national parks should serve as locales where visitors are encouraged, regardless of past experience or skill level, “to try more challenging and demanding recreation” (Sax, 1980, p. 61). Here, an OLYM Natural & Cultural Resources employee explains how Sax’s argument still remains relevant to his thinking about risk management in national parks, even 30 years after the publication of *Mountains without Handrails*:

> … I’m with Sax on this and thinking that the park experience can be a learning experience that makes us closer to nature, and at the *cost* of some comfort, perhaps, but to the benefit that it makes us better citizens and better humans… By not having a handrail on the mountain, you realize that you are responsible and you must not go near the edge, or if you are *carefully trained* and you’re thinking logically, yes, you can approach the edge and here’s how you do it, and here’s how you do it safely, and so on. And then there’s certain risks that are *not* worth taking (OLYM7).

Likewise, a MORA Natural & Cultural Resources employee suggested that the risk-taking opportunities available in national parks, such as hiking the famous 93-mile trail skirting the base of Mount Rainier, could help foster a sense of individual responsibility:

> You’ve got to push yourself a little bit from time to time, and you’ve got to experience things… So if you’re out on the Wonderland Trail overnight, camping somewhere and get rained on—that’s a real experience… When you’re taking that responsibility, that, *if I fall, I might die, no one might be able to help and I’ll have to get myself out of here*, that makes you—I feel like that’s life right there (MORA21).

Like Sax, these and other employees saw part of the value of national parks as their ability to “confront the visitor with the less familiar setting of an unmanaged natural landscape” (Sax, 1980, p. 86). In such places, people can, following the vision of famed landscape designer Frederick Law Olmsted, free themselves of the “impediments” and “distractions” of urbanized life. In so doing, the risk they encounter may become, in part, a platform for contemplating loftier ideas: their individual freedom, a sense of personal responsibility, and their own mortality.

Understanding the NPS Responsibility

> I think it's a shared responsibility and I think our responsibility is to highlight hazards that do exist here, understanding that a lot of people really don't understand those (MORA19).

Shared responsibility

When asked to explain the responsibility to ensure the safety of park visitors, most interviewees described this responsibility as shared between visitors and the representatives of the NPS, including employees, managers, and volunteers. For many interviewees, demarcating the exact line between one group's responsibility and the other's was somewhat difficult; many preferred to speak in vague terms about a "cooperative effort" (OLYM3), a "split" (OLYM8), or a "combination" (MORA18), and expressed the general belief that, "…both parties have a part in [visitor] safety" (DEWA15). According to one MORA employee in the Maintenance & Trails Division:

> It's sort of a group participation, as far as who's responsible for it. We can do as much as we can, but we can't do everything, so [visitors] have the responsibility to make sure that they're conscious of what's going on around them (MORA6).

While interviewees appeared to agree on ensuring visitor safety as a shared commitment, they differed somewhat in how they allocated accountability for achieving this reality. As will be described below, though some viewed the responsibility as evenly split between visitors and the park, others preferred to hold visitors more accountable for their own safety.

Fifty-fifty. Though not asked to give a specific number or percentage, some interviewees described ensuring visitor safety as a responsibility allocated equally between NPS employees/volunteers and the visitors themselves. Recognizing their role in providing information, enforcing rules, and maintaining infrastructure (which will be explored in depth in the sections below), these interviewees saw an equivalent onus on the visitor to seek information, be prepared for his or her activities, and remain alert to and aware of the potential risks in the park. The following quotations, from a law enforcement ranger at DEWA, exemplifies this interviewee's conception of the idealized balance between their job responsibilities, and the visitor's own personal responsibility:

> …I think it's kind of a 50-50 split. I mean, I think it's our job… Everything that we do from speed enforcement to just visitor contacts—it's all safety-related. But I think that… there needs to be some ownership placed on the visitor of understanding what they're getting into (DEWA6).

Seventy-thirty. Whether stated explicitly or suggested through their comments, other interviewees saw the balance as tipped in favor of the visitor. Though acknowledging the NPS role in visitor safety, these interviewees awarded visitors' individual (i.e., internal—see Chapter 5) responsibility primary importance. A MORA administrator commented: "…To have a safe experience, well, I'd say 70-80% of that responsibility, at least in my mind, is really on the person" (MORA8), and a DEWA Natural & Cultural Resources employee echoed: "I think the majority of the responsibility is due on the visitor" (DEWA14). Likewise, a DEWA administrator described individual responsibility as paramount to the experience of visiting a national park:

> … I think [visitors] need to know that the safety is their responsibility, above all, and that they can't assume that the risks they're taking are somehow going to be ameliorated by the Park Service or anybody else. When you enter a park, a natural area, you assume certain liability for what happens to you (DEWA9).

In describing visitors as primarily responsible for their own safety, some interviewees believed that acting as a "babysitter" or "parent" for unprepared and/or incompetent visitors was neither feasible nor appropriate, given the mission of the NPS and the resources available to the park. While envisioning clientele akin to children may appear patronizing, interviewees' explanations demonstrated that they tended to use this metaphor as a way to describe the park's risk management goals, rather than as an opportunity to derogate their user base. In general, these interviewees believed an emphasis on individual responsibility to be both appropriate and necessary for visitors, a point-of-view that made some disagree with management practices they perceived as visitor "hand-holding." One MORA fee collector noted that, "…if you do hand hold too much…[visitors] won't take accountability" (MORA17). Similarly, a MORA interpretive ranger explained how excessive park management can limit the learning necessary for behaving safely in a national park: "It's sort of like children. You have to let them learn by burning themselves" (MORA16). Interviewees noted that park managers-as-parents might also impose controls that might limit the type of experiences that draw some visitors to the park (as explained in the previous section). As one MORA volunteer commented, the "self-sufficiency" required to recreate in wilderness areas draws some visitors to national parks; therefore:

> If the park has to act like a babysitter and make sure everything is taken care of and [visitors] never get close to the hazardous places, I don't think you can do that (MORA11).

Taking a macro perspective, other interviewees objected to a "parental" role on the basis that it violates basic democratic principles, as expressed in one OLYM interpretive ranger's comment:

> …Do we really expect an entity like the Park Service to take full responsibility for babysitting all of our visitors? And that seems kind of absurd and impractical and almost seems to fly against the American ideal of freedom… People *should* take on some level of responsibility. And it seems like that's what being a citizen of the United States should be (OLYM4).

While interviewees may have generally agreed that they are not (and cannot be) visitors' parents, interestingly, some park policies seemed to nonetheless reinforce this role. For instance, while one MORA interpretive ranger emphasized that visitors "have to take some responsibility," she also described how her staff manages weekly ranger-led snowshoe walks to guarantee the safety of all participants, who often have a range of abilities. She explained, "…We usually have a volunteer that comes with us, so if someone does have problems and needs to go back, then the volunteer can go back with them (MORA4)." This tension between expecting visitors to be competent and prepared park users, while at the same time anticipating that they will not be, appeared throughout employees' comments and is likewise reflected in many of the NPS' strategies to manage visitor risk, which will be explained below.

3 Es. As will be explored in more detail in the following sections, interviewees identified unique responsibilities that they attributed to the NPS, that can be classified into three categories, pertaining to: (1) education and communication, (2) engineering, (3) legislation and enforcement. Classifying risk management strategies by this tripartite typology is not a new approach, and understanding its origins serves to further illuminate the discussion. In the context of injury control, Baker (1973) argued that preventing injury is akin to preventing an illness, disease, or infection. Her discussion of "countermeasures" (i.e., injury reduction strategies) included, among others, educational approaches to inform consumers about home safety, regulations to upgrade and maintain medical emergency systems, and improving safety standards on vehicles.

Around the same time, Heberlein (1974) wrote about "three fixes" to water management issues as "technological," "cognitive," and "structural." While referring to preventing negative environmental impact, rather than unintentional injury, Heberlein's concepts mirror those of Baker (1973). First, "technological fixes" (broadly equivalent to Baker's "ergonomics") include strategies like dams and irrigation projects—strategies that are "appealing," Heberlein (1974, p. 280) notes, because "it is much easier to simply build a dam or seed clouds than to change land use or other behavior patterns." Since technological fixes tend to "[make] only the simplest assumptions about human behavior" (Heberlein, 1974, p. 281), the two additional fixes attempt to account for these shortfalls. The "cognitive fix" posits that supplying people with more information will lead them to "modify beliefs, attitudes, values or motivation" (Heberlein, 1974, p. 282), most similar to Baker's "education." Finally, the "structural fix" focuses attention on modifying individual behavior; though not framed in terms of enforcing rules, this "fix" nonetheless may employ management rules, such as removing access to an area or lobbying for a new law. More than a decade after Baker and Heberlein's publications, the National Committee for Injury Prevention and Control, in 1989, adopted a similar three-part paradigm, labeling it "education," "engineering," and "enforcement" (Dr. Sara Newman, pers. communication, February 1, 2012); I apply these categories in the following sections.

Education

For most interviewees, educating park visitors was understood as a central part of the NPS responsibility. As will be discussed below, the majority of the interviewees described a responsibility to provide information to public audiences, yet the ways in which such information should be delivered resulted in less of a consensus. Moreover, interviewees saw clear challenges to developing and disseminating messages appropriate to diverse park audiences, as well as limitations, both logistical and philosophical, to providing information at all.

Responsibility to provide information. When interviewees discussed the Park Service's responsibility to ensure visitor safety, they routinely mentioned that park managers must provide information to visitors. Not all visitors are accomplished mountain climbers, or even aware of the climatic conditions of an alpine summit; recognizing that "ignorance" can exist on a spectrum from, for instance, "knowing what you don't know" to "not knowing what you don't know," for many employees was a crucial distinction. According to one OLYM law enforcement ranger:

> …I have no problem with visitors being ignorant when they walk in the door… Actually, the more descriptive is they're ignorant, they're not stupid. They just don't necessarily *know* the… proper way to go at it… (OLYM3).

In this spirit, most employees were less interested in castigating ignorant visitors than in understanding the source of this ignorance, and using it to better understand the information necessary to meet their clientele's needs. Most importantly, interviewees noted that the information they disseminate must encompass the "known" risks in the park, such as inclement weather, wild animals, or poisonous plants. Because many park employees recognized visitors' "ignorance" of the physical conditions of a national park, including the above risks, they also acknowledged the importance of providing information that, in the words of a MORA fee collector, "might not be apparent to an average person" (MORA17); stated differently by a MORA law enforcement ranger, and emphasizing the recreational context in which tourists visit the park: "…the park is absolutely responsible for making the public aware of hazards that exist and the whole range of potential outcomes for the trips that people go on" (MORA7). As a case in point, several DEWA employees described needing to inform visitors about the dangerousness of river conditions, especially given the massive Delaware River's misleadingly placid façade. According to one park interpretive ranger:

> We definitely try to tell people that the current's much faster than it appears. I mean, sometimes you could be down at Kittatinny Point or one of the visitor centers and people think it's a lake because of the way the wind's blowing… And then also we talk about all the other unknown factors out there—some of the steep drop-offs of the banks of the river can be pretty deep… A lot of people are surprised by that (DEWA15).

Other "known" safety-related information that interviewees felt that NPS should share with visitors included the following topics:

- Trip planning and general preparedness, including proper food storage while camping, route finding in the backcountry, carrying the “ten essentials,” how to file a camping permit, etc.
- Interactions with wildlife (e.g., discouraging approaching and feeding wildlife).
- Weather and park conditions, such as trail conditions, road conditions and closures, river levels, and natural hazards (e.g., avalanches, lahars).
- Issues not necessarily unique to national parks, such as driving safety (e.g., adhering to the speed limit, not driving while intoxicated).

Examples of how and when park personnel in all three parks approached these topics for their respective visitor audiences include the following:

- …At every campfire program there are certain safety messages that we include…. If you’re leaving your camp, your campsite, your fire must be out... Take the ten essentials with you when you hike kind of thing. You have kind of a captive audience, so it’s a good way to get a number of quick messages out to them (MORA4).
- …The people that we’re dealing with are residents, not visitors. So that adds a whole different perspective to this park, so that [when] we’re performing drunk driving campaigns—a lot of it isn’t the visitors that we’re getting there, it’s the locals that we’re educating… (DEWA5).
- …In general we talk with visitors about making sure they have enough gear for whatever they’re doing. The ten essentials kind of stuff. And just general traffic safety, about slowing down driving around here (OLYM3).

By providing information to their clientele, many interviewees thought that visitors, in turn, would be empowered to make “informed decisions” about how to behave in the park. For instance, a DEWA administrator described NPS brochures and canoe livery safety talks as, “giving [visitors] that personal freedom to make their own choice” (DEWA16)—hopefully, to avoid injurious consequences. (Informed decision-making will be explored in more depth below). Whether the information provided does, in fact, lead visitors to comply with park rules and make the types of decisions that park managers would support, remains an empirical question. The link between the park's safety-related communication and its rate of visitor injuries and fatalities is likewise hypothesized, though not necessarily supported, as is illustrated by a DEWA law enforcement ranger's comment:

> …If we have one drowning this year, does that mean that our communication was so much better that year? Or was it just luck? The next year could be the same exact communication and have ten (DEWA6).

Meaning and connection. In addition to providing topical information about the risks visitors might encounter in the park, some interviewees also described their responsibility to inspire visitors to make connections with the park. Across the NPS, interpretive rangers routinely refer to the former action as providing "orientation," and the latter as "interpretation." A goal of interpretation, then, is helping visitors to understand the park at a deeper level. In the case of OLYM, for instance, one interpretive ranger suggested that helping visitors appreciate the meaning of wilderness extended beyond simply informing them of the park's legal designation. As he explained:

> … Our job as educators, interpreters is: *what does that mean*?... Some of the stories we tell that are associated with wilderness, that maybe people can really experience and take home with them… It's a place where, the din of humanity—it's not *here*. You hear the wind, you hear the rivers, you hear the birds… And so letting folks know that this is a wilderness park and helping them hopefully to have a connection, and a bit of an understanding of what that might mean (OLYM 4).

Similarly, as one of his colleagues put it, interpretation becomes "not just saying 'this is a daisy, this is a lupine,' but *so what*? Why does it matter that it's a daisy or a lupine?" (OLYM6). When employees and volunteers assist visitors in developing a sense of place, many rely on their own meanings of and attachment (e.g., Farnum et al., 2005, Low & Altman, 1992) to the national park settings in which they work and live. One OLYM law enforcement ranger described being on a routine boat patrol on Lake Crescent, a large glacial lake in the northern part of the park, and stopping to appreciate the beauty of his surroundings. Upon contacting visitors, he tried to impart this sense of inspiration that he experiences daily in the park: "… I try to translate that into what people are seeing, and how they're sort of in awe of where they are" (OLYM8). Encouraging visitors to form connections to a park can also be strategic. As interviewees explained, when visitors understand and feel connected to a park, they may also be motivated to behave in ways that help to protect and preserve it. In this way, visitors become stewards and invaluable partners to park employees and volunteers in supporting the Park Service mission, as the following quotations suggest:

- … I think it's important for people to come to these areas even though they may be from clear across the country and still feel a kinship with this area that they're visiting and that's really the whole goal of interpretation… (MORA4).
- …You want people to know what the point of the park is and what it has to offer them, what they don't have in their life… If they appreciate all the things that are going on, the types of trees, the beauty, the largest concentration of bears on the East Coast, that way they'll value the park and want to take care of it, especially when they're here (DEWA14).
- My hope is that people will care enough about the place [that] they'll want to be a good steward of it… Hopefully we can impart something—an ideal or something that will help them recognize that, 'Gosh, this is a really awesome place and what can we do to change our behavior to help other people take care of it?' (OLYM2).

Empirical work conducted in sociology and environmental psychology (among other disciplines) has demonstrated similar linkages between sense of place and participation in pro-environmental behaviors (e.g., Brehm, Eisenhauer, & Krannich, 2006; Stedman, 2002). While an explicit part of an interpretive ranger's job, encouraging visitors to take positive action on behalf of the park, such as following park rules or donating time or money to the NPS, did not seem limited to this employee group's domain. Though other employees or volunteers may encounter fewer opportunities to engage in the type of persuasive "storytelling" about the park described above, they nonetheless saw the value in doing so.

"The agency of the ranger." When describing the sources from which park visitors could obtain information (including, but not limited to, risk- and safety-related information) about the park, interviewees mentioned the usual suspects, including brochures, pamphlets, maps, bulletin boards, and the NPS website. For many interviewees, however, their and their colleagues' role in providing face-to-face contact with visitors was granted particular importance. For one, interviewees noted how in-person, employee-visitor contact enables the type of "visitor proficiency profiling" (Rickard, McComas, & Newman, 2011) that may dissuade visitors from participating in activities for which they are unprepared; though not always stated explicitly, interviewees seemed to view this form of risk communication as more effectual than a posted sign or brochure. By focusing on spoken and unspoken cues, such as visitors' dress, equipment, or the types of questions they ask, employees can often "size up" these individuals, and then tailor their risk communication accordingly. While Rickard et al. (2011) initially observed proficiency profiling during a summer season at MORA, comments from interviewees in all three parks in this study lend increased support to the idea that this strategic communication process may be enacted more widely throughout the Park System and in all seasons. Examples of proficiency profiling as a dynamic, two-way interchange between the employee and the visitor included the following:

- …[Visitors] just say, 'Oh, I need a permit.' And so we'll say, 'Well, where are you heading?'… If we know that there's 10 or 20 feet of snow there, then we kind of start asking some questions, like, 'Do you have really good map and compass skills? Do you know about the avalanche danger today? …Do you have avalanche transceivers, probes, and shovels?' And then, depending on their answers to those questions, and we get more into detail, and you just kind of learn to read people a little bit, just the way they present themselves… (OLYM2).

- …You get an initial impression just based on the way they're dressed and what they have with them… And talking to them. There's different jargon and lingo that people can use. And they'll tell you, 'Oh yeah, I brought my map and compass. What is the declination?' So when someone starts talking about declination, I know they're *pretty* comfortable with

> their map and compass… Through conversation you can kind of get an idea of what their skill level is… (MORA3).

- If the visitor services people sort of size up their abilities and say, 'Well, yeah, you can go up this rough trail over here, 'cause you guys look like you would enjoy that' or, 'Maybe you would want to enjoy Dingman's Falls where you have a boardwalk and you can see a nice waterfall there' (DEWA4).

When profiling visitors, as in Rickard et al. (2011), the present study found evidence that employees struggle with what they describe as a tension between wanting to warn visitors of potentially hazardous park conditions, while not wanting to "scare them away" from the park. Describing the difficulty of informing visitors of the dangers of swimming in the Delaware River while not dissuading them from being at the park, a DEWA interpretive ranger explained:

> …A lot of times when I'm talking to somebody, what I want to say is, 'You are the picture of our demographic'… We try not to scare them. But we do let people know that people have drowned in this river. And here are the number one causes (DEWA12).

Likewise, a MORA volunteer observed that NPS managers do not necessarily try to "publicize" park hazards as it may "discourage people from going out and experiencing the park" (MORA13). These and other interviewees' concerns about the use of "scare tactics" as a form of risk communication is relevant to research on fear appeals, which has described the possibility of inducing defensive avoidance or reactance given inadequate self-efficacy information (e.g., Witte & Allen, 2000); in the case of the park, this unintended consequence of a message might mean scaring people away, rather than encouraging them to visit the park (e.g., Byrne & Hart, 2009; Cho & Salmon, 2007).

In addition to seeing park personnel as essential for proficiency profiling, some interviewees viewed the ranger as the Park Service's historic—and popular—resource for informing public audiences. For some individuals, staff clad in "flat hats" and the NPS "grey and green" provide a kind of nostalgia for generations past, as well as an encouraging reminder of the stewardship that the Park Service has provided of federal lands for nearly 100 years. As a DEWA administrator and an OLYM interpretive ranger, respectively, commented:

> National parks have always been the agency of the ranger. This is what we wear, this is the badge. We've always been the face-to-face person. We need more face time with the visitor (DEWA16).
>
> …I think tradition is important… I think when people come to a national park, what [visitors] want is something different than they get in everyday life. Like they want something that they saw fifty years ago that hasn't changed, they want a polite person in a uniform… (OLYM5).

For some, pride in the job runs deep, as does commitment to the agency, the job, and the general public. In a book documenting the history of the national park ranger, former ranger Charles "Butch" Farabee (2003, p. vii) sums up this mix of dedication, skill, and historical significance by characterizing park rangers as "an amalgam of Jedi Knight, favorite teacher, and Smokey Bear." Continuing, he notes:

> As stewards of our nation's treasures, they are heir to five thousand years of tradition: they celebrate this legacy with pride, reflect it with humility. It is a privilege to be called a ranger; but the title must be *earned,* gained through credibility, confidence, and ardor. … It is an attitude and choice; a fervor for the resource and dedication to public service.

Other interviewees, however, saw providing face-to-face contacts as visitors important less for the sake of preserving tradition than for ensuring effectiveness. In an agency committed to engaging the public, many employees consider speaking directly with their clientele to be the gold standard of communication. Research in leisure studies further substantiates these comments, as park visitor studies have shown rangers to be both highly used and effective information sources, from the perspective of park visitors (e.g., Doucette & Cole, 1993; Manning, 2003; Manning, Cole, Stewart, Taylor, & Lee, 2000; Rickard et al., 2011). Interviewees noted that one-on-one, face-to-face contacts between NPS staff and visitors enable the type of tailored information not always available from other park information sources, whether posted signs or podcasts; in the words of a MORA fee collector: “that is where you can get the most up-to-date, most accessible, anything you need kind of thing, is from anybody in uniform” (MORA17). According to some employees, engaging visitors in two-way conversation, moreover, can be more persuasive than some of the newer forms of information technology, especially in cases where human health and safety may be on the line. According to an OLYM Natural & Cultural Resources employee:

> … We try to substitute all these media things—podcasts, and electronic, virtual tours… I think the personal contact is really important and can be very helpful because a ranger would explain to somebody… ‘Are you going out there in that meadow? Do you see those elk out there?... Well, they can move about 60 mph when they want to, and they don’t want people getting near them.’ (OLYM7).

Importantly, some noted that these face-to-face intercepts could be critical in instances where visitors may need safety information, such as about weather or trail conditions, yet may not seek out this information on their own. For instance, many parks, including Grand Canyon and Yosemite, have instituted “preventive search and rescue” (PSAR) programs in which park staff and volunteers rove popular trails in order to intercept individuals who may be ill-equipped to participate in the activity. Explaining the merits of a PSAR program, a DEWA law enforcement ranger noted:

> …You can have all this information available, you can put it out, you can do public service announcements, you can have it available in dozens of languages… But… I think with some people you really need that actual visitor contact (DEWA17).

Limited research in national park contexts has substantiated this claim, with the exception of Yee and Iserson (2008), whose retrospective quantitative analysis of Grand Canyon search and rescue (SAR) data between 1998 and 2005 suggests that PSAR has contributed to a reduction in overall SAR incidents. Other studies have demonstrated the effectiveness of park staff (over posted signs and barriers) in guiding visitors’ behavior, such as deterring them from hiking off trail in environmentally sensitive areas (Swearingen & Johnson, 1988). Even as they extolled the virtues of face-to-face communication, interviewees noted the difficulty of providing adequate levels of park staffing to ensure that these contacts took place; no one seemed to believe that hiring more people was a foreseeable prospect, given ever-dwindling federal funds for national parks. (For a further discussion of funding, see below).

"Shift from wood signs." Rather than praise tradition, some interviewees described what they viewed as real problems in the antiquated communication channels in place within most parks. When asked to evaluate the park's efforts to disseminate risk- and safety-related messages to visitors, one DEWA interpretive ranger voiced frustration with the status quo—communication strategies she saw as poorly suited for a new generation of tech-savvy consumers:

> Our website's not that easy to navigate and find information easily …Our brochures are not graphically pleasing enough to really make people interested in reading them. We just don't have a lot of media that's in the right format…That doesn't work for a generation, or people who are coming to the park now. They want it quick. They want it free. And so, we're not meeting their needs (DEWA2).

The sense that parks have been unable to keep up with changing expectations that their clientele may have for acquiring information seemed most salient to interviewees' discussions of social media and the park website. Until very recently, most parks were unable to access online platforms like Twitter, Facebook, or YouTube through federal government Internet servers. Unsurprisingly, the new availability of these services has resulted in widespread adoption, including all three parks in this study. Moreover, at the time of this research, both DEWA and MORA had recently hired a full-time employee responsible for managing the park's social media presence.

Referring most directly to Twitter and Facebook, many interviewees seemed to suggest that by adopting forms of social media, the park could improve the park's communication structure; however, interviewees were not always clear in explaining just *how* social media would transform the park's communication, or *why* these forms of communication should be considered an improvement over more traditional forms of communication, such as signs, bulletin boards, and brochures. Most centrally, interviewees seemed to make the argument that, when it comes to communication technology, newer is better, especially in, as a DEWA law enforcement ranger put it, "keeping up with the times" (DEWA13) and communicating with younger park audiences. In the words of a MORA administrator, "[Twitter] is a tool… So we've got to shift from signs that are painted brown" (MORA8). Likewise, a DEWA Natural & Cultural Resources employee agreed:

> I think we probably haven't explored nearly enough other means of communication that us old guys don't really partake in too much that seems to be more the norm. Facebook and Twitter … video chats and YouTube videos and stuff like that, people are gonna look at and pass around (DEWA4).

Of the interviewees who offered more of an argument for how social media could transform park communication, a handful mentioned using these platforms to disseminate simple, yet urgent, risk messages. In the case of MORA and OLYM, for example, park employees described using tweets to inform park visitors about weather or driving conditions —information that might not be instantaneously updated on the park's website or telephone information line, and would not appear in written materials like brochures. As one MORA employee explains:

> …For Twitter… 'heavy avalanche danger, we're not opening the road,' or, if the road is open there's heavy avalanche danger, be careful in the backcountry' (MORA16).

Questioning the role of these platforms as a panacea for the park's communication challenges, a few interviewees challenged this utopian view. Referring back to one of the central missions of the Park Service, to attract visitors to recreate in national parks, a DEWA administrator noted, somewhat tongue-in-cheek, "…simply having the Secretary of the Interior tweet about something isn't going to draw those [younger generation of visitors] in" (DEWA9). Similarly, a DEWA law enforcement ranger explained how simply *creating* a Facebook page does not necessarily result in connecting with park visitors:

> …They just opened up a Facebook site like yesterday… *But you've got to get people to know to join them!* …This isn't an easy—you're supposed to solve all problems after this! Because we have smart people that have been *trying* (DEWA8).

Like the use of social media, park websites received both praise and criticism. On the positive side, many interviewees remarked that park websites contained copious information and resources for planning a visit, such as trail reports, road closures, and locations and operating hours of visitor centers and museums. Accordingly, they viewed the website as an essential resource: something every visitor should (and, conceivably, could) refer to prior to arriving at the park. Yet, as other interviewees explained, such as the MORA interpretive ranger quoted below, the wealth of information contained in the website is not always easily accessible, due in part to its federally-mandated format, which is similar across all park units:

> There's a *lot* of information on our website. It's *not always easy to find*… Things get buried. But it's that overall template and you're trying to shove things into things… What it does is it kind of *prevents* some of the flexibility for us to *use* (MORA4).

In the same vein, others called park websites "awful," "terrible," and "a mess," noting that they routinely received complaints about them, or, like the employee quoted above, spent time assisting visitors to locate information "buried" deep within the sites. According to some interviewees, in addition to being non-"user-friendly," park websites can also jeopardize park managers' goals of helping visitors develop relationships with the park. According to a MORA Natural & Cultural Resources employee:

> Coming from an interpretation method… you can't really navigate [park websites] in any sense of anything. It takes a long time to find anything and the information, like the ways to connect people to resources, aren't there, I don't think (MORA21).

As this section has illustrated, in the area of visitor communication, some park employees saw real issues to be addressed moving forward. Whether the NPS has "appropriately" adapted to an evolving information climate, and if using new technological innovations might benefit its employees and visitors, remains an empirical question, as employees are left to evaluate their communication efforts based on their *impressions* of what has worked.

Involving the community. Whether posting signs or tweets, the types of information described in the previous sections rely on top-down dissemination by the NPS. In contrast to this format, interviewees also discussed instances in which the Park Service partnered—or could partner—with outside agencies or businesses in order to provide information to park visitors (or potential visitors). In general, interviewees suggested that these partnerships served (or could serve) two main purposes: first, to introduce and orient public audiences to national parks, including raising awareness and appreciation of undeveloped areas, and second, to target and educate park user groups who have been historically involved in safety incidents. In service of the first goal, interviewees mentioned efforts to partner with schools, universities, private businesses, and nonprofit groups. NPS employees have taught classes, talked to local radio DJs, and manned booths at local fairs. Describing how several of his staff members, permanent residents of the surrounding communities, have begun volunteering with local public schools, a DEWA law enforcement ranger explained, "…if you get the kids involved, you'll get the parents involved" (DEWA7); as potential park visitors, these parents would learn from their children, and be better informed of safety and environmental issues in the park. Also working with local schools, an OLYM interpretive ranger described taking teenagers from the surrounding communities on hikes in the park as a transformative experience able of combating the "nature deficit disorder" (Louv, 2005) he viewed as widespread in this population. Recounting a recent trip, he remarked:

> …We'll talk about sword ferns and Douglas firs and Western red cedars and start to try to reconnect… At the end of my workday, that's probably gonna be the most possibly rewarding thing and ultimately—hopefully—the most beneficial thing that we might be able to do (OLYM4).

Partnerships can also occur even when park employees are not directly involved. Several interviewees from the Washington parks described how businesses and nonprofit groups offer information and training designed to orient public audiences to safe outdoor recreation—an outcome that, in turn, helps park managers. For instance, a MORA Natural & Cultural Resources employee described how local branches of REI, a popular outdoor clothing and gear outfitter in the Pacific Northwest, offer "everything from kayak classes to navigation courses, whether it's GPS or map and compass, how to snowshoe, or ski" (MORA20), and others noted that similar courses were offered by the Seattle-based nonprofit group The Mountaineers.

While the aforementioned partnerships are aimed at the visiting public, writ large, other partnerships that interviewees described would target particular user groups. A handful of interviewees suggested that partnerships with groups like the Boy Scouts would assist the park in preventing the types of rule violations, injuries, and accidents attributed to these groups. As an OLYM interpretive ranger explained:

> We could do more outreach to like Scout groups... They certainly have been a resource protection problem. But being proactive with them and their leaders and trying to train in Leave No Trace…could probably help us in the long run (OLYM6).

Similarly, an OLYM administrator suggested that, following numerous safety incidents and infractions among Navy personnel unaccustomed to recreating in the park or the climate of the Pacific Northwest, the park reached out to the base's administrators: "forming relationships with whoever the leaders were, and that way, they would know to post notices or press releases or whatever on the bulletin board [at the base]" (OLYM1). According to this individual, these efforts resulted in fewer problems among this target group.

Tailoring messages. Because many interviewees discriminated between different visitor "types" they also believed that communication with visitors could not (and should not) be "one size fits all." Indeed, employees from all three parks described ways in which they struggle to manage park experiences for a range of visitors based on assumptions of these groups' levels of awareness and preparedness, as well as previous exposure to park-related information. Some of these assumptions are likely borne out, as in one MORA law enforcement ranger's example of comparing a mountaineer to a sightseer:

> …Someone obviously climbing the mountain is going to have to do a lot more research on being up to speed with avalanche conditions and going through the process of getting a permit, versus someone who's just going up to the visitor center to watch the movie and maybe go to a program (MORA14).

While not asked specifically in the interview to distinguish between park visitors, interviewees nonetheless described multiple ways in which they classified the "types" of visitors they encounter on a daily basis. These classifications, it seemed, helped interviewees to better contextualize the discussion of risk management, including the role played by risk and safety-based communication. I describe several of these visitor "types" below.

"The Paradise crowd." For employees and volunteers at all three parks, classifying visitors by the recreational activities they took part in (or avoided) was an easily employable strategy. MORA, OLYM, and DEWA each feature a diverse set of activities suitable for a range of abilities and skill levels, from visiting indoor exhibits, to canoeing rivers, to scaling glaciers; however, when characterizing visitor "types" interviewees tended toward a more dichotomous description: those who leave their cars, and those who do not. As several interviewees noted, while some visitors seek the developed park areas, such as picnic areas, museums, and visitor centers, others visit parks to experience untrammeled places. Referring to the vehicle-accessible base of Mount Rainier, equipped with snack bar, restrooms, and a museum, one MORA ranger described some visitors as “the Paradise crowd”: individuals who expect that “everything’s close to their car…and they’re wearing their penny loafers and those kind of things” (MORA12). Likewise, a DEWA law enforcement ranger explained that, while the park’s developed recreational sites, such as lifeguarded beaches, attract “a certain type of visitor,” “thousands and thousands of visitors to the park, they don’t want anything to do with that; they want to come and be out in nature” (DEWA6). In addition to providing space for sightseers and nature enthusiasts, parks can also attract highly competent, experienced, or even professional-level athletes to their mountains, rivers, and forests. As one DEWA administrator described, these individuals often differ markedly in skill-level from the majority of visitors, which can pose a different kind of risk management challenge:

> [Professional kayakers] like to come up when the water’s high in spring and challenge the waterfalls and things like that. Some of those activities may be OK for those folks, in terms of not getting hurt, because they are so expert at it, but they’re also setting an example for other people that… [are] not going to be able to follow it without getting hurt (DEWA9).

As these and other comments suggested, in categorizing visitors by their recreational choices, interviewees also implied that visitors differ in both their levels of voluntary risk-taking and their acceptance—or seeking—of (un)developed landscapes. Interestingly, a MORA administrator expressed uncertainty with the park’s traditional emphasis on informing and regulating visitors participating in high-risk recreational activities, such as mountaineering. Using a banking metaphor, he explained the careful strategy involved in the decision to tailor safety-related messages to visitor types:

> …We're not going to have enough money to do everything so what…*group* of visitor do you get the most for the investment in safety information [?]… Yeah, we spend a lot of time in the high-risk activity, but they're probably the most prepared… People who, driving in the winter for their first [view] of snow… that's probably a different risk (MORA8).

First time visitors. Interviewees also categorized visitors based on whether or not they had previously visited the park. Specifically, they differentiated between first-time visitors, and those who may have been to the park several times already. Suggesting that familiarity with park rules and safety may develop over time, several employees noted that the first-time visitor could lack understanding of the conditions at the park. Describing his staff's struggle to educate visitors about park-related safety, one MORA administrator noted, "…Over time people become educated. If they're coming in for one trip… we're limited about how much impact we can have on them" (MORA8). In the same vein, a MORA law enforcement ranger described his staff as flummoxed by their futile attempts to:

> …[Deal] with the more typical vacationer coming out from Ohio or whatever, that's a transient population that you can go and hit hard and two weeks later, none of those people that saw all of that [safety-related] activity are around, so that's just a problem inherent in parks (MORA9).

As these individuals' comments describe, having an audience consisting of many first-time—or even one-time—visitors poses perennial challenges. Ideally, risk managers provide risk and safety-based information that visitors can acquire and assimilate over time; in reality, however, park personnel must struggle to decide, as the MORA administrator quoted above put it, "…what's the minimum that the one-time visitors *has* to *have* in order not to get hurt [?]" (MORA8).

Locals. Related to the previous category, interviewees also distinguished between visitors from the local area and those visiting from out-of-town. As might be expected, some employees noted that local visitors are often repeat visitors, as they take advantage of the recreational opportunities offered in close proximity to their home. Describing the type of winter visitors who frequent Hurricane Ridge at OLYM, a location with designated sledding, cross-country skiing, and downhill skiing areas, one OLYM law enforcement ranger called them, "…a lot of locals who pretty much know all the rules and follow them fairly well" (OLYM11). Knowing the park's regulations, however, does not always mean leaving behind the habits of home. Employees at DEWA, in particular, described how visitors from nearby metropolitan areas seemed to bring with them the customs of city life; specifically, in the words of one employee, "they're always trying to go fast" (DEWA11). Whether or not visitors intend to appreciate DEWA's scenery, or to drive the park roads as a turnpike to New York City, employees suggested that they seemed to, consciously or not, bring city culture with them; for most employees, these habits were not viewed favorably. Comparing DEWA to a few Western national parks in which he had worked, one DEWA law enforcement ranger described:

> …I think just the lifestyle is different here. It's like the hustle, the bustle, everybody's riding up your tail… But I mean they're used to… the city and the horns and riding each other and trying to get somewhere and cutting people off…it's not like they're gonna do that in the city and then come here and *not* do it (DEWA13).

Interviewees also noted that local visitors are more apt to visit the park spur-of-the-moment, rather than as part of a pre-planned trip. For instance, many employees described a sunny day in the Puget Sound metropolitan area, one in which Mount Rainier looms large above Seattle, as a "billboard" for park visitation. As one MORA law enforcement ranger described:

> …The main thing that we run into is the last-minute visitors at this park, particularly… Here, it's more of the person that's coming out, *oh you can see the mountain out, let's go out for the day* (MORA18).

Ironically, employees noted that, in some cases, out-of-town visitors were *more* prepared for their park visit than local visitors, as the non-locals had taken the time to research the park's conditions, as well as to plan an itinerary. (See below for a discussion of visitor preparedness).

As employees indicated, determining how to reach all visitor types, and with what information, is often less than straightforward, especially given limited budgets. One DEWA law enforcement ranger described the park's ongoing struggle to disseminate park-related press releases to a widespread visitor base as "[figuring] out how to reach into the city and get our message out to the people that are visiting from those areas" (DEWA6).

English as a second language. While all three parks receive foreign visitors, DEWA interviewees in particular described how hosting many non-English speakers poses particular challenges. With a large Hispanic/Latino visitor base, park managers have attempted to reach their users by posting bilingual signs throughout the park, and by ensuring that at least a handful of their staff can communicate in Spanish. Yet, despite these interventions, the on-the-ground interactions between park employees and non-English speaking visitors can be cumbersome at best. A fee collector at DEWA explained the challenges of communicating simple payment instructions at a popular beach area:

> None of my [staff] speak Spanish now… I've had people on park staff who are Spanish-speaking help us make up signs and stuff to put in our windows, as far as putting the receipt on your dashboard. And there's no Spanish word for 'dashboard'…And I actually point, '*Up here, put it here*!' And I'll watch them do it. '*No, don't put it in your wallet. Put it up here*!' It's difficult (DEWA3).

While bilingual signs and staff play a basic role in ensuring that information is disseminated to all audiences, tailoring messages may be about more than getting the language right. On a summer afternoon, as extended families converge on the park to barbeque and kick a soccer ball, a DEWA swimming beach can be transformed into a melting pot of Central and South American cultures: Guatemalan, Ecuadoran, Mexican, and Salvadoran, among others. Given this atmosphere, a DEWA administrator observed, "I look at my lifeguards. *All of them are White*, Anglo-Saxon kids… So what we've got is… having to deal with a different culture" (DEWA16).

Cultural differences between visitors and employees can also manifest in reactions to the physical park environment. A MORA administrator described how park managers assembled a focus group of diverse members of the public to discuss the park's communication strategies, only to find that many believed the photographs of wild animals displayed on park brochures to be unwelcoming and scary. As he recalled:

> I still remember—don't put wild animals and scary bears and cougars and stuff on the front page. But at the same time we've always used that [approach] as thinking that's effective (MORA8).

Similarly, the DEWA fee collector quoted above was surprised to find that visitors accustomed to more urban settings may *fear* the dense canopy of hardwood trees shading the park's narrow roads, an aspect of the park she and other employees find appealing. As these examples demonstrate, whether differences in language or values (or both), employees encounter substantial barriers to disseminating park information.

"Can't put a sign everywhere." Though most NPS employees saw themselves as responsible for providing information, they were quick to clarify the limits of their role. Referring to the idea of "common sense" (which will be discussed at length below), employees noted that their responsibility to provide information must work in tandem with visitors' own knowledge of safety—the information employees tend to expect all visitors to have, regardless of their background. Discussing the park's responsibility to provide safety messages in its publications (e.g., pamphlets, maps, signs), an OLYM employee in the Interpretation & Education division described what she saw as an appropriate and essential boundary demarcating the park's and the visitor's responsibility:

> We can provide general safety information… like hypothermia, or if you see a cougar, do this, or don't drive up to the ridge today… But we can't say like, 'When you're hiking on a mountain trail, don't climb up a tree 'cause you might fall out.'… A lot of it has to be

> their own common sense. We can give them as many safety warnings as we can, but we can't go with them (OLYM5).

Like the individual quoted above, many employees viewed the NPS responsibility to provide information as extending only so far. Limited in personnel and other resources, parks are often forced to make do; in the context of providing information, this can mean producing pamphlets, podcasts, and signs, placing them in the park, and then hoping for the best, as illustrated in these employee comments:

> …All you can do is make as much high quality information available as you can and hope people internalize it (OLYM1).

> … I guess a lot of that still kind of gets back to educate, and hopefully somebody makes an informed decision… and I guess at that point let the cards fall where they will (MORA20).

That the responsibility of information dissemination has necessary limits was expressed most directly in interviewees' belief that park managers "can't put a sign everywhere." Some interviewees used this expression to emphasize the sheer impossibility of labeling, through signs or park literature, each potential hazard throughout the park; as a DEWA administrator put it, "you can't put a sign everywhere in the river where there's a rock" (DEWA1). Similarly, other interviewees noted that signs and brochures are not necessarily useful in disseminating information that should be obvious to park visitors; as indicated by an OLYM Natural & Cultural Resources division employee: "Would you have a big sign that says, 'you must use common sense in here?' Would that help in any way? I don't think so" (OLYM7). Likewise, a MORA law enforcement ranger noted:

> …As law enforcement we can say, 'it is your responsibility to know the rules and regulations of the park.' So you should know that you're not supposed to cut down trees or feed the wildlife. Like there doesn't necessarily have to be a sign everyplace to dictate that (MORA14).

Other interviewees seemed to suggest that signs and brochures could become crutches: risk management resources that park managers relied upon too heavily, despite limited evidence of their effectiveness in guiding visitors towards prescribed behaviors. According to an OLYM interpretive ranger:

> …A lot of people in other divisions think, '*We need a handout, we need a sign, we need another handout, we need another sign*.' …Well, people… walk out into the meadow and they sit on the signs that say 'please don't walk on the meadow.'… And so signs aren't the answer everywhere, but it seems like we need to make at least some effort to give people the information (OLYM6).

An over-reliance on signs, moreover, was also seen as decreasing visitors' receptiveness to park messages, including those related to safety. A MORA volunteer (and risk management professional by training), noted that park managers should, "…pick and choose what they want to highlight at the moment because otherwise…then there's the risk of de-sensitizing" (MORA13).

"People don't read signs." Even as interviewees noted the utility of having some (limited) signage, they also expressed the strong belief that park visitors, as a group, "don't read signs"—a contention that applied not just to signs and bulletin boards, but to park-related communication in general. As interviewees were quick to explain, the reasons for not paying attention to NPS communication varied. First, employees acknowledged that visitors might never receive the information in the first place. In this sense, visitors can be, unwittingly, "defiant" by default. While park managers can (and do) make certain information available to visitors, they can neither guarantee that individuals are aware of its existence, nor that they know how to find it. A MORA law enforcement ranger summed up this perennial dilemma as such, "…The information's provided to them; it's there if they go looking for it. But how do you get them to actually see it?" (MORA15). Describing a kind of information impasse, a second MORA law enforcement ranger suggested that individuals who most need information about the park could also be those least likely to seek it out:

> People who read the trailhead sign and recognize the cues that we're putting out there don't need the trailhead sign, for the most part, because they know what they're getting into. And the people who *don't* [know what they're getting into] don't read the sign… (MORA7).

While not stated explicitly, this ranger's comment also implies that the inexperienced visitor may "ignore" signs because of his or her unfamiliarity with the physical context or the recreational activity. Though an unwarranted sense of self-confidence may persuade visitors that seeking information is unnecessary, at the same time, these visitors may have little idea of what information they do *not* know, and what they might *need* to know to recreate safely in the park. Complicating matters, in some parks, such as OLYM, regulations vary by location, such that visitors familiar with camping in alpine regions, for instance, might be unaware of the rules of camping on the coast. As one OLYM law enforcement ranger who supervises a popular backcountry hiking area saw it, "…There isn't a huge group of people who's intentionally trying to break the rules. There's just a lot of people who, in good faith, didn't get it" (OLYM9). Likewise, rules for appropriate visitor behavior can also vary by park, leading to potential confusion for visitors traveling to more than one national park. A MORA Natural & Cultural Resources employee, for instance, gave the example of the need to secure one's food items while traveling in bear habitats, a procedure meant to keep wildlife from becoming sick from, and accustomed to, human food:

> …You go to Yosemite, and they say don't leave your food in the car. And if you're in Yellowstone or even here or Olympic, we say *leave your food in the car*… People who are hitting all of the different parks… and they've kept their food in the car, and all of a sudden they get to Yosemite and it's kind of like, '*Why do I have to take it out of the car?*' (MORA20).

As this employee's anecdote illustrates, managing parks for localized ecological and biological conditions, while central to the NPS mission, can result in inconsistent risk messaging and, perhaps, uninformed (and unintentional) defiance of park rules.

Employees also noted that some visitors inadvertently miss signs and other park-related information due to their familiarity with the park and surrounding areas. Even the most striking warning sign, employees noted, fades into the background for those most accustomed to seeing it, such as repeat park visitors. Moreover, as seminal research in risk communication has shown, both familiarity with a risk as well as an optimistic bias, can serve to limit the associated perception of risk, which may likewise affect some repeat visitors (e.g., Weinstein, 1987). Interestingly, employees acknowledged that they, too, can "ignore" signage for just these reasons. A DEWA Natural & Cultural Resources employee used the example of a prominent park traffic signal at a highly traveled intersection in the park to demonstrate how signs can be rendered invisible for those most exposed to them:

> …There's a sign that has a traffic light… And it has *two blinking yellow lights there everyday*. It flashes all the time. I've asked people, 'Do you know where that sign is?'… I mean, people that drive by *everyday.* 'There's a sign that flashes?' (DEWA11).

One DEWA interpretive ranger explained how, as a long-time smoker, she, too, has come to ignore the safety warnings on cigarette packaging. This reaction, by extension, has convinced her of the importance of rules and enforcement (as opposed to just risk communication) to preventing drowning fatalities in the park:

> …People say, 'Why don't people see the signs? Why don't they read the signs?' And I'm like, 'I do it all the time!' Rip [the Surgeon General's warning label] off, throw it away…. So if we…. close Kittatinny, well then people won't drown there anymore. Because they won't be able to go there, and they won't be able to go in the water here, just like I can't smoke anymore [in buildings, due to state law] (DEWA12).

In addition to the “types” of defiance described above, it is possible that some visitors who “do not read” signs or disobey park rules simply do not comprehend the messages contained therein, such as due to a language barrier, as was discussed above. Lacking empirical evidence gathered from the visitors themselves, we cannot determine with certainty which of the possibilities described above is more often the case when visitors appear defiant.

As this section as shown, educational approaches were perceived by interviewees as the central pillar of NPS’ visitor risk management strategy. When compared to engineering and enforcement approaches, which will be discussed below, educational interventions can be both lower in cost and higher in acceptability; even as some interviewees voiced their distaste for “signs everywhere,” such approaches are (arguably) less invasive than constructing barriers or limiting access, and thus continue to be adopted. Yet the advantages of educational programming may be tempered, in part, by their expected effectiveness, something interviewees seemed to indicate in their common refrain that visitors “don’t read signs.” Rather than magic bullets, educational approaches are mercurial, their effectiveness relying on factors that may be beyond the control of NPS managers, such as the past experiences and motivations of their visitor base. Describing the necessary shortfalls of the “cognitive approach,” Heberlein (1974, p. 288) concluded that:

> The mainstay of the cognitive fix is to transmit information. This information is likely to be effective when it helps the person realize the goals he is already motivated to achieve, rather than to change old motivations or create new ones.

The extent to which interviewees appreciate Heberlein’s (1974) comment—and the nuances of the “educational approach” more broadly—remains in question, though at least one individual, an interpretive ranger at DEWA, was forthright in her recognition of the potential shortcomings of simply providing education:

> …While I know that what I love the most, and brought me into this career is the education side of things, and I want to feel like that is the most important because that's what I do… I know that it's the least effective. And so, going in everyday to do a job that you feel really is really important but you know is the least effective way of doing that job—that can start to wear on you and get frustrating after a while, too (DEWA12).

Engineering

Engineering solutions to reduce park risks represent the second area of NPS responsibility that interviewees discussed. In describing the park's responsibility to engineer handrails, walkways, and railings, interviewees broached larger issues, such as liability and the legal and philosophical concept of wilderness.

"Can't put a handrail everywhere." Like the limits to informing park visitors, interviewees also suggested that the park's ability, or inclination, to reduce park risks through engineering can only extend so far. Just as park staff cannot place signs at every corner, or provide brochures at each trail junction, a DEWA law enforcement ranger explained, "There comes a certain point where we can't put fences up…we can't put walkways up, we can't make every path even and balanced so you don't trip and fall" (DEWA7). For one, the unknown or unpredictable nature of some park risks, such as weather or wildlife, make reducing or eliminating these risks near impossible. As a DEWA law enforcement ranger remarked, with respect to engineering park risks, "…it would be impossible to mark every place that a snake could be or something like that" (DEWA17). Second, most parks lack the personnel and funding to engineer the type of extensive handrails, walkways, and bridges that a "safe" park would conceivably require; a MORA law enforcement ranger noted, "we just don't have the manpower or money to do that" (MORA18). Finally, and perhaps most crucially, interviewees explained that limiting risk in parks by altering the landscape might run counter to part of the NPS mandate to conserve and protect natural resources; according to the same MORA ranger quoted above:

> This is a national park and part of the mission statement is to conserve the wildlife and the scenery. And that doesn't always necessitate having to put boundaries up everywhere (MORA18).

Stated simply, by a MORA Natural & Cultural Resources employee: "You can't have just hundreds of miles of yellow ribbon, or steel tubes, or chain-link fence in the wilderness settings" (MORA20).

Complicating matters, interviewees pointed out that some visitors *purposefully* break park rules, such as by entering an area that has been cordoned off, even after receiving information about the potential risks and the consequences that could ensue. A DEWA member of the Natural & Cultural Resources Division characterized these individuals as risk-takers, describing a common scenario in a popular park location:

> At Childs Park… we have overlooks… There's a set of three waterfalls there. It's posted 'no swimming'… People still go over the railings and jump off the waterfalls… Unless we had a ranger posted there 24 hours a day, we wouldn't be able to stop it. And even then we might not be able to stop it. So there's that risk that people are choosing to take… (DEWA11).

Likewise, an OLYM law enforcement ranger agreed, expressing an almost fatalistic attitude towards the inevitability of visitor defiance, despite park managers' best efforts:

> We can set up as much info and guidelines and sort of protections as we can, which will work really well for visitors if they choose to avail themselves of it; however, there are some people we're never going to get to and will do silly things despite all of the information that is out there to the contrary (OLYM3).

As these examples suggest, park employees often perceive at least a portion of their clientele as willingly and consciously putting themselves in unadvisable situations, despite the employees' best efforts to deter them.

"Known hazards." Some forms of engineering, however, may be a requisite part of the park's responsibility to ensure the safety of visitors. When describing the park's role in managing visitor safety, many interviewees mentioned the park's responsibility to mitigate “known hazards.” Based on interviewees’ descriptions, these hazards were particularly egregious and located in well-traveled areas to which visitors are “invited” by the park. An OLYM maintenance worker, for instance, described how his staff is replacing a cedar plank boardwalk with a gravel path because the wooden walkway becomes particularly slippery in the damp coastal area (OLYM12). At DEWA, park personnel constantly assess the hundreds of man-made structures on the park’s property—some historic farmhouses and homesteads, some dilapidated sheds or abandoned wells— to determine which need to be removed for the safety of park visitors. Though most of these structures are clearly posted off-limits to the public, they must nonetheless be considered as potential hazards, as a DEWA Natural & Cultural Resources employee explained:

> …Some [structures] are really falling down. Others, the floors are about rotted out and there’s holes in them and if somebody does break in…if they go through the floor, that’s something that we feel can be prevented if we remove the structures (DEWA11).

In these and other examples, interviewees explained how, in accessible, high-visitation areas such as campgrounds, park hotels, short trails, and picnic areas, they felt a responsibility, as one DEWA Natural & Cultural Resources employee explained, “not to entice [visitors] into dangers that they’re not aware of” (DEWA4). Recounting a visitor rescue in which he was involved several years ago at a popular sightseeing area called Marymere Falls, one OLYM law enforcement ranger explained his disapproval of the agency’s upkeep of its infrastructure:

> We had a woman who, last year… slipped and broke, I think an ankle, but then as she fell, she broke a wrist. … If I was that person… I’d file a tort claim and say, ‘Come on, this is ridiculous!’ ‘Cause if you look at it, the stairs they have there, they’re just not right…So if you’re gonna provide any kind of *trail* like that… I think they need to do a better job (OLYM8).

In a similar case, a DEWA Visitor & Resource Protection Division employee explained how the conditions at a campground were unfit for visitors, and her dissatisfaction with park management for failing to ameliorate the situation. As she explained:

> Our campground in NJ, the dirt driveway has had the hugest potholes for years. I've been asking them for at least five years to go in and grade it… And we're charging people thirty dollars a night to stay here… It's so rutted and pot-holed and muddy and disgusting that people are now driving over the field to get around it… (DEWA3).

Somewhat differently, in some cases, engineering safety in these parks means balancing historical character, as two MORA Natural & Cultural Resources employees explained in reference to historic architectural features in prominent national park locations:

> I remember in Yellowstone we had a situation where… the Mission '66 railing was pretty much a rail that probably had an 18-inch gap… We actually had a little girl who fell. She was sitting on the bench, but the rail was wide enough that… she fell, and she wound up dying (MORA20).

> [At Yosemite's Awanhee Hotel] they had these big, beefy log railings that were really low. And the fact that they were so big actually made them even more dangerous because the tendency was you want to sit on it. But if you were to lean back you could be in serious trouble (MORA22).

Apart from built structures, several interviewees referred to the park's responsibility to remove "hazard trees": dying or dead specimens that pose a larger risk of falling. In a "natural" setting, a fallen tree benefits the park ecosystem by providing rich organic matter to nurture young seedlings; however, in populated areas, falling trees pose formidable risks and negative consequences for people and property. As an OLYM interpreter explained:

> …If we invite people to *sit* and have like a target, whether it's a picnic table or a tent pad, then we are responsible for assessing the health of the trees around that. If there's one leaning over and about to fall on them, we need to cut that tree down… (OLYM6).

A DEWA Natural & Cultural Resources employee agreed, remarking, "The rotting dead tree hanging over the picnic table is something we probably should fix" (DEWA4). While seeing the value in removing a potentially hazardous obstacle, some interviewees reflected on the idea that a decision to benefit its visitors might be detrimental to the park itself. In this way, managing hazard trees can be understood as a small example of a much larger tension in the NPS mission: the call to facilitate visitor recreation while protecting the health of the park flora and fauna; unfortunately, for some interviewees, this balance is rarely achieved in an equitable way. In the words of a DEWA interpretive ranger:

> Being in a park, sometimes you can mitigate the hazard easily. Sometimes it's more difficult and we're supposed to *preserve and protect and hang on and take care of these trees* and all of that. And I know there's that balancing issue sometimes where the protection of the resource and the protection of the visitors can sometimes be at odds (DEWA12).

Negligence or wilderness. As the examples in the previous section illustrate, the park's responsibility to provide engineering solutions to limit the risk in an area likely differ based on the location of these risks. This analysis does not attempt to decipher—or critique—the letter of the law in the context of national parks; however, it does recognize the importance of park employees' own interpretations of "negligence" and "wilderness," two legally defined concepts, as contributing to their attributions of responsibility. Interviewees' descriptions would suggest that the park's responsibility to provide engineering solutions is not necessarily static, but rather varies geographically, depending on the character of the environment and the volume of visitor use. Many interviewees seemed to distinguish between "backcountry" and "frontcountry" or "developed" or "undeveloped" areas in order to explain how this responsibility could fluctuate in a single park, as described by one MORA law enforcement ranger:

> People sleeping in a building and we don't have proper fire protection in place and we have a bad incident and people are killed, obviously our liability is way up and *should be*… We can talk about people getting out into the backcountry… I think that's a bit different. People go out and step off the edge of a wash or something, or a cliff. We didn't invent gravity. We didn't make the wash (MORA9).

Making a similar point, a DEWA law enforcement ranger expanded this conception of backcountry hazards as existing outside of the Park Service's general control, stating: "… You may not be able to put a fence along the entire ridgeline. But yet at a developed waterfall area, I think we would generally" (DEWA17). Running through these and other comments is the sense that interviewees see parks as multiple units in one: highly developed areas providing the amenities available in many metropolitan areas, as well as primitive wilderness settings, where the flora and fauna are largely untouched by human intervention. While instances of negligence may be more straightforward in developed areas, such as inadequate fire protection in a visitor center or park hotel, the issue becomes less black-and-white in the hundreds of miles of trails surrounding these buildings. As an OLYM Natural & Cultural Resources employee noted, while trails into the park's wilderness areas may be "undeveloped" in comparison to a paved highway, they are nonetheless fabricated with steps, bridges, primitive campsites, and signs (among other interventions), thus raising questions about the park's responsibility to ensure the safety of hikers and campers:

> …If the agency is directing people into certain areas, if there's a designated campsite or permit system where you're assigning people where to camp…then you get into a gray area because there's designated campsites all over the wilderness and to what extent do those need to be made more safe? Handrails put in? (OLYM14).

As this section as shown, engineering approaches are perceived as important, yet in limited situations; their acceptability seems to be contingent on the existence of "known risks" that park managers feel compelled to address, in areas to which members of the public are "invited." In many cases, engineering solutions become acceptable based on their geographical location, with developed, frontcountry locations, such as visitor centers and campgrounds, more obvious choices than wilderness settings. That park employees may see clear—or less than clear—distinctions in their responsibility based on location in the park begs the question: do visitors perceive these distinctions similarly? Stated differently, do visitors and park employees agree on the point at which "wilderness" end, and "frontcountry" begin?

Enforcement

Across all three parks, interviewees described situations in which their responsibility included enforcing park rules and regulations. Interviewees noted that their ability to maintain visitor safety could be challenged by a lack of a law to enforce, or the failure of visitors to recognize the laws that were in place.

Allowing access. At MORA and OLYM, the two parks I visited in the winter, discussion often focused on the issue of park access. Because severe storms and avalanches are perennial issues, interviewees explained how they devoted countless hours to enforcing tire chain restrictions and ensuring that park roads were passable. At MORA, a decision model including several factors, such as weather, avalanche risk, and the number of personnel on duty, allowed law enforcement rangers to determine whether to open the single road allowing vehicle access to the mountain's 5,400 ft. base at Paradise. Unlike the Washington Department of Transportation, the MORA and OLYM road crew use neither salt nor chemical de-icing agents on the road, nor do they employ explosives to clear avalanche chutes. Deciding to close the road, in essence, involves weighing multiple risks with allowing visitors access to the park. As an OLYM law enforcement ranger noted:

> …It's not just '*oh, avalanche danger is high, we should close the road.*' It's 'avalanche danger is high, there is a big storm with big winds, and it's snowing and you can't see the road.' There's a whole bunch of different factors that go into the decision-making process (OLYM11).

Given these complex circumstances, as a MORA law enforcement ranger explained, "…we make that decision *for* [visitors] by closing the road if we feel it's too dangerous for most people to pass" (MORA5). Interestingly, maintaining vehicle access is not limited to high alpine parks.

Responsible for over 200 miles of road, including 22 miles of Route 209, a major state highway and commuter access road, DEWA officials face similar challenges to keep park roads open during snowy winters. Indicating the centrality of the park's role to the livelihood of the surrounding communities, a DEWA administrator remarked: "I always joke that if we don't plow the road when it snows, nobody here is going to work" (DEWA9).

Whether kayaking the Delaware or summiting Mount Rainier, visitors can make many recreational choices largely without tremendous oversight. Though recreational permits issued by the park are required for some activities, such as ascending above 10,000 ft. at Rainier or camping in the backcountry at any of the three parks, employees are often powerless to stop visitors from embarking on misguided itineraries. As Rickard et al. (2011) point out, this inability to prevent park visitors from engaging in non-illegal, though arguably unsafe, activities forces many employees to rely principally on persuasive communication. Unfortunately, talk alone is sometimes inadequate in convincing visitors to change their plans, as one OLYM interpretive ranger explained:

> …We had some guys come in here… They were going to go for a day hike from the Sol Duc to the Hoh.. It was in the late winter, early spring, I think, and the woman that ran the visitor center at the time said, 'Well, that's, I don't think you probably should do that.' And they started and one guy has never been found… But she gave them all the right warnings, but people can still choose to do silly things (OLYM6).

A MORA law enforcement ranger echoed this sentiment, explaining how managers' decisions to allow access depend largely upon calibrating the level of risk they deem "acceptable" for the general public; however, as previous discussion has noted, different visitor "types" mean that acceptance—and tolerance—of risk can vary greatly throughout the visiting population, leaving managers to approach risk conservatively (see also Rickard et al., 2011):

> …We'll close off sections of hiking trails, like if there's a bridge out. And there may be a number of people that can do that river crossing absolutely safely. But, if our feeling is

> that it's too high a risk for the general public to try to cross that, then we'll close it down… But in most cases, I think the park… pretty much allows people to make their own judgments about what activity they're going to do. And we may encourage them not to do it, but we'll stop short of saying 'you can't' (MORA5).

At DEWA, interviewees described how they may close the river to swimming given high water levels, such as after a storm event. Interestingly, at this park, rather than simply punishing rule violators, managers have embarked on an alternative path. As a DEWA interpretive ranger explained, park of the park's water safety program involves using face-to-face contacts on the river to reward individuals who comply with the park's recommendations:

> …We bought a lot of positive reinforcement promotional items, floating keychains in the shape of a PFD, safety whistles, water bottles… to positively reinforce safe behavior when we saw it on the river… And it was a nice entry because then you could just say, 'Well, you just wear your life jacket and let me show you how to put it on properly. You, too, can have a water bottle' (DEWA12).

Finally, and somewhat differently, allowing visitors the authority to decide for themselves whether or not to engage in an activity—to ski an avalanche-prone slope, or to cross a large river, for instance— might constitute part of the "visitor experience" that the NPS mission hopes to achieve, the type of "challenge" and "elevated experience" discussed above. As an OLYM Visitor & Resource Protection employee suggested, the visitor's prerogative, in this regard, may be just as critical as his or her safety:

> ...It's good that we don't restrict as much as we *could* restrict.…. We don't tell them that they can't go in to the backcountry when they're not maybe totally prepared to go into the backcountry… We could be much more controlling in that respect, but… that's part of the experience of going to a national park (OLYM10).

Since allowing access to recreate in federal protected land constitutes part of the NPS mission, enforcing restrictions of this access can, understandably, make some employees uncomfortable; as a MORA law enforcement ranger reflected on his staff's decision to close the road to Paradise during the winter, he noted: "…there are times when we feel we have to do that and we feel we can justify it. *But we get conflicted a little bit*" (MORA5).

Questions of identity. Even when park personnel *can* enforce rules, however, their ability to do so can be compromised by inaccurate public perceptions of national parks and the role of the people who work there. Of the law enforcement rangers interviewed, several expressed frustration with the public's lack of recognition of the park as federal land, and of their role as commissioned federal officers who uphold the laws therein. According to one MORA law enforcement ranger:

> That's one of the biggest challenges in my entire career: the public perception of what a park ranger does…They think kind of like the Smokey the Bear-type thing whereas they see us and we've got our defensive equipment on and they're like, 'Whoa! We didn't know park rangers carried guns!'…They didn't realize that they're in an exclusive federal jurisdiction. Most of them don't realize until they do something wrong and they end up getting a violation notice from us explaining that they have to show up in Federal District Court…(MORA15).

As a second MORA law enforcement ranger described, visitors' misconceptions about his job could also, ironically, threaten the safety of the very visitors he is tasked with protecting. For instance, he preferred *not* to wear the iconic NPS "flat hat," a staple of the park ranger uniform, because, in his experience, visitors will "see it and think, 'Oh, Yogi Bear!'…People don't look at me and see trooper when they see that on" (MORA9). In addition, this individual discussed how visitors oblivious to his role or the circumstances have, in some cases, interrupted an arrest or a crime scene investigation to inquire about the location of a trail, or a type of tree. Explaining the challenges he faces in navigating his role in the park, he noted:

> …When I see the family collecting pinecones or whatever, I'm fine with explaining why we don't do that. But, when a knucklehead needs to be dealt with, you need to deal with them. And, I think sometimes we do a disservice when we are the 'Oh hi, just friendly park ranger'… and spend five minutes telling them to get out of the road or whatever when sometimes I'll just yell an expletive and tell them to move… quite honestly, when I've done that, I've gotten an immediate result (MORA9).

In addition to misunderstanding the personnel, not knowing about the nature of a place could translate into not knowing how to behave appropriately. For instance, several interviewees discussed visitors' tendency to conflate national parks and state parks, as well as the U.S. Forest Service (USFS) and the National Park Service. As one OLYM law enforcement ranger observed, "*So* many people come in and they're like, '*Oh yeah, Olympic National Forest is so nice*'" (OLYM11). Similarly, a MORA Natural & Cultural Resources employee suggested that visitors might confuse federal land designations in the same way they might fail to discriminate between consumer brand names:

> ...It's like Goodyear or Goodrich on tires. [Visitors] mix the Park Service with the Forest Service. And in some cases they get it, and in other cases, it's just the Great Outdoors (MORA20).

Semantics aside, this belief can be particularly troublesome because USFS land is subject to different regulations than NPS land, such as those relating to logging, hunting, the presence of domesticated animals, and operating motorized equipment. Moreover, many parks, such as OLYM and MORA, are surrounded by USFS land, including trails and campsites, confusing the issue further. One MORA interpretive ranger described how he explained to discontented visitors the benefits and drawbacks of NPS regulations, such as road closures and hiking permits:

> … I tell them, 'Look, there's a lot of things that we have rules [for] in the Park Service, but there's a trade-off. These things that you want to do here, you could go right outside in the Forest Service just next to the park and do it. But they're not going to be plowing the roads, or come patch you up if something happens' (MORA3).

Likewise, a MORA law enforcement ranger suggested that the NPS commitment to visitor safety, as stated in its official legislation and practiced "in the field," means that, "…the consequences of screwing up in the national park [are] a lot less severe, for the most part, than screwing up somewhere else on your own" (MORA7).

Interestingly, at DEWA, questions of park identity were central to many interviewees' comments. Unlike MORA and OLYM, DEWA has no central entrance where vehicles must stop, make contact with a park employee, and pay a fee; instead, entrances to the park abound (i.e., 70 access points from adjoining rural roads and state highways), but signage indicating the park's boundaries is scarce. As a result, several employees spoke of local residents being unaware of the park's federal designation, or even its existence. As a park administrator noted: "We get more visitors than the Grand Canyon. Twice as many as Yellowstone and Yosemite… Not all of them are leaving here with the knowledge that they visited this park" (DEWA9). Visitors will often become confused by the location of the park that, though named after the river, is situated in the states of Pennsylvania and New Jersey. The administrator quoted above spoke of his staff's longtime struggle to "[create] an identity so that when you're in the park, you know that this is the park" and that "It's not in Delaware" (DEWA9). Like most of the law enforcement rangers I spoke with, another DEWA employee saw the park's lack of identity as endangering her ability to perform her job:

> I find the most frustrating is that people have never even heard of this park… and they have no idea of the scope and the size… Even people that live right outside the park and drive through everyday. And that does add to a lot of the confusion and complications and the people not understanding what's going on and why am I stopping them and can I give you a ticket 'cause you're just a ranger… (DEWA8).

Clarifying this point, a DEWA interpretive ranger noted, "[Visitors] might not know that they can't remove plants or wildlife or things like that because they might not know that they're in a national park" (DEWA15). In the coming months and years, DEWA officials plan to continue addressing their "identity problem" through more extensive, up-to-date, and prominent signage, especially at each park entrance.

Three Es in practice: Additional considerations

In practice, the approaches to education, engineering, and enforcement reviewed above face real challenges in the form of limited funding, as well as the threat of legal action. Because of these limitations, many interviewees were quick to mention that their plans to disseminate information, engineer a safety fix, or enforce a park rule, were more often "pie in the sky" than proven on the ground. In this sense, there existed potential for disconnect between interviewees' idealized notions of their responsibility to ensure safety, and the reality of these interventions.

Resource limitations. Despite park employees' perceived responsibility to manage the "three Es" of risk management, they also recognized that limited resources imposed significant roadblocks to meeting this responsibility, as the examples below describe.

Education. With a limited staff, fewer rangers are available to make the face-to-face contacts many of them deem imperative for informing park visitors about potential safety risks. Limited funding also means an inability to hire new personnel who could spearhead efforts to introduce new communication technology into parks, to evaluate and upgrade the communication sources currently in use (e.g., videos, brochures, exhibits, etc.), or to establish partnerships with local organizations or businesses to educate public audiences. According to interviewees:

> I think the Web is certainly a place where people are getting more and more information, but we don't have a lot of *dynamic* information on our website mostly because we don't have a position dedicated to trying to keep that stuff dynamic (OLYM6).
>
> Unfortunately, we don't have the staffing to be out there and to contact people as much as we'd like to. I know even our interpretation folks, even though they have seasonals, they're trying to staff visitor centers and handle the programs that they have and still do some roving things, but we have 70,000 acres. It's not easy to be everywhere! (DEWA11).

Engineering. With less funding, park employees cannot repair the known risks they routinely encounter around parks, such as deteriorating pavement, hazard trees, or splintered wood on picnic tables. Moreover, limited funds make budgets small (or non-existent) for the emergency medical and fire prevention resources that visitors may expect, should they get into trouble. In the words of interviewees:

> [Visitors] shouldn't come here and have grass be this high with the little clover flowers and bees and snakes and poison ivy all over the place. The bathroom should be working, clean. I don't think it's right (DEWA3).

> …In the picnic area we have a lot of paved walkways where all the edges are crumbled off because people walk across, so there's really tripping hazards… So, in a sense, we're creating hazards for the visitors because we don't have the money to eliminate these hazards (MORA6).

> …I worked at some park, we had an ambulance, I mean it was *horrible*… It shot sparks and flames out the exhaust… We couldn't afford to maintain it. We couldn't afford to replace it…. This is a life safety thing… You'd be better off putting the person in a wheelbarrow… (DEWA17).

Enforcement. Few law enforcement rangers in general, and even fewer on duty on a given shift, means the need to prioritize certain tasks (e.g., digging out signs from under snow) over others (e.g., patrolling park roads); however, *all* of these tasks are arguably necessary to ensure safety for park visitors, as these comments describe:

> Some of those [visitors] maybe wouldn't have [jumped off a waterfall] if they knew that there was a good chance that they would see a ranger and they would get in trouble and would get a ticket or a fine… (DEWA8).

> …We are professionals, and that means that, first and foremost, we deal with law enforcement and emergency services… You have to be out there to enforce the laws and to see where you're going to be picking someone up potentially for search and rescue or medical situation (MORA18).

> …Where there used to be thirty or forty uniformed rangers patrolling in working parks, there's 15 now… And it'll never go back the other way… We do what we can do and we prioritize… Take care of what's most critical, which is protection of visitors and staff. And you kind of prioritize everything underneath that (DEWA7).

"Society's love of litigation." Along with having limited resources to enact the 3 Es, park employees and volunteers described being hamstrung by the legal issues surrounding these practices. For one, many interviewees spoke of visitors as being quick to litigate in an attempt to find fault with an action (or inaction) of the NPS and/or to abdicate their own personal responsibility. Two MORA employees explained the situation as indicative as a more general societal climate, rather than exclusive to park visitors:

> Everyone in this sue-happy world doesn't want to take responsibility for anything they do and so they don't and so they want to blame it on the highest level of authority there so they can see what they can get out of it. It's like that lady who bought the coffee at McDonald's and then sued because it was too hot! (MORA23).
>
> …Part of it I think might be our society's love of litigation… People are so used to… something is going to tell me or keep me away from something dangerous, where out here you can walk right up to the edge sometimes, or, there's not going to be anything saying, 'Hey, the rocks are wet' (MORA3).

In light of this litigiousness, from putting up signs to contacting visitors, park employees explained needing to navigate risk management strategies carefully and deliberately. Risk messages about the park, for instance, might be interpreted in ways that would implicate the park in an instance of injury or death, as a DEWA law enforcement ranger explained, based on a conversation with an NPS solicitor:

> …We never really deemed the river 'closed' because then if we called the river 'open' then we would actually assume more of the risk 'cause you could say, 'Well, you're saying it's open and we can go in there, so you're saying it's safe to go in there' (DEWA13).

In situations where an action may become a precedent, park managers must tread carefully. A MORA law enforcement ranger explained this in the context of a park's interaction with private property owners while he was working at OLYM:

> …Actually their land, it was private property, but it fell under the exclusive federal jurisdiction of the park. So people would say, 'Well, this tree's dangerous.' And we'd go up and look at it, and if it was… yeah, we'd address it. But we still didn't go up and do hazard tree mitigation and evaluate all the trees along the whole road just for that reason. Because if we did it for that mile of road, we'd have to do it for all of the miles of road. Just from a tort, liability standpoint (MORA15).

As these examples have illustrated, interviewees described a critical awareness of how even seemingly small actions—removing a hazard tree, for instance—could have monumental repercussions from a legal perspective. For some interviewees, the Park Service's role in enacting the three Es, while also advocating for visitors to take personal responsibility, represents a tension not easily resolved in tort claims. As a MORA Natural & Cultural Resources employee remarked:

> …When is the time to just say… 'You're putting your family or your kid or somebody else in jeopardy.' And our society places so much emphasis on personal freedom and not taking away access or denying them that, but … we're real happy with *suing* people, and looking for deep pockets (MORA20).

The Visitor's Responsibility: Prepared and Aware

> …The public doesn't take enough responsibility to educate themselves enough before they come here… The only ones that ever seem well prepared are the ones they—the only activity they will do here in the park is picnic (DEWA19).

When interviewees described their view of visitors' responsibility to ensure their own safety, a temporal "checklist" of duties and requirements seemed to emerge. The responsibility to ensure one's safety, according to interviewees, begins not just at the park gates, but also in the days and weeks leading up to one's visit, as an individual must prepare for the experience. Once at the park, a separate—but related—set of responsibilities must then be engaged.

Before the visit

According to interviewees, prior to coming to a national park, visitors must take responsibility to adequately prepare themselves for their trip. Importantly, employees and volunteers emphasized that visitors must *seek out* information, which, ideally, would be available from NPS and other sources. Emphasizing this point, a DEWA Maintenance Division employee distinguished between unprepared and inexperienced, viewing the former as unacceptable for park visitors, given available information resources about the park:

> Inexperienced is one thing. Unprepared is something else. Obviously, if it's your first time here, you're going to be inexperienced. OK, but you *can* research. I mean *everything's available out there*…(DEWA19).

Stated differently, as one of his colleagues put it: …You're going to another place. It's up to you to either find out the information or make the contacts…" (DEWA14). On more than one occasion, an interviewee explained this responsibility to seek information as what he or she would expect to do as a visitor to an unfamiliar location, national park or otherwise. A MORA Natural & Cultural Resources employee, for instance equated the experience of visiting a national park to visiting a different country, suggesting:

> You're not just going to travel to that foreign country. You're going to *research* it a little bit, you're going to learn what you need to take, what do you need to not take…what is there to do, what are the things that you need to know about doing that thing (MORA21).

For a DEWA law enforcement ranger, visiting Death Valley National Park for the first time meant scouring multiple sources for information about the park's conditions, with the intent of keeping himself and his family safe. As he explained:

> …You get the brochures, you get the pamphlets, you talk to the people at the visitor center, you try to educate yourself as much about, OK, 'Where should we not be going this time of year? What is a better area to go? What are the dangers we face?' (DEWA7)

Making the same point, this ranger's colleague also mentioned that, despite his familiarity working in national parks, if he visits an NPS site unfamiliar to him, he will adopt the perspective of a park visitor: "[doing] some research before I get there…[finding] out the areas that I shouldn't go to… And not just [relying] on someone else to keep me safe" (DEWA6). In particular, interviewees suggested that, before driving through the park gates, visitors were responsible for knowing the following:

- **Potential park hazards, such as challenging terrain, wildlife, and inclement weather.**
    - …When you're driving up into the mountains in winter, expect ice (MORA9).

- **Park rules and regulations, including speed limits and other safety requirements.**
    - For people coming to the park, it would be nice if they were able to give a call first, and they were familiar with the campsites, where they needed to park, what were some of the rules and regulations. Life vests required, all of those kinds of things (DEWA 5).
- **Current weather conditions and area closures, including the awareness that these conditions might change.**
    - ...Realize that it's May but there are still ten feet of snow on the mountains… so you're not going to be doing the Seven Lakes Basin hike without ice axes, crampons, maps, and compasses (OLYM4).
- **Recommended equipment, provisions, and clothing for the recreational activity (or activities).**
    - There's people that'll show up and say, 'Where can I find water? Where can I find gloves?' *And would you not bring water or gloves in the middle of the winter*? (MORA3).
- **His/her physical fitness level, physical abilities, potential health issues, recreational goals, and risk tolerance.**
    - ...I think they need to know their capabilities and limitations (DEWA4).
    - …Not being under the influence of mid-altering substances, alcohol, things like that. Not being influenced by peers to do things that you're not physically capable of (DEWA9).

During the visit

According to interviewees, while within park boundaries, visitors must also take responsibility to behave appropriately. In many ways, this discussion mirrored the ways in which interviewees discussed "ignorant" or "deficient" visitors (discussed above), since "responsible" visitors, by comparison, are aware of their surroundings, and able to make informed decisions.

Situational awareness. Interviewees felt that being a visitor in a national park required the type of "situational awareness," a term often used among military and law enforcement professionals to describe the need to know, as one MORA Natural & Cultural Resources employee put it, "everything that's going on around you all the time" (MORA21). Instead of being distracted by their recreational goals, responsible park visitors attend to how their actions in a complex, dynamic environment might affect their own wellbeing. Exercising situational awareness as a visitor could be as simple as, in the words of one Natural & Cultural Resources employee, "[paying] attention to where they are and how to get back" (DEWA4). Though employees strive to maintain many park areas, weather conditions can make conditions variable; a rotted sign or a flooded trail is not an uncommon sight. In addition to following posted signs and learning current conditions, as one OLYM Visitor & Resource Protection employee noted that visitors have a responsibility to:

> …Pay attention to what [they're] doing. That's difficult in a national park because you came to the national park to look at things, and to enjoy the great outdoors and everything… you're not on a sidewalk walking downtown, you're on a trail (OLYM10).

While recognizing their role to remove certain known hazards, or provide appropriate warnings (see above), interviewees likewise saw a role for visitors to: first, heed their instructions, and second, to remain vigilant during their park visit. One DEWA interpreter, who devotes a large part of his job to developing water safety interventions at the park, emphasized that visitors, "need to be receptive to our messages…and willing to understand why we're doing what we're doing in trying to make sure that they're safe" (DEWA15). At MORA, although park employees spend a considerable amount of time addressing and removing hazard trees in popular park locations, a Natural & Cultural Resources employee suggested that this risk management operation might be a responsibility shared with visitors. In the case of hazard trees, visitors could assist park managers by being mindful of the conditions that make such trees particularly dangerous to be around:

> …In some areas, campgrounds, maybe even though we try to treat hazard trees, if people took some responsibility themselves and said, 'This doesn't look right,' or if the weather is changing, or if it's just getting really blustery… (MORA20).

Informed decision-making. Just as employees saw visitors as responsible for being "receptive" to their risk- and safety-related information and recommendations, they also felt that their clientele needed to take responsibility to use this information as the basis for making informed choices. Having sought information prior to the park visit, and collected additional expertise from park personnel, visitors will ideally be well equipped to make decisions about how to recreate safely in the park; as a MORA interpretive ranger put it, "…There's a time when it's the visitor's responsibility to decide whether they're going to heed that advice or not" (MORA10). According to some interviewees, this responsibility to make decisions about, for instance, where to recreate in the park, or what to bring with them, made up a critical part of the visitor experience; a second, and equally important, part of this responsibility was accepting responsibility for the consequences of these decisions, whether positive or negative. A MORA administrator described this interplay between informing visitors, and also allowing them the space to make their own choices—a responsibility he saw as landmark of the national park experience:

> …You have to accept the responsibility for your decisions. I mean but it's not that you throw people to the wolves… I think our job is to not let them learn the hard way… I think we have to highlight the obvious risk and try to communicate those as best we can. But people have to make their choices (MORA19).

As is apparent in this quotation, and has been described above, this tension between informing and enforcing (or preparing and proscribing) appeared often throughout employees' comments. In some sense, this tension may be representative of park employees' challenge to manage risk while also allowing visitors the freedom to experience the park on their own terms—an interpretation of the organizational mission of the NPS and part of the appeal of wilderness areas.

Unsurprisingly, in instances where interviewees perceived visitors as knowingly breaking rules (i.e., "informed defiance", see above), they had limited patience for violations. A DEWA Visitor & Resource Protection employee remarked that areas that are, "…clearly marked that you shouldn't be parking, hiking, leaving the trail, no access beyond this point, [visitors] need to take some responsibility…because the signs are there for a reason" (DEWA5).

Challenges to visitor responsibility

While interviewees had no trouble identifying the actions they saw as comprising the visitor's responsibility, they also discussed what could be considered challenges to achieving these goals. Interviewees recognized that new sights, sounds, and activities could distract park visitors from being vigilant about their own safety. At the same time, they expressed the belief that visitors' actions and decision-making often seemed to indicate a lack of "common sense." When interrogated further, however, lacking common sense seemed more a reflection of a visitor's unfamiliarity with a park setting, including expectations regarding how to behave in these places, and their inherent risks.

Tourist mentality. For some employees, visitors' ignorance emerged from their "tourist mentality." Excited to be on vacation, distracted by unique or unfamiliar landscapes, visitors may attend to the scenery at the expense of their own safety. Having witnessed countless visitors taking part in unadvisable behaviors, park personnel often comment that such visitors have "left their brains at home" (see Rickard et al., 2011). One MORA administrator suggested how the thrill of being in the park could negate one's usual attention to traffic conventions—a reaction that might appear, to an outsider, as ignorance:

> …There is a lot of that… the rules don't apply because I just saw a bear. Or, I can get out here and leave my door open and take a picture of that mountain and get back in. The fact that I'm on a highway doesn't sink in to them (MORA8).

In this sense, visitors' goals of seeing the mountain or photographing the bear, become prioritized, sometimes at the expense of the more mundane requirements of "situational awareness," such as paying attention to traffic. At the same time, these goals must often be achieved within a limited vacation schedule, increasing the pressure to focus on the scenery even more. As one MORA interpretive ranger described it, "…[Visitors] look through their viewfinder and they forget" (MORA4). In addition to eschewing laws and customs, visitors may also appear to ask "dumb" questions, a type of ignorance that employees also attributed to operating within the tourist mentality. Just as the OLYM law enforcement ranger quoted above distinguished "ignorance" from "stupidity," employees noted that visitors may appear "dumb," when, in fact, they are simply unable to articulate their needs. An OLYM interpretive ranger described what she saw as the necessity of not taking visitors' comments at face value, and of giving visitors the benefit of the doubt:

> …It might sound *really* stupid to you 'cause you're coming from a different… foundation, but try to read between the lines. What is it that they're asking? They're probably asking a legitimate question, but they just haven't figured out how to say it … If you probe a bit you can often get to what the real question is (OLYM6).

In some cases, employees described experiences in which they, too, have asked "dumb questions" while playing the tourist role, such as in a foreign country; however, whether this sort of self-reflection is practiced by all employees—or unique to a select few—is unclear.

Common sense. Whether they are stopping their car in the middle of the road, or asking a seemingly obvious question, visitors often appear to park employees to lack "common sense"—an opinion that NPS employees expressed both frequently and vehemently. Describing her explanation for what she often witnesses while on patrol in MORA, one law enforcement ranger noted:

> …People are on vacation and they want to relax and they tend to forget just the common sense things of driving, the general preparedness, just the typical things that I think folks would normally listen to or adhere to… They want to get the best picture, they want to have the best experience possible (MORA18).

That tourists often "lack common sense" has also been used by scholars as part of a sociological explanation for the proliferation of crimes aimed at unassuming vacationers. As Tarlow (2006, p. 97) writes:

> Travelers often leave their commonsense at home… The word 'vacation' gives us an insight into this phenomenon. We derive the word vacation from the French word *vacances* meaning 'vacant.' A vacation then is a time of mind-vacancy, a period when we relax and tend not to think… Any police officer who has worked a beat in which there are a large number of tourists will report on how bags are left unattended or cameras left on benches.

In a similar sense, Tarlow (2006) points out that tourists may be operating within "in a state of anomie" (p. 97)—confused by local customs or currency, among other factors—as well as liable to be stressed by common frustrations of traveling, such as flight delays or cramped car rides. These factors, Tarlow argues, combine to make tourists more likely to lower their inhibitions, making them easy targets for pickpockets and con artists.

In the context of recreating in a national park, where the risk of crime may be less of a central concern, interviewees expanded on Tarlow's (2006) reasoning, indicating that the concept of "common sense" itself might require further examination. On its face, describing their clientele as lacking common sense can appear insulting; however, when prompted to explain further what they meant by "common sense," employees were quick to acknowledge the inadequacy of this simplistic concept in explaining a complex phenomenon. Rather than a universal "truth," they saw common sense as variable, differing from person to person depending on one's biography. In the words of a DEWA law enforcement ranger, "Common sense… is not the same for everybody, based upon your education, based upon your environment" (DEWA7), echoed by one of his colleagues: "…what's common sense for me would not be common sense for other people" (DEWA8), and a third OLYM law enforcement ranger: "…part of common sense is your life experiences" (OLYM8). As these three rangers' comments imply, many employees recognize that what they refer to as common sense is less unanimous than their everyday parlance would suggest. Indeed, the knowledge, awareness, and behavior that an NPS law enforcement ranger attributes to common sense would not necessarily be equivalent for each and every park visitor. More specifically, the common sense that visitors lack may be contingent upon their *familiarity* with the park setting and the *expectations* associated with behaving in these areas, two themes explored in more depth below.

Familiarity. Employees may perceive a national park in a similar way, not only because they work for NPS, but also because they experience the setting daily. As an OLYM law enforcement ranger put it: "most people, unlike the rangers, don't live in the parks and don't know the day-to-day in and out of stuff" (OLYM3), or, in the words of an OLYM Natural & Cultural Resources employee: "…people who are maybe on the trail crew here who pretty much *live* in the backcountry are just really aware of what all those hazards are" (OLYM14). As year-round residents of the park or the surrounding area, employees often develop an intimate familiarity with what can be challenging, unique physical landscapes; NPS employees learn to endure the heat of Death Valley and the snow of Mount Rainier, as well as the hazards that can accompany living in undeveloped areas. In comparing themselves to visitors, many employees, for instance, contrasted their familiarity with wilderness settings to many visitors' familiarity with cities. As many employees explained, their comfort traveling on backcountry trails, might be equivalent to a visitor's ease in navigating the streets of an urban center. A DEWA interpretive ranger described this phenomenon as such:

> …People from New York—well, they're used to buildings and things like that. [DEWA] is… something totally different than what they're used to, and so it appears wild. It's the unexpected around the corner. There could be a bear, there could be a rattlesnake, there could be that hidden waterfall around the corner… It's that unexpected and out-of-the-norm. *Their* norm, that is (DEWA2).

Contrasting the OLYM wilderness and downtown Seattle, an OLYM interpretive ranger provided a similar explanation:

> …People come to this park and they're more afraid of things *here* than they are risks that they deal with in their everyday lives. But because they deal with them day in and day out, they're used to it. They know. *They lock their doors*. *They lock their car*…. I'm more afraid of the city than I am of going backpacking alone in the Olympics. Because that's my comfort level. I'm familiar with it (OLYM6).

The realization that bugs and snakes could be scarier than urban streets—an unfamiliar perception for many park employees—thus allowed some interviewees to begin to see the park from a visitor's point-of-view.

As the above quotations suggest, in addition to making the urban-rural comparison, employees also suggested that some visitors lack familiarity with "nature" writ large, which could explain their "non-commonsensical" beliefs and behaviors. A Natural & Cultural Resources employee noted that, "…the farther insulated from nature they are, the more likely they are not to have common sense when dealing with nature. Because they're not *familiar* with nature" (OLYM7). Describing a highly used area in the northeast corner of the park, another MORA park volunteer described how a common visitor injury, a leg fracture from falling debris, may be a result of the lack of common sense about natural systems:

> …One of the popular places for people to sit in the spring on the Carbon Glacier trail is an area that's out of the trees and just has low brush and big sunny hillside behind you... The reason there are no big trees is one thing I tell them: if you're in a place in Washington with no big trees, *there's a reason. And it's an avalanche chute*… So that's not park-unique, that's…the way mountains work (MORA10).

While "obvious," perhaps, to a seasoned hiker in the Pacific Northwest or an NPS employee at MORA or OLYM, understanding "the way mountains work" may not be knowledge common to the general public, especially the first-time park visitor. Though the intentions of employees like the one quoted above are likely beneficent—to inform, so as to affect positive behavior change—the way in which such information is delivered deserves scrutiny; is discussing "the way mountains work" a neutral act of providing information, for instance, or could it also function as a more subtle attempt to prove one's own superiority?

While familiarity with nature might entail awareness of ecological processes, it could also encompass knowing how to manage one's exposure to environmental hazards that may be widespread in the park. A MORA administrator described how visitors who live in the greater Puget Sound metropolitan area, a short drive from MORA, can be overwhelmed by, and unprepared for, the park's high altitude micro-climate: "…they're sitting there playing with their crocuses and…the next day they're in white-out conditions and they're clueless" (MORA8). Across the country, a DEWA Natural & Cultural Resources employee suggested that DEWA visitors are often not accustomed to avoiding deer in the road, noting, "I don't think a lot of people learn to drive that way when they're growing up in a more urban environment" (DEWA11). Time and again, interviewees described how visitors failed to recognize hazards associated with popular recreational activities. One MORA volunteer spoke of roving a high-altitude area popular for winter camping in snow caves:

> The scariest times for me are in the winter up at Paradise… People hike up in there and they don't understand that there's running water down underneath the snow and if they go in, they're dead and it's happened many times up here at this park (MORA11).

Similarly, at DEWA, one employee worried that visitors' ignorance of the most deadly, and perhaps, unlikely, wildlife at the park could endanger their safety:

> I think people are aware if a raccoon is acting funny or something, that they know, get out of the way. But the tick thing—they're so *little*… they're very hard to see… (DEWA14).

As this employee indicates, for visitors unaccustomed to the East Coast, ticks can be, in both a physical and psychological sense, an "invisible" risk: a risk not ignored, but rather not even seen.

Expectations. As described above, because visitors are often more familiar with urban areas, their notions of how to behave in a park—i.e., "common sense"—may be founded on the *expectation* that they will receive the amenities and services provided in a more developed setting. Many employees expressed frustration with what they perceived as visitors' inaccurate assumptions that park services would mimic urban services—for instance, that their cell phones and GPS units would function without a hitch, or that an ambulance could arrive at the drop of a hat. To some park employees, such expectations seemed far-fetched. Explaining how some visitors will assume they can access avalanche-prone areas without sufficient gear or knowledge, one MORA interpretive ranger noted:

> I find a lot of people don't really quite make that connection of—that it's not safe, it's not like if you turn around the corner and you forget your food, there's a Subway [restaurant]. And if you don't decide to gas your vehicle up, there's going to be one around the next corner. There's all that stuff that in our normal, civilized lives that there's a lot of safety and back-ups built in (MORA3).

Interestingly, some employees hypothesized that these unrealistic expectations may develop based on physical markers built into the park landscape. The paved roads, restrooms, gift shops, and snack bars dotting many national parks may contribute to visitors' expectations of being in a setting no different from a suburban shopping center. Traveling to the park from an urbanized area, many visitors, in the words of one MORA Visitor & Resource Protection employee, "…come in here off the modern road; they see it's black and it's asphalt. And they drive it like they can drive modern roads" (MORA1), thus paying limited attention to the road's narrowness, curves, or the often treacherous weather. Just as the expectation of "routine" driving conditions may discourage visitors' vigilance, ubiquitous signage throughout the park may likewise encourage distraction. Referring to the wording of the park's numerous interpretive displays, illustrated signs placed around the park to alert visitors to natural or cultural points of interest, one MORA law enforcement ranger argued:

> …We definitely put up cues that take people out of … the immediacy of their surroundings… It's like, '*imagine this, picture this*,' and we have all these viewpoints and overlooks and places that we—*we* bring people to. And whenever people are told to go somewhere, they sort of abdicate the responsibility for their decision-making. So I think the cues are definitely there to be *distracted* (MORA7).

Paradoxically, as this employee suggests, attempts to engage and inspire visitors to think about the larger natural and cultural issues surrounding parks may interfere with managers' expectations that visitors remain alert and aware of their surroundings.

Still other employees, without referring to a particular attribute of the built landscape, argued that national parks, for some people, connote "safety," and even encourage a degree of optimistic bias—an idealistic notion that, as one DEWA administrator put it, "I'm in a park and I can't get hurt" (DEWA1). According to some employees, this perception of safety stemmed from visitors' expectation that a national park was a different *kind* of park, one with a different set of appropriate behaviors. Frustrated by some visitors' inability to distinguish DEWA from the tourist trappings of the surrounding Pocono Mountain resorts, one Visitor & Resource Protection employee explained:

> …I want the visitor to understand, this is a national park. It's not an amusement park. They come in, they ask you where the rides are, do you have a playground, where's the pool?... They complain that we don't have sand on our beaches, and it's like, 'It's a natural river beach. We don't enhance it. It's gravel, rocks, grass, soil…!' (DEWA3).

Interestingly, physical landscapes deliberately modified to manage risk can also be mistaken for "natural" attributes of the park, as one DEWA law enforcement ranger noted: "…there's a fair number of people who see trail steps and stuff and think that that stuff's *natural*" (DEWA17). Whereas the fast food restaurants, golf courses, and outlet malls surrounding Delaware Water Gap may confuse the uninitiated DEWA visitor, employees noted that even the parks bounded by national forests could mislead visitors. Explaining that many MORA visitors drive to the park for the day from the surrounding Puget Sound metropolitan area, one MORA law enforcement ranger noted that they bring with them the expectations of an urban recreation experience:

> …There are those folks that think that they're just going to go on a hike in a city park, where you're just going to go on this short trail, and don't realize that some of those trails are a lot longer than they anticipate. And potentially a lot more strenuous with not the paved trails with the railings at every single location (MORA18).

Perceptions of Visitor Accidents

> Anything that's unplanned that has some sort of … negative consequence. An accident could be I stubbed my toe, or an accident could be I chopped my toe *off* (DEWA2).

Characterizing interviewees' perceptions of their own and visitors' responsibility to prevent visitor accidents (i.e., ensure visitor safety) also involved asking them to share their understanding of an "accident." In addition to defining accident writ large, such as was asked of Kouabenan's (1998) respondents, interviewees also described how they understood accidents in the context of national parks. After presenting a typology of accident types, I explain two ways in which interviewees attributed causal responsibility for two kinds of hypothetical visitor accidents: "user errors" and "acts of God."

Defining an accident

Just some of Kouabenan's (1998) respondents preferred to define accidents through a "characterization" of a hypothetical event, when prompted for a definition, many interviewees chose to describe an accident through its general attributes. First, several respondents described accidents as involving negative consequences, including bodily injury and property damage. Most simply, in the words of a DEWA employee, an accident is, "Anything that they did not want to happen to them that had a negative effect" (DEWA2). As one OLYM employee noted, such effects need not be drastic in order to "qualify":

> I suppose it involves injury to a person or property. But I think injury could heal. So it's not debilitating … It doesn't have to be big. Just some level of injury or property damage would be an accident (OLYM13).

Nonetheless, many respondents saw accidents as "reportable": events worthy of bringing to the attention of park officials or other medical personnel. Second, respondents also saw accidents as unintentional occurrences. For instance, using the context of a motor vehicle collision, one DEWA employee explained an accident as, "…something you didn't do on purpose… I don't think there's very many people that purposefully crash into other cars" (DEWA9). Similarly, and constituting the third attribute of an accident, interviewees saw accidents as unscheduled; according to a MORA employee, an accident is:

> …Something that's unplanned, that happens, and whether you get hit by a tree, or you fall, or it's a car wreck**…** I guess when I think of an accident I usually just think of something that is—just happens that you did not expect at the time (MORA20).

While most respondents agreed upon the aforementioned accident characteristics (i.e., involving injury/damage, unintentional, and unplanned), some disagreement surrounded the extent to which accidents were seen as preventable, avoidable, and/or controllable. On the one hand, one faction of respondents viewed accidents as inherently preventable, a point of view often expressed in the context of personal biography, as evidenced by the following comments:

- …My father… worked in a place where they made bombs and explosives and stuff and his specific focus was on safety reviews. So I grew up hearing like the refrain *accidents can be prevented* or like this whole concept that nothing is really an accident because if you use your head and you take time to think things through, accidents…can be prevented (OLYM1).

- An accident, first off, is preventable. You learn that being on the Fire Department… (MORA 23).

- …When I first had driver's ed, the guy was like, '*There's no such thing as an accident. It's all preventable.*' I agree with that mostly (MORA3).

In emphasizing accidents as preventable, these interviewees echo the contemporary perspective of many public health professionals, for whom unintentional injuries, like viruses and bacterial infections, can be understood, tracked, and ultimately averted (e.g., Girasek, 1999; Loimer & Guarnieri, 1996). Baker's (1974) perspective also resonates, as she describes progress in injury control as "retarded by the 'accident' folklore, including the notion of reckless, selfish, careless, and intoxicated people, 'getting what they deserve'" (p. 987). Yet not all interviewees subscribed to the public health, "injury control" point of view. For these individuals, the uniqueness of the national park setting, as well as the varied responsibilities of a national park employee, made accidents both unpredictable and unpreventable. As these employees noted:

- ...You could be on the ladder not over-extending and the ladder could collapse for whatever reason. You can take preventive measures but sometimes things still happen. …So I don't believe that all accidents are preventable. I think we can do a lot to minimize accidents, but I also believe that that's why we call them accidents (DEWA1).

- Well, it seems like we're always going to have rangers walking on snowy surfaces. We're going to have rangers in tidepools on slippery surfaces. Are we gonna be able to prevent every accident? … I don't know how you can do that (OLYM4).

- If you're driving down the road and Bambi jumps out in front of you in a split second, I mean I would consider that an accident just because, I mean you didn't… really have any *control* over that (DEWA13).

Whether or not accidents were viewed as preventable also relates directly to the schema participants used to attribute causal responsibility, which will be explored further below.

Accidents in national parks

When asked to describe a "visitor accident," respondents described outcomes and contributing factors that exemplified actual visitor injuries that have occurred in each park. In general, these descriptions align with two of Kouabenan's (1998) categories: (1) defining an accident by describing the "circumstances of an accident" and (2) by describing "the nature of the accident/an example of an accident." Since many of the interviewees play central or supporting roles in visitor safety, such as by providing emergency medical care, patrolling park roads, or volunteering in SAR missions, this apparent overlap is unsurprising; indeed, most interviewees spent (or had spent, at another point in their career) significant time in the field interacting with park visitors and seeing, first-hand, the types of scenarios they proceeded to describe. In general, definitions of visitor accident fell into four categories: (1) motor vehicle accident; (2) minor traumatic injury; (3) serious traumatic injury; (4) medical injury due to interaction with wildlife/environment.

Motor vehicle accident. For many respondents, a typical visitor accident in the park involved driving, a scenario that could easily occur outside of park boundaries; unlike most modern thoroughfares, however, park roads can be narrow and winding (a product of their historic designation), and often remain open in inclement weather conditions, such as high winds, low visibility, ice, and snow. As respondents noted:

- If I'm thinking visitor accident, most of the time I'm thinking it's automotive… The roads are narrow, they're not pitched (MORA1).
- … In my experience, it's usually motor vehicle accidents is the first thing that usually comes to mind. Since that's one of the most frequent things we respond to (MORA15).
- I guess on the road, a vehicle accident. This winter we've had several cars driving on the Hurricane Ridge Road in winter, icy conditions, and they've gone off the road into the ditch, sometimes turned their car on the side, so, it's fairly common, I suppose, for this time of year and that road (OLYM11).

Minor traumatic injury. Another common definition of a visitor accident revolved around a minor traumatic injury, such as a sprained, strained, or fractured ankle, and was often described as precipitated by a slip, trip, or fall. As with automobile accidents, sprains, strains, and fractures are not unique to park settings; however, the uneven terrain of trails and other "natural" walkways, as well as the number of individuals choosing to walk in these areas, make such injuries even more likely. In the words of the respondents:

- Someone who's walking and then happens to slip on the root and then turn an ankle (MORA2).
- We had a gentleman trip over one of the curbs where you park your car… He tripped over that last week and smashed his face all up (DEWA3).
- The quintessential visitor accident is, I would say, a broken ankle (MORA7).

Serious traumatic injury. Other employees chose to define visitor accident in terms of serious traumatic injuries and fatalities. In these instances, the examples given were often park-specific, and were precipitated by high-risk recreational activities, such as mountaineering at OLYM and MORA. In general, these are activities pursued by a small percentage of park visitors. As the respondents described:

- …A fall, climbing accident on Mount Deception. Someone glissading and they're un-roped and they glissade right into a crevasse. That's happened on Mount Olympus. I think he's still there (OLYM6).
- Well, for here I think of climbing accidents (MORA16).
- …Like if you were climbing and you fall in a crevasse (MORA20).

Medical injury. The final category of exemplary visitor accidents involved medical injuries, such as allergic reactions, secondary to interactions with wildlife or the physical park environment. While poisonous plants and insects (e.g., poison ivy, ticks), as well as wildlife (e.g., snakes), exist outside of national parks, the park environment can offer a particularly amenable habitat for certain species. As one DEWA employee suggested:

> We have designated beaches, we have lifeguards, we're trying to maximize [visitors'] safety in the river. And yet [visitors will] park along the road, they'll walk through the poison ivy to get into the river. Well, they're gonna go home with poison ivy! That's an accident (DEWA1).

Again, the examples interviewees chose to discuss seem to suggest that they are aware of—if not also involved in—the day-to-day incidents unfolding in the park around them. Unpublished data gathered at MORA between 2001-2010 (see Appendix A) suggest that fractures, sprains/strains, and medical emergencies, such as allergic reactions or heart attacks, were some of the most prevalent visitor emergency medical issues.

Accidents and causal attribution

As indicated above, respondents disagreed on the extent to which they perceived accidents as unavoidable maladies or preventable events. For some respondents, however, the circumstances surrounding the accident rendered it one or the other, leading to attributions of causal responsibility. Generally speaking, two categories of generalized accidents emerged, "ideal types" I refer to as "user error" and "Act of God"; each was associated with a distinct pattern of causal attribution.

User error. Accidents in this category were referred to by respondents as occurring due to an individual's bad decision, with the implication (stated or not) that the individual *should have known better*, and that a different person in the same circumstance would have chosen differently. Referring to factors such as poor judgment, a lapse in attention to the physical setting, unpreparedness, and exceeding one's skill level for a recreational activity, respondents appeared to place causal responsibility for this type of accident squarely with the individual. Implicit in many respondents' explanations was the idea that the individual consciously *chose* this unadvisable position, whether through unfortunate ignorance, or willful risk-taking, as the following quotations exemplify:

- So someone wears cheap flip-flops hiking on a rocky trail where it just rained. They may slip and cut themselves on their ankle, they may sprain their ankle… they're just unprepared for what they're doing. So… that was a bad decision to actually hike that area (DEWA14).

- I would say that an accident occurs when somebody has exceeded their skill level or their acceptable level of risk. And it may be that they didn't *know* what their acceptable level of risk is, but that in and of itself, going into an activity not knowing what level of risk you're going to accept, I mean that's a risk in and of itself (MORA5).
- …Like someone jumping off of a waterfall that's already signed, 'no swimming, no jumping' and it's got handrails. That's not an accident. That's someone chose to take a risk and they got injured in the process (DEWA11).

As the above examples illustrate, by perceiving visitors' behaviors as *informed defiance*—they chose to do something when they knew better—when these individuals are injured, some employees seemed to "blame the victim" for the unfortunate outcomes. As is described by the Just World Hypothesis (Lerner & Miller, 1978), some interviewees seemed to indicate that visitors they perceive as *choosing* to defy regulations (or their own "common sense") "get what they deserve" or "deserve what they get." A DEWA law enforcement ranger described this perspective as widespread among her colleagues, especially with respect to driving-related incidents in the park:

> Like we've had construction zones and we were having all kinds of motorcycle accidents because of the way that the detour was. And the response from *many* of the law enforcement rangers was … there were speed limit signs that said to slow down. And if they chose not to, then if the result of that is that they wreck and get hurt, then they *deserve it* (DEWA8).

Similarly, a MORA volunteer suggested that part of the "culture" of the NPS consisted of, in part, "…saying, hey, you get what you pay for. It goes with the territory. You come out here, you'd better know what's going on, otherwise you're going to get in trouble" (MORA13). In a "just world," defiant visitors may be, to use a biological metaphor, "selected" for their fate, as their poor choices result in unsavory outcomes. Referring to a widely visited abandoned railroad track above the Delaware River, a DEWA administrator provided a sardonic explanation for the recurrent unintentional visitor injuries occurring there:

> …National parks are the last great place for natural selection. You can't fix stupid. You can't tell 18 year-old boys, 'Don't jump off the Karamac Bridge abutment.' 'Cause they're going to (DEWA16).

Likewise, a MORA Natural & Cultural Resources employee expressed a resigned frustration that park policies cannot always prevent certain visitor behaviors. Referring to what he saw as a certain "type" of visitor, he noted:

> …You have to put up some sort of obstruction to [an unsafe area], but if [visitors] still want to go over it, *they're still gonna go over it…* They're the *Darwin Award* winners, basically. They go over these places, they slip on a slippery rock, and fall down and die. *And it happens*. It's too bad but they're the ones that went over it (MORA21).

Despite the park's best efforts, in the end, defiant visitors will be defiant visitors, and their injuries, while unfortunate, to many employees are not unexpected. By assuming (consciously or not) that these individuals understand both the rules of the park and the ramifications of their actions, however, many employees may preemptively assign causal responsibility to park visitors. In turn, an overemphasis on internal responsibility, as Baker (1974) suggests, may actually hinder progress on determining causal factors outside of the individual himself that might be able to be changed. (This point will be explored further in Chapter 7).

Act of God. Other accidents were described as being the outcome of chance: a fluke, bad luck, or an unfortunate constellation of circumstances, such as being hit in the head by falling rocks. While respondents acknowledged some degree of preventability might be possible in these instances, such as choosing to hike earlier in the day when rock fall is less likely, for the most part, these accidents were perceived as considerably less preventable, avoidable, or controllable than the "user error" accidents described above.

- Hazard tree falls on the New Jersey side, lands on a car, crushes two people, kills them dead. There was nothing they could have done… Is it the hand of God, what is it? Those things happen (DEWA12).

- … I call it a fluke thing because it's—in my mind, it's somebody that is completely prepared, and just, the nature of the beast, things change, or something happens, you can't prevent a rock rolling down a hillside and crashing into a car…You can't prevent someone who's got the full hiking boots on, well prepared, physically fit, and just happens to roll their ankle. That happens. That's what I would consider an accident (MORA18).

- An accident is more like you're driving and a deer jumps right out in front of you and there's no way you can even react to it. That's something that is very hard to prevent. There's just no reaction time… (DEWA11).

- …Sometimes a person is sitting at the bottom of a cliff and somebody above knocks off a rock and that rock just falls down… The guy sitting on the ground did nothing wrong. He was just sitting there, and, so far as the guy on the ground was concerned, it was an act of God… So I'd call that an accident (OLYM7).

In general, during the interviews, employees and volunteers appeared to make external causal attributions when talking about this "type" of accident, referring to characteristics such as challenging environmental conditions or the risk inherent in park settings, especially wilderness areas. Instead of attributing responsibility to park personnel or infrastructure, however, most respondents saw the issue of blame as non-applicable, or even irrelevant, a point of view that may differ from that held by certain injured (and litigious) park visitors. As these employees explained:

- …Some things that happen are just like an act of God. Windstorm comes up, a heavy rain, the ground's soaked, trees start blowing over. If you're driving on a road, a tree falls and you hit it, whose fault is that? Well, it's nobody's fault, it's just what you call an act of God… And people have tried to sue us for that, but it's like, we have no control over that! That's just the way it is (DEWA14).

- …If someone slips on…like the black tar at the beach that we tell people is slippery … it's not really their fault. It's not the park's fault. It's just an accident… You walk down a gravelly trail and your leg goes out from under you and you slip and fall. It's not the person's fault… It just *is*. It's just how it is (OLYM5).

While shying away from assigning responsibility, many respondents preferred to lean on the adage "accidents happen" when explaining the cause of accidents perceived as "acts of God."

Suggesting that prevention can only do so much, and that accidents are not only probable but also likely, some respondents acknowledged that they, too, could fall victim to the circumstances described; in other words, accidents do not (necessarily) discriminate. Summarizing this point of view, an OLYM employee noted, "…I could do it just as easy as anybody else. And pre-planning is not always going to help you" (OLYM8). Likewise, a MORA employee described:

> We don't work in an office, where things are pretty regulated. We work in a wild place where things can happen, and no matter what you can do, there's always going to be something that happens (MORA21).

Though associated with different cultural norms, these employees' reactions, like those of Kouabenan's (1998) West African respondents, seem motivated, at least in part, by a fatalistic perspective. Whether car collisions, or slips on pavement, the perspective that accidents will happen seems to offer respondents a way to avoiding assigning blame altogether.

Understanding NPS Safety Culture

…If you're thinking about employee safety, then you should be thinking about visitor safety, too, and a lot of stuff sort of carries over (OLYM3).

While parks are places to recreate, they are also places to work: sites hosting a particular "safety culture" (e.g., Cooper, 2000). Understanding how employees view their responsibility to keep visitors safe may, in part, relate to how they view their own safety on the job. The following section discusses the ways in which interviewees defined a "positive" safety culture in a park context, including the communication mechanisms involved in creating and re-creating this culture, and the challenges to maintaining it. Finally, I discuss how interviewees see employee safety as related (or not related) to visitor safety, including their opinions of what this relationship *should* be.

Defining "positive" safety culture

Just as employees viewed managing visitor safety as enacting a balance between their own and visitors' responsibilities, when discussing employee safety, interviewees described a partnership between managers and on-the-ground workers. For a "positive" safety culture to perpetuate, as scholars have noted (e.g., Cooper, 2000), managers must supply the conditions for safe work (e.g., safety equipment, trainings), just as workers must pledge a certain degree of personal responsibility for following these conditions. Describing this interplay between management and workers' responsibilities, one OLYM administrator noted:

> …I know I'm supposed to wear chaps if I use a chain saw. Most employees know that. It's also incumbent on us to make sure that there are chaps. And that they work right. *And* to make sure that we have a protocol that talks about using chaps, so that there's no question about that (OLYM3).

But while administrators, like the individual quoted above, can do much to ensure the conditions for safety, they also look to their colleagues on the ground to sound the alarm when these circumstances do not exist. During the winter season at MORA, a law enforcement ranger responsible for patrolling the popular area around Paradise recognized that she must rely on her employees, seasonal hires paid to oversee the "snowplay" (i.e., sledding) operation at the base of the mountain, to assist her efforts. As she noted, "… I've had to teach [my staff], like, 'Hey, anytime you guys see a safety hazard deficiency, correct it, or let me know, and I'll try to do something about it'" (MORA14). Several interviewees noted that granting lower-level employees the authority to report concerns to higher-level management, and to take ownership of their own and their colleagues' safety, resulted in gains for all: employees, volunteers, and visitors alike. In this sense, an employee directly involved with employee safety at OLYM described how ground-up workplace safety efforts, those in which staff are entrusted with developing their own safety initiatives, tend to be more sustainable than more traditional top-down, command-and-control efforts:

> The most effective programs that I've seen have been developed by employees… Because if they develop it, they've got ownership in it, and they're going to participate in it. If I come down and say, 'You have to do this now.' Well, a week later when I'm not there, they're not interested (OLYM10).

Empowering lower lever employees in this way, interviewees noted, also makes them more likely to notice, voice, and avoid risks that could influence the safe performance of their jobs (see Edmondson, 1996). A MORA Natural & Cultural Resources employee discussed how his personal tolerance of on-the-job risk did not compromise his boss' evaluation of his performance; instead, as he described:

> When I'm out in the field with [my supervisor] and he crosses a log and it's wet and it's a narrow log and I hate crossing logs above water, and I don't feel comfortable doing it, *I don't do it*… He doesn't judge me. I wouldn't judge anyone that says the same thing to me. So, we have that opinion, and we're very safe that way (MORA21).

As this and other interviewees recognized, in the long run, any productivity compromised by recognizing safety concerns would be made up by a decrease in employee injuries, as well as time spent steering through the tortuous bureaucracy surrounding them.

Creating safety culture

As safety science scholars have noted (e.g., DeJoy et al., 2004), safety culture emerges, in part, from the communication processes occurring daily in the organization. Interviewees described both formal and informal examples of official communication enacted daily, and in response to particular safety-related events.

Formal communication. Within the three parks, interviewees discussed a litany of official, formal forms of routine communication enacted both within divisions and at the all-park level, including:

- Safety “tailgate” sessions, i.e., staff-wide discussion of safety concerns related to a particular job, usually conducted directly before doing the job
- Trainings, including how to use personal protective equipment (PPE) correctly
- Safety Committee meetings, i.e., groups of park employees who meet regularly to discuss and correct employee and visitor safety concerns
- Operational Leadership training

Whereas the first three items listed above might be enacted with respect to particular safety concerns at a park, such as removing asbestos from a building, or repairing a road, the last describes a more general philosophy toward approaching safety. Developed by the U.S. Coast Guard, Operational Leadership (OL) is a set of trainings aimed at employees in all levels of the NPS to teach risk assessment. As its core, OL relies on the “GAR” model: training employees to assess job-related situations as “green” (i.e., safe), “amber” (i.e., use caution), or “red” (i.e., danger/risk imminent *before* they take action that may, ultimately, put them and/or park volunteers or visitors at risk). While OL had been adopted in all three parks at the time of this study, one DEWA law enforcement ranger suggested that uptake by park administrations nationwide varied considerably, with East Coast parks less likely to offer OL trainings to its seasonal and year-round employees. As a result, he noted, not all NPS employees may familiar with how the program works:

> … If you ask National Park employees what’s the safety program in the Park Service, maybe 95% of them, they don’t know. Or they have it on a mug, *NPSafe*, or they have it on a lanyard, but they don’t know what the program does. It’s on the InsideNPS website but over in the corner down on the right. But I don’t think that many people actually know anything about the program… So we haven’t done a good job (DEWA6).

Though OL ostensibly reinforces the “positive” safety culture norm that, “it’s not just the supervisor’s responsibility for safety; it’s the seasonal [employees’] responsibility to speak up”

(DEWA6), this message may have a shorter reach than intended by NPS officials.

In the situation that visitor injuries *do* occur, park managers engage a number of formal communication mechanisms, each creating and re-creating the park's safety culture. These forms of communication included:

- Safety "stand-downs", i.e., abstaining from performing an activity until further review of an injury/accident.
- Reporting an injury to a supervisor.
- Performing a root cause analysis to determine the contributing factors to a particular injury/accident.
- Assembling a Board of Review investigation (involving NPS employees from outside of the park) to determine the cause of an injury/accident, how it might have been prevented, and how to prevent a similar situation in the future.
- Issuing fines to employees whose injuries/accidents, and resulting damage to park property, are deemed the cause of their actions.

Together, these forms of communication emphasize a culture of transparency, and appear, on their face, to encourage acknowledging an unfortunate incident rather than sweeping it under the rug (e.g., see DeJoy et al., 2004; Edmondson, 1996). As some administrators discussed, in some cases encouraging timely reporting can create the illusion of an injury "epidemic"; for instance, cases of poison ivy, while both serious and ubiquitous, are probably less concerning to managers than an amputated digit. Nonetheless, as a DEWA administrator remarked, "…mostly we like to encourage people to report their accidents because something that seems minor today might result in medical problems down the road" (DEWA9).

Informal communication. In addition to these formal communication mechanisms, interviewees also mentioned informal communication as a way to convey safety messages between managers and employees. After conducting a more formal safety "tailgate" session, managers and employees may continue the conversation throughout the workday. A DEWA Interpretation & Education employee explained how, when directing park volunteers on maintenance or construction projects:

> We all meet at the tailgate of the truck or wherever we're working and we talk about safety, make sure it's signed off on, and then, prior to, after any breaks, we also have an additional safety talk (DEWA10).

At OLYM, where a large staff of rangers is responsible for patrolling a vast expanse of wilderness, one law enforcement ranger discussed how taking her employees on an "orientation patrol," a group overnight hiking trip in the wilderness area, provided an opportunity to assess their skills and ability to travel safely in an undeveloped environment:

> …It's a good opportunity for me to see how the new people that I have never worked with before handle being in the backcountry. I make everyone light the stoves and light the lanterns just so that I'm comfortable with, like, if I send them back there by themselves, I know they're not going to eat cold food… So, it makes me sleep better at night (OLYM9).

Finally, employees discussed ways in which informal communication allowed them to look out for one another, such as to remind a colleague of a safe(r) way to perform a routine task. As a DEWA law enforcement ranger explained, self-policing can be an effective way to remind employees to take responsibility for their own safety:

> We keep track of each other if we're on a motor vehicle accident, then, if one's wearing their vest and the other one's not, then, 'Hey, grab your traffic vest.' That way you're high visibility and people can see you when you're out there. 'Cause if you were to get hit, if the simple solution was, why didn't you just tell him to wear his vest, it's just kind of us policing ourselves out there… (DEWA13).

Challenges to "positive" safety culture

Achieving the kind of positive safety culture described above is not as easy as scheduling a few trainings or talking to one's co-workers. Interviewees described several factors that they believed made it difficult to create workplaces in which injuries are minimized, accidents are reported, and employees play a pivotal role in improving safety conditions.

Characteristics of employees. Some of these challenges are perceived as stemming from the characteristics of NPS employees and the nature of their jobs. First, as some interviewees described, many parks support a dynamic workforce that changes yearly and seasonally, given patterns of visitation and the movement of non year-round employees between parks. This lack of continuity, as one MORA Maintenance Division worker noted, can be a barrier to they type of acculturation necessary to make achievements in safety culture:

> You look at the industry, and they may have the same employees for year after year after year, so you can develop a real culture with them. Here, we tried to take half our seasonal staff this year for three months or four months and it's really hard to instill that culture into them at that time, in that time frame… (MORA6).

Second, achieving "positive" safety culture may be complicated by goals of the individuals who are often drawn to work in the Park Service. For many NPS employees, parks represent not just a workplace, but also a recreation site, as they spend their leisure hours hiking, biking, skiing, and climbing in these places. In some cases, the sources of risk that may be avoided during the work week become desirable on the weekend, as some employees seek "[getting] a thrill" or "being on the edge" (MORA5). As a MORA law enforcement ranger further explained:

> They could be on a trail working on Friday and we expect them to do things in a certain way so that ultimately they're safe as they're working. But if they choose to go out on Saturday on their day off on that same trail and do something more risky, well, that's their right as an American (MORA5).

As this individual's comment suggests, some employees must learn to manage a personal risk tolerance that may be misaligned with that of management; an action or decision suitable for a Saturday, for example, may be inappropriate on Monday.

Characteristics of the job. Just as employees must juggle work- week and weekend risk-taking behavior, they are also challenged by the multifaceted nature of their jobs, which can pose another barrier to creating positive safety culture. As several interviewees noted, NPS employees are often expected to be "jacks-of-all-trades," able to complete tasks in a variety of domains, from handling wildlife, to writing traffic tickets; having the necessary, up-to-date certifications to complete these tasks, however, is daunting, and sometimes impossible. A DEWA Visitor & Resource Protection employee explained that NPS employees:

> … Do such a hodgepodge of things all the time [so] it's hard to stay on top of all the safety-related stuff that they need to do. Whereas you might have guys putting on roofs, that's primarily what they do… Where our guys might just do it once in a blue moon, but they're out there doing it… and the concern is they may not be as prepared as they *should* be when they go out because they're doing so many things, they're kind of like a jack-of-all-trades… (DEWA18).

Law enforcement rangers in particular face considerable challenges, as they must balance the inherently dangerous nature of their job with, like other employees, collateral duties that require them to maintain varied certifications and up-to-date expertise. According to a DEWA law enforcement ranger, he and his colleagues must come to work each day:

> …On our A game. … We're not coming to sit behind a desk…. Our known risks are a lot different than someone who's driving to work and then coming to work at Headquarters or something. And I mean, their safety issues are going to be a lot different than our safety issues, as far as their chair and their posture and lifting boxes … compared to ours where, I mean, just earlier today I was going like 90 mph to get to a call (DEWA13).

Moreover, the tasks required of them often require training and practice, which they may not routinely receive, given the diverse nature of their daily assignments. Comparing himself to a state patrol officer, whose daily job is limited to making traffic stops, one OLYM law enforcement ranger noted:

> *They're good at it. That's what they do*. And I'd like to say I'm decent at doing traffic, too, but it's a challenge because I have to get back into it whenever I can after doing boat patrol or doing work out in the woods, or whatever it might be. So there's that tug and pull, I mean, it's definitely a challenge (OLYM8).

Demands on employees to fulfill multiple tasks—and different types of tasks—can also lead them to perceive that they must rush through their duties, a situation compounded by short-staffing. As a handful of management-level interviewees noted, including two individuals at DEWA, working too quickly can result in injuries that could have been avoided:

> There's a perception that management *demands*, and management demands that it be done today and it doesn't matter, do it today. [We] have never demanded anything ever get done today. What we're basically saying is we have an operation, let's do what we have to support that operation, but let's do it safely (DEWA1).
>
> I'm constantly lecturing people about not speeding in government vehicles. Somehow people get the impression that, because they have a lot of tasks, they have to speed. But I'm *always* telling them, 'Don't speed. Don't take chances with a motor vehicle' (DEWA9).

Unfortunately, when taken together, the circumstances described above can combine to create a culture in which employee safety may be idealized and promoted, and yet in practice, not achieved. Despite the best intentions of managers, safety can be compromised by the simple reality of too much work for too little staff.

Management role. Interviewees also suggested that barriers to achieving a positive safety culture could emanate from the management level. For one, because individual park units have considerable authority to determine their own operational rules and norms, the focus on safety can be variable. Based on her experience as an employee in several parks, an interpretive ranger at DEWA noted that park superintendents could vary in how they perceive the responsibility of the park to ensure visitor safety, such as in the case of preventing hiking-related injuries and accidents:

> Some superintendents are just *hyper sensitive*. They go maybe over or above and then some that I don't think are sensitive enough that… we have such and such number of people on this trail, and this is a hazard. We need to do something about it. And they see it as, 'Well, the visitor's going off the pavement; they need to take on that risk themselves.' I've seen the extremes (DEWA2).

In this and other instances, interviewees described how higher level management played a significant role in making decisions that influenced the development of a park's safety culture. With respect to Operational Leadership, for example, a DEWA law enforcement ranger suggested that whether or not park employees received these trainings rested principally with the Superintendent: "…Each park is its own little fiefdom, and if the Superintendent there really thinks it's important, they could get the [OL] class… (DEWA6). In other cases, management decisions dealing with a park's safety program could have the effect of disenfranchising employees who might not agree with a program's direction. One DEWA lower-level administrator, for instance, expressed disgust with the park's past attempts at supporting employee safety, viewing it as little more than expensive, bureaucratic, and procedural:

> We have spent *hundreds of thousands of dollars* on safety programs, safety initiatives. We had one program… we had to do little checklists, where we'd observe each other. So if you walked into my office and you saw that my drawers were all shut and it wasn't a tripping hazard, you'd do a little checklist… *All right, come on!* We did things like that. And we paid big money for it (DEWA16).

Other employees disagreed with management's strategies to promote their own (purported) success. A MORA Natural & Cultural Resources employee described these self-congratulatory efforts as potentially alienating and ultimately detrimental. As he explained:

> …Like you get the emails from the safety people that say… 'Oh, our injury claims were down to three worker injuries per year!' Well, what happens if the next year, you're one of those people? *You're not gonna want to report it*. There's gonna be some embarrassment about it… There could be some, 'I don't want to report this because I'm gonna make the park look bad.' And I think that's a *really*, really, really bad thing… (MORA21).

Relating visitor safety and employee safety

Understanding interviewees' perceptions of safety culture also meant disentangling their views about employee safety and visitor safety—two goals that, for some, are not pursued equally by the NPS. Whether or not management tends to emphasize the safety of one population over the other, however, many interviewees seemed to suggest that parks with safe employees would, by extension, host safe visitors.

Visitors over employees? When asked to discuss the relationship between employee and visitor safety, some interviewees spoke of the NPS *emphasis* on each, both what it was, and what it should be. Interestingly, at DEWA in particular, employees seemed to hold conflicting opinions as to whether the park—and the agency, broadly speaking—attends more to issues of visitor or employee safety. On the one hand, a DEWA employee in the Natural & Cultural Resources division maintained that he and his colleagues "…put more thought into visitor safety as we're looking at a facility or as a project or whether we're maintaining something… Whereas employee safety probably comes in second, behind that…" (DEWA4). As he further explained, this emphasis on the visitor above the employee was justified by the expectation that visitors may be "ignorant" of some of the safety concerns around them (see above). As he argued:

> …We expect more out of our employees, though, than we expect out of the visitors, as far as safety awareness and we know what they've been trained to do and we know that they're supposed to watch out for stuff and not get themselves into bad situations (DEWA4).

As this individual's comment indicates, NPS' attention to the "3Es" make sense, given visitors who may be unaccustomed to such settings, and employees who may be—even upon hiring—expected to "know better." On the other hand, some interviewee saw the situation differently, such as another DEWA employee, who suggested that management decisions have tended to prioritize the employee:

> … Park Service has *always* had a pretty good push for safety. But what I'm seeing lately, it's the safety of the employee only. We'll talk to like our Safety Officer about water safety and he says, 'That's not my concern.' And I think it's more than just the employee. The biggest thing is to keep our visitors safe if we can. And I think we need to have more of that attitude from the top down… (DEWA16).

As these examples suggest, whether (or the extent to which) a particular park, or the entire agency, emphasizes visitor safety over employee safety may be difficult to quantify. As this chapter has shown, efforts to address the needs of both are—and have been—in place in all three parks.

"Trickle down hypothesis." With regard to whether one group *should* be emphasized over the other, however, interviewees expressed a bit more agreement. As has been mentioned elsewhere in this chapter, many visitors come to the park just once—and for a short timeframe—allowing limited opportunity for park staff to share information with them. According to some interviewees, this limitation provided a clear argument for focusing safety initiatives on employees. In the words of one DEWA Visitor & Resource Protection employee:

> …With visitors, people come to your park to do things…and so you might have a brief contact with them. They *may or may not* read any of your signs, or any of your things, and there's nothing you can do about that…. Employees, on the other hand, I mean you can make that a condition of the employment. So you have more opportunity and plus, you have policies, procedures, safety plans, and job safety analysis and all that stuff that is supposed to be followed… (DEWA18).

As this individual's comment suggests, a "visitor safety culture" may be impossible to create, let alone change. Focusing management efforts on the employee may also be not only practical, but also strategic. A popular sentiment among interviewees was the notion that "safe" employees promote "safe visitors," what I call the "trickle down hypothesis." Stated simply, safety-consciousness breeds safety-consciousness, as employees not only model safe behaviors, but also are alert to potential visitor concerns. The DEWA employee quoted above described, "… If [employees] have a good safety culture or a good safety background, they could take that and, kind of… recognize issues that might affect visitors (DEWA18). As models for visitors, employees can capitalize on opportunities to communicate spoken and unspoken messages about what constitutes "appropriate" behavior in a park setting, as these two employees describe:

> …Our employees interact with the visitor all the time. And if they're…carrying that message, then even by the way they do their jobs, it's going to be obvious to a visitor that this is important to us, and this is the way we do business here (OLYM10).
>
> … If our patrol rangers are out on the river, like they have all their safety stuff, they have all their PFDs, they have their safety ropes…. So if they're rolling up to a boat, and they're contacting somebody without their PFDs on it's real easy to say, 'Well, where's your PFD?' … I guess that's kind of like leading by example…(DEWA13).

That safety consciousness spills over from one population to the next is an appealing hypothesis. Yet whether employees who adhere to appropriate precautionary behaviors influence visitors to make similar decisions is unsubstantiated, rather than given. According to at least some interviewees, however, by this logic, a focus on employee safety ensures, by extension, that visitors will likewise receive the message. As a DEWA law enforcement ranger put it:

> … Whenever you change that mindset with your employees, you will get your employees to start looking at visitors in the same mindset and spreading that same type of knowledge onto them… We're always trying to push that in the face of employees, just slow down and think ahead and are you wearing the proper PPE, are you looking at this right. I think with that mindset, when that starts being even more instilled in the employees… it definitely will spill over to the visitors (DEWA7).

Chapter Summary

Drawing on qualitative in-depth interview data, this chapter examined employees' and volunteers' perceptions of risk and risk management in national park settings. Responding broadly to research questions (and sub-questions) 8 and 9, emergent themes were discussed in five main substantive areas: (1) the multidimensionality of risk in national parks, (2) the responsibility of the NPS to ensure visitor safety, (3) the park visitor's responsibility to keep him/herself safe, (4) perceptions of visitor "accidents", and (5) the NPS safety culture (or cultures). Table 6.1 provides an overview of the major themes and sub-themes discussed in each of these areas.

Table 6.1. Overview of Major Themes and Sub-Themes: Chapter 6

Substantive Area	Emergent Themes

Multidimensionality of Risk in National Parks	• **Risk as inherent**
	• **Risk as desirable**
	  o *Tolerance and voluntariness*
	  o *Challenge and elevated experience*
	  o *Learning and self-development*

Understanding the NPS Responsibility	• **Shared responsibility**
	  o *50-50*
	  o *70-30*
	  o *3Es*
	• **Education**
	  o *Responsibility to provide information*
	  o *Meaning and connection*
	  o *"The agency of the ranger"*
	  o *Shift from wood signs"*
	  o *Involving the community*
	  o *Tailoring messages*
	    ▪ "The Paradise crowd"
	    ▪ First-time visitors
	    ▪ Locals
	    ▪ English as a second language
	  o "*Can't put a sign everywhere*
	    ▪ "People don't read signs"
	• **Engineering**
	  o "*Can't put a handrail everywhere*
	  o *"Known hazards"*
	  o *Negligence or wilderness*
	• **Enforcement**
	  o *Allowing access*
	  o *Questions of identity*
	• **The 3Es in Practice: Additional considerations**
	  o *Resource limitations*
	  o *"Society's love of litigation"*

The Visitor's Responsibility	• **Before the Visit**
	• **During the Visit**
	  o *Situational awareness*
	  o *Informed decision-making*
	• **Challenges to visitor responsibility**
	  o *Tourist mentality*
	  o *Common sense*
	    ▪ Familiarity
	    ▪ Expectations

Perceptions of Visitor Accidents	• **Defining an accident**
	• **Accidents in national parks**
	  o *Motor vehicle accidents*
	  o *Minor traumatic injury*
	  o *Serious traumatic injury*
	  o *Medical injury*
	• **Accidents and causal attribution**
	  o *"User error"*
	  o *"Act of God"*

Understanding NPS Safety Culture(s)	• **Defining "positive" safety culture** • **Creating safety culture**

Understanding NPS Safety Culture(s) (continued)	◦ *Formal communication* ◦ *Informal communication* • **Challenges to "positive" safety culture** ◦ *Characteristics of employees* ◦ *Characteristics of the job* ◦ *Management role* • **Relating visitor safety and employee safety** ◦ *Visitors over employees?* ◦ *"Trickle down hypothesis"*

CHAPTER 7.

OVERALL CONCLUSIONS AND FUTURE RESEARCH

Introduction

Attribution theory has been a mainstay of the social science research repertoire for over half a century. Experimentalists and qualitative researchers alike have contributed to our understanding of how individuals attribute the causes of—and responsibility for—events both common and extraordinary, from failing a test to surviving a car crash. Historically, whereas much of the social psychological research has adopted a dualism of attributing responsibility to "internal" traits of individuals or to "external" characteristics of the environment (e.g., Heider, 1958; Kelley, 1963), researchers in anthropology, science & technology studies, public policy and sociology (among other disciplines) have envisioned attribution of responsibility more broadly in cultural, moral, and ethical terms (e.g., Crittenden, 1989; Douglas, 1990; Green, 1997a). Though much of the multi-disciplinary research incorporating aspects of attribution theory attends to the more expansive issue of risk management, no apparent research has attempted to integrate these studies.

In response to this gap, this dissertation has envisioned the concepts of responsibility and risk more holistically. As stated in the introduction (Chapter 1), this dissertation applied attribution theory on an individual level (i.e., how individuals explain the causes of accidents and unintentional injury) and envisioned attribution as occurring within a social context (i.e., how individuals perceive their responsibility in the promotion of safety in public spaces). In so doing, it drew from two previously segregated approaches to attribution theory, both applicable to understanding risk management. The research also worked towards a more thorough integration of risk perception concepts into attribution theory, examining how the perceived nature of risks (e.g., controllability, desirability) and the context in which they are encountered may affect attributions of responsibility. Finally, the dissertation examined how sociocultural variables (e.g., past experiences, group memberships) and exposure to both “official” (i.e., institutionally-scripted) and “unofficial” (i.e., unscripted) park risk and safety-related communication relate to attributions of responsibility. The study pursued the above goals in the applied context of three U.S. national parks, where I conducted in-depth interviews with park employees and volunteers, and surveyed park staff and visitors.

The following chapter is an attempt to draw together previous chapters in order to provide preliminary answers to the larger questions driving this research: Considering multiple audiences, who (or what) is perceived as responsible for ensuring that accidents do not occur, and why? And, what do these attributions mean in the context of envisioning institutional risk management strategies? In so doing, I also reflect on how this study might inform future research integrating attribution theory and risk communication. The chapter is organized as follows. First, I review the major findings, along with the theoretical and management implications of the five major conceptual areas considered in this dissertation: (1) causal attribution, (2) prevention attribution, (3) sense of place, (4) risk perception, evaluation, and communication, and (5) safety culture (see Table 7.1). The chapter concludes with a discussion of avenues for future research, which builds upon the findings and implications.

Table 7.1. Major Findings, Theoretical Implications, and Management Implications

	Major Finding	Theoretical Implication	Management Implication
Causal Attribution	Differences in causal attribution were found between employees and visitors.	Extends the notion that causal attributions can vary by occupational or hierarchical role (e.g., Kouabenan et al., 2001).	The NPS should consider co-orientation or attribution “re-training” in order to counteract “misalignment” of attributions between park staff and visitors.
	“External” causes loaded onto three separate factors: (1) NPS-related; (2) related to the biophysical environment; (3) related to fate, bad luck, chance, etc.	Extends the dualistic causal schema typically used to classify unintentional actions, including accidents. Suggests some support for the idea of “superphysical causality” (Shaver, 1985).	
	There was a dualistic interpretation of accidents, as “user errors” or “acts of God,” with corresponding attributional processes.	Suggests support for extant social psychological theory, e.g., “Just World Hypothesis” (Lerner & Miller, 1978).	How visitor accidents are framed can play a significant role in how both visitors and employees attribute causal responsibility; suggests need for balance between “blaming the victim” and invoking bad luck.
	Causal attribution differed by level of experience in a setting, and involvement in a similar accident.	Supports empirical research connecting attribution theory to applied contexts (e.g., Kouabenan, 2002).	Visitors with less experience in parks may be the least likely to see the visitor as responsible; suggests a potential “misalignment” between new visitors and park staff in expectations for responding to visitor accidents.
Prevention Attribution	Differences in attributing responsibility for preventing accidents were observed on the basis of individual characteristics, including activity choice.	Supports Rickard et al. (2011) as well as research on “adventure recreation” (Ewert & Hollenhurst, 1989) and “edgework” (Lyng, 1990).	Recreation activity choice, in many cases, can be a proxy for voluntary risk-taking) Therefore, tailoring messages based on activities may be a useful and efficient strategy.

Table 7.1. (Continued)

	Differences in attributing responsibility for preventing accidents were observed on the basis of demographic characteristics, including age, sex, race/ethnicity, education level, and native language.	Supports the findings of Espiner (2000) and, less directly, research in cultural psychology (e.g., Menon et al., 1999).	Park managers should collect demographic information about visitors to help them better anticipate potential differences in responsibility beliefs between visitors and park staff, and to craft communication accordingly.
	Differences in attributing responsibility for preventing accidents were observed on the basis of employee "type."	Supports Espiner (2000).	Promote discussion of expectations for visitor injury prevention at all levels/divisions of parks. Consider attribution "re-training" in order to counteract "misalignment" of attributions.
	The "shared" responsibility for preventing visitor accidents seems to be understood by employees/volunteers as temporal, distributed, and spatial.	Suggests that national parks may be "liminal" spaces (Shields, 1991; Van Gennep, 1960); also reflects a "deficit model" approach to distributing risk information (e.g., Durant et al., 1989).	The NPS should consider if—and how—they communicate a "shared" responsibility, as well as how, in practice, a "shared" responsibility is applied. A "framework for shared responsibility" may be necessary to streamline communication of this concept across the Park System.
Safety Culture	Parks appear to support not one, but many safety cultures, including those related to employees and (possibly) to visitors.	Supports and extends findings in the safety science literature (e.g., Findley et al., 2007; Harvey et al., 1999) to apply to a new occupational setting.	Suggests the need for more attention to how particular park divisions and/or levels of the agency understand their responsibility to prevent both visitor *and* employee accidents, given the unique characteristics of employees and their job requirements. How these cultures may interact and/or mutually reinforce one another remains an empirical question.
	A "positive" safety culture is created and re-created, in part, through formal and informal communication.		

Table 7.1. (Continued)

Safety Culture	There are numerous threats to maintaining a "positive" safety culture, such as characteristics of employees (e.g., risk tolerant) and of the job (e.g., competence required in several areas).		
Risk Perception, Evaluation, & Communication	Perceived desirability and acceptability of risk depend at least in part on its origin and the circumstances under which it is encountered, as well as a person's risk tolerance.	Builds on Machlis and Rosa's (1990) "desirable" risk concept as well as on the "voluntariness" of risk (Tulloch & Lupton, 2002). Also lends credence to the basis of cultural theory approaches to risk—that one's experiences, affiliations, etc. influence perceptions and evaluations of risk (e.g., Tansey & O'Riordan, 1999).	Park managers should be aware of potential differences in assumed risk tolerance and familiarity of park staff versus visitors. While central to the park experience for some, risk may not be "sought out" by all visitors, and opportunities should exist to cater to both groups.
	Some sources of risk in national parks are perceived by employees/volunteers as inherent and dynamic and, in some cases, unmanageable.		
	Differences in causal attributions were observed on the basis of perception of the controllability of park-related risk.	Extends the concept of controllability of the cause (e.g., Weiner, 1996).	How visitors perceive the controllability of park risks matters in their development of causal attributions. Message strategies could aim to achieve a balance between inspiring an "exaggerated" sense of control (optimistic bias) and inspiring fatalism.
	Those who perceived risk as desirable were more likely to view a visitor accident as caused by challenging environmental conditions and/or bad luck.	Builds on Machlis and Rosa's (1990) concept of risk as desirable.	Suggests that managers may need to tailor messages based on recreational choices (see above).

Table 7.1. (Continued)

Risk Perception, Evaluation, & Communication	Those who perceive risks as desirable are less likely to see the NPS as responsible for preventing visitor accidents.	Supports Rickard et al. (2011)	
	Visitors' reliance on and exposure to official park information was positively related to internal causal attributions.	Suggests some support for the idea that reliance on particular information sources may predict particular attributions of responsibility (e.g., Doria et al., 2006).	Points to a need to review the content of agency-wide and park-level communication: how is attribution for causing and preventing accidents represented? New safety-related messages should be designed strategically, in order to garner support for how the NPS would like to represent responsibility, i.e., as "shared" between visitors and staff.
	The amount of safety-related information visitors received was related to perception of individual responsibility to prevent park accidents.		
Sense of Place			
	There was evidence for the presence of a "blended" place meaning that incorporates both human and nature-based ideas about parks.	Supports the concept of the "hybridity" of natural and cultural meanings in "special places" (e.g., Cantrill, 1998)	Those less aligned with the natural/cultural meaning of the park, and less attached to it (i.e., presumably, first-time visitors) would be more likely to see the NPS as responsible in the case of a visitor injury/accident. Suggests that park managers might target new park users as an audience for "attribution re-training" (see above).
	Agreement with blended place meaning and higher place attachment was positively related to internal causal attributions.	Extends the sense of place literature to consider attribution of responsibility (causal and prevention).	
	Those who were more attached to the park were less likely to view the NPS as responsible for preventing visitor accidents.		

Causal Attribution

Using two hypothetical scenarios ("Hellroaring Creek" and "Mammoth Hot Springs") describing visitor injuries, the survey measured visitors,' employees,' and volunteers' beliefs about the cause of these accidents, including factors *internal* to the victim (e.g., his unpreparedness for hiking), and those *external* to the victim (e.g., environmental conditions, lack of park safety infrastructure). In addition to further explaining the classification of external causes, this section also describes differences in causal attributions between employees and visitors, how respondents tended to interpret "accidents" more generally, and the relationship between experience in parks (and in actual visitor safety incidents) and causal attributions.

Understanding "external" causes

As described in Chapter 4, results of a factor analysis (varimax rotation) indicated that external accident causes (i.e., factors outside of the scenario's hypothetical victim, Roger Ellison) did not load onto a single factor. Instead, three items related to the NPS (e.g., the NPS' attention to park safety infrastructure) loaded together, leaving two separate items: (1) challenging environmental conditions, and (2) bad luck, fate, chance. From a theoretical perspective, it is interesting to note that the typical "dualistic" locus of the cause schema used to classify unintentional actions (see Malle, 1999) did not capture what appeared to be a more nuanced interpretation of the scenario. Indeed, that "fate, bad luck, and chance" was a separate construct, together with the tendency of some individuals to explain the hypothetical accident as an "act of God" in free responses lends some support to Shaver's (1985) notion of "superphysical causality"; however, it is unclear the extent to which this reasoning may have been a product of the religiosity of the respondent, a demographic variable not measured in this study, but often important to making such attributions (Shaver, 1985).

This expansion of the external causes category also poses interesting implications for the idea of the controllability of the cause, a second property utilized to attribute causal responsibility (Weiner, 1996, 2006). As Weiner (1996, 2006) reminds us, we can think of controllability of a cause as either controllable by the actor himself (i.e., in the case of the scenario, Roger Ellison), or by an outside agent (i.e., the National Park Service). Following this logic, the actions of the NPS in the scenario may be viewed as external to Roger Ellison as well as controllable; that is, the NPS (hypothetically speaking) had control over whether to maintain its safety infrastructure, enforce its safety policies more rigorously, and so on. The concepts of bad luck and challenging environmental conditions are also external to Ellison, yet the perception of controllability in this case may be less straightforward. While most would agree that, by definition, one lacks control over what is perceived as “bad luck” or “fate,” environmental conditions such as terrain or weather may not foster the same agreement between individuals. As will be discussed below, the extent to which respondents saw themselves as able to control their exposure to park-related risk, such as inclement weather or rough terrain, varied among the sample. As Weiner (2006) explains, and as this dissertation has begun to show, the extent to which we perceive a cause as controllable matters in terms of how we attribute responsibility to external actors (e.g., the NPS), develop emotional reactions (e.g., anger vs. sympathy), and support or act on behalf of a person or a social policy.

Differences between employees and visitors

As described in Chapter 4, comparing employees and park visitors’ causal attributions with respect to the visitor accident scenario revealed significant differences. Employees were more likely to view internal causal factors (i.e., those related to the victim, such as his lack of preparedness) and challenging environmental conditions as important causal factors than visitors were. On the other hand, visitors were more likely to view bad luck as an important causal factor. As hypothesized, the "misalignment" between employees and visitors in their causal attributions appears to parallel that which has been documented in the safety science literature as occurring between upper-level managers and lower-level employees (e.g., Lacroix & Dejoy, 1989; Lehane & Stubbs, 2001). As distinct populations with varied experiences in park settings and responsibilities (i.e., recreating in the park vs. managing risk in the park), these differences are not necessarily unexpected; however, as Lehane and Stubbs' (2001) findings suggest, such perceptual differences indicate that the direction of future risk management decisions may not align with park visitors' expectations or needs. For instance, if park managers are more likely to hold visitors responsible in the case of an accident, they may be less motivated to investigate potential park actions that may have contributed to the event, such as a lack of communication or the (non) enforcement of a park rule, and to work towards changing these conditions in the future. Lacroix and Dejoy (1989) echo this point, arguing that managers' "chronic belief that most accidents can be prevented by heightened worker effort" (p. 106) may result in "little or no attempt to reconstruct accident sequences or to identify basic causes" and in potential organizational conflict. To extrapolate, visitors could interpret park managers' inaction as a lack of interest in their safety and wellbeing, or even a failure to meet their expected responsibilities—Freudenburg's (1993) notion of "recreancy" —leading to negative attitudes toward and a lack of trust in the NPS. Following the logic of the occupational safety literature, achieving congruence between causal perceptions of park visitors and employees/volunteers would thus "foster a better environment for the effective implementation of preventative strategies in a mutually supportive way" (Lehane & Stubbs, 2001, p. 125).

The idea of achieving "congruence" between visitors and employees/volunteers is reminiscent of co-orientation, a concept steeped in public relations and mass communication research, and applied in deliberative contexts involving multiple audiences. Weaving together diverse research traditions in sociology and psychotherapy with the symmetry model, mass communication researchers introduced co-orientation as a concept describing the "relationships between the cognitions of two or more people" (McLeod & Chaffee, 1973, p. 470). By comparing the beliefs of two separate groups, co-orientation operates under the assumption that:

> …A person's behavior is not based simply upon his private cognitive construction of the world; it is also a function of his *perception* of the orientations held by others around him and of his orientation to them (McLeod & Chaffee, 1973, p. 470; emphasis theirs).

As a management approach, co-orientation can provide insight into the relationship between the public's (and other key stakeholders') subjective judgments, and those of managers, thus providing a basis on which to construct more successful policy-based interventions. Researchers have used the co-orientation approach to compare the perspectives of two groups or stakeholders, for instance, those of decision-makers with those of the public, in order to gauge common ground and disagreement on both topical subjects and perceptions of each other (e.g., Broom & Dozier, 1990; Grunig & Stamm, 1973; Leong, McComas, & Decker, 2007, 2008; Tichenor & Wackman, 1973). With respect to causal attribution, adopting a co-orientation perspective would require a survey of park staff and visitors in order to determine: (1) park staff's causal attribution of a particular event, such as a visitor accident; (2) park visitors' views of the same event; and (3) each group's estimate of the other group's views. Once each group's beliefs about the event, and about the other group's beliefs have been tabulated, steps can be taken to reach common ground. As communication and public relations scholars have argued, documenting the dimensions of belief correspondence can be critical to formative research on key audiences (such as park visitors), leading to later shaping of appropriate and effective strategic communication (e.g., Broom & Dozier, 1990).

While co-orientation approaches often employ a series of deliberative forums over an extended time period to achieve shared understanding within and between groups (e.g., see Leong et al., 2008), targeted interventions meant to "train" (or "re-train") certain audiences' causal attributions may be another promising approach (Cushner & Brislin, 1995; Haynes, Perry, Stupnisky, & Daniels, 2009; Sarkisian, Prohaska, Davis, & Weiner, 2007; Williams-Piehota et al., 2004). In a public health context, researchers have begun to pilot communication-based interventions that aim to influence responsibility beliefs and target individual behaviors. Recognizing that health messages emphasizing an individual's behavior could unintentionally inspire feelings of anger, guilt, or fatalism, Williams-Piehota et al. (2004) designed a study to investigate whether messages emphasizing the role of social groups (e.g., friends, families, religious groups) could influence health-based decision-making. To do so, the authors randomly assigned subjects to receive a telephone message emphasizing either individual (i.e., internal) responsibility for consuming the appropriate amount of fruits and vegetables, or social (i.e., external) responsibility. While both types of messages increased fruit and vegetable consumption, Williams-Piehota et al. (2004) found that the social responsibility message appeared to motivate increased intake over time, as compared to the individual responsibility message. Also in the health context, Sarkisian et al. (2007) designed an "attribution re-training curriculum" consisting of both educational trainings and exercise sessions for older adults in order to influence their causal beliefs about becoming sedentary; more specifically, "participants were taught that becoming sedentary is not inevitable with aging and that older adults should attribute being sedentary to modifiable attributes rather than to old age" (Sarkisian et al., 2007, p.

1842). Sarkisian et al.'s (2007) apparent success—intervention participants both exercised more and reported more positive beliefs about their own mental and physical health—suggests support for the use of strategic communication in order to influence attributional beliefs.

Management implications. Sarakisian et al.'s (2007) attribution re-training is founded on the idea that individuals can be persuaded to "reject stable and uncontrollable attributions and instead adopt unstable and controllable explanations for failure" (p. 1843). Put simply, how a person attributes responsibility is less a belief set in stone, and more a judgment open to change. In the context of a national park, one can imagine designing a communication campaign or multiple campaigns, (e.g., one specifically for visitors, one for employees, etc.) meant to influence that group's beliefs about the causes of, or responsibility for the prevention of, visitor injuries. Based on the results of this dissertation, for instance, messages might emphasize that visitor accidents are not solely the result of "bad luck," but that individuals have considerable control over certain aspects of their park visit, such as seeking information about the park and carrying certain supplies with them. (Further discussion on the potential content of these messages, as well as a research agenda related to messaging strategies, will be provided below).

Interpretation of "accidents"

How study participants attributed causal responsibility for visitor accidents may also be a product of their understanding of accidents more generally, which was explored among employees and volunteers in Chapter 6. Interviews highlighted employees' and volunteers' tendency to describe visitor accidents using a dualism that seemed to follow the traditional social psychological attribution model: as "user errors" (i.e., stemming from internal causes, usually under an individual's control) or as "acts of God" (i.e., stemming from external causes, often perceived as not under an individual's control). Whereas employees described many park accidents as falling into the first category, they likewise described ways in which visitor accidents may be uncontrollable, unpreventable, and even unpredictable. In the context of Mount Rainier, for instance, one can imagine a hiker injuring his leg while wearing inadequate footwear versus injuring his leg while escaping a volcanic debris flow; the hiker's ability to select appropriate footwear—his *control* over a potential cause of his injury—may be important to his safety in both scenarios, but could be overshadowed given other, more immediate sources of risk. When reading the Hellroaring Creek scenario, it is possible that employees interpreted details of the scenario as "cues" for viewing the scenario as a case of "user error"; in free-response answers describing the cause of the accident, survey respondents tended to highlight the fact that the individual *chose* to hike alone, and also to extrapolate that he *purposefully* veered from the established trail to take a photograph, despite no explicit information in the scenario that he did so. This interpretation of the hypothetical accident—one in which a visitor retains the ability to make rational choices about his experience—may have led employees to hold the visitor as primarily accountable for his fate. In this sense, respondents' interpretations of the scenario seemed to follow Green's (1997a) description of how, in a contemporary "risk society" (Beck, 1992) concerned with statistical probability, accidents tend to be constructed as occurrences that are under the control of the individual:

> Accidents, even in such high-risk recreations such as rock-climbing or long-distance hiking should not happen. They only do so if the public fail to take due care to calculate known or knowable risks (p. 126).

As the interviews illustrated, this interpretation of visitor accidents may not be limited to the hypothetical, as employees and volunteers described "victim blaming" as a common response to accidents precipitated by situations in which they perceived visitors as "choosing" to defy park rules or "common sense," including engaging in high-risk recreation or in more mundane activities, such as driving; as the Just World Hypothesis mantra goes, these individuals "got what they deserved" (Lerner & Miller, 1978).

Management implications. That the propensity to "blame the victim" may be preceded by the way in which a particular visitor incident is framed suggests implications for how park managers, as well as news media outlets, choose to communicate about such incidents with public audiences. As the expansive literature in message framing suggests (e.g., Entman, 1993; Iyengar, 1991, 1996), whether park-based communication places particular emphasis on an accident as being caused by internal factors or external factors may influence how audiences come to attribute responsibility for the cause of such accidents. The final section of this chapter posits a research agenda for investigating how particular message strategies, such as framing, might be invoked to influence attributions of responsibility.

Importance of experience

Chapter 4 also provided evidence that an individual's level of experience in a given setting may influence his or her causal attributional judgment (Kouabenan, 2002; Kumagai et al., 2004a; Kumagai et al., 2004b; Winter & Fried, 2000). Employees who had never been involved in an actual visitor safety incident (e.g., participating in a park search & rescue effort), as well as those who had never experienced an incident similar to that described in the scenario, were more likely to report above median internal causal attributions. Following Kouabenan (2002), we may interpret these attributional judgments as self-defensive, in that employees appeared to prefer to attribute responsibility to characteristics of the visitor, rather than to circumstances that may have been more under their managerial auspices, such as the physical infrastructure at the park, or the enforcement of park rules. As suggested above, the "default" attributional response of NPS employees, especially for those without first-hand knowledge of responding to visitor safety incidents, may be to blame the visitor; given the ubiquitous refrain among Park Service employees and volunteers that visitors "leave their brains at home" (as described in Chapter 6), this response may be somewhat understandable. Likewise, we might hypothesize that those employees or volunteers who *have* been involved in visitor safety incidents, whether as a patient or as a medical provider, may develop a more nuanced understanding of the causes of such accidents, including both internal and external factors.

For visitors, experience seemed to play a parallel role. Experience in a national park setting, measured through number of visits at the park, length of the most recent visit, and number of national parks visited overall, was negatively correlated with viewing NPS-related causes of the hypothetical accident as important. The more time visitors spent recreating in national park units, in other words, the more their causal attributions approached those of the employees and volunteers in the sample. We can interpret this finding in several ways. First, it is possible that those more accustomed to national park settings have also, to some degree, internalized the "culture" of personal responsibility perpetuated by the NPS (see below), leading them, like employees and volunteers, to view visitors as blameworthy in such situations. A second possibility relates to the operation of an optimistic bias (Weinstein, 1980, 1987) that may persuade more "experienced" visitors to assign greater importance to "human factors" in the case of visitor accidents. Extrapolating from DeJoy's (1989) work on (in)experienced drivers and causal attributions of responsibility for car crashes, we can expect that a visitor who has spent a lifetime hiking or paddling in national parks might perceive other visitors as similarly "in control" of their personal exposure to risk and overall safety in a park, and thus blameworthy in the case of an accident (see also Green, 1997a).

Management implications. From a management perspective, the finding that visitors with less experience in park settings may be the least likely to view the visitor as responsible in the case of an accident deserves further attention. As federal efforts such as "Healthy Parks, Healthy People" and the "America's Great Outdoors Initiative" aim to attract more diverse populations to national, state, and local parks, critical questions emerge. Will these new visitors, individuals who may be unfamiliar with the biophysical environment, as well as with the rules and regulations of the park, tend to attribute more responsibility to the NPS in the case of a visitor accident? How might these attributions of responsibility influence intentions to take legal action, such as the filing of tort claims in the case of visitor injury or death in a national park? These and related questions call for further empirical scrutiny.

Prevention Attribution

In addition to understanding how respondents attribute responsibility for a visitor accident that (hypothetically) took place, this dissertation also attempted to explain how respondents understood the responsibility to prevent such events from taking place: the responsibility to ensure safety, or what I have chosen to call "prevention attribution." I measured prevention attribution with both survey items and with in-depth interview questions. The following section describes differences in attributing responsibility for preventing visitor injury/accidents by visitor demographics, such as race/ethnicity, and also by recreational activity choice. Next, I take a closer look at the meaning of a "shared responsibility" for preventing visitor injury/accidents, including the underlying assumptions. The remainder of the section examines the relationship between causal and prevention attribution.

Differences by visitor "type" and demographic characteristics

Recreational activity. As described in Chapter 5, how visitors attributed responsibility for preventing accidents (i.e., ensuring their own safety in the park) seemed to vary by individual characteristics. For instance, participation in high-risk recreational activities, such as skiing or mountaineering, was negatively associated with expressing support for NPS responsibility to prevent visitor injury. Following Rickard et al. (2011), this relationship seems to make intuitive sense, as it suggests that skiers or mountaineers, among other "high risk" or "adventure" recreationists (Ewert & Hollenhurt, 1989), would prefer not to see their participation limited by NPS oversight, such as through enforcing rules or restricting access. As considerable sociological research has indicated, for some individuals, climbing or skiing is not simply a pastime, but rather an activity fundamental to one's self-concept (e.g., Lipscombe, 2005; Lyng, 1990). Taking part in these activities, therefore, may be felt as an expression of larger personal and societal issues, whether self-actualization, or freedom of expression. That visitors participating in different recreational activities tend to hold distinct judgments about their—and the NPS'—responsibility for ensuring safety also indicates that employees' natural tendency to group visitors by activity, as noted in Chapter 6, has potential merit.

Demographic characteristics. Chapter 5 also illustrated how attributions of responsibility for preventing accidents may vary across common demographic characteristics, such as age, sex, education level, race/ethnicity, and native language, confirming the findings of Espiner (2000) in the context of New Zealand national park tourists. In particular, women, older individuals, more educated individuals, those who were non-native English speakers, and those identifying as Asian tended to express more support for NPS responsibility; those identifying as

Hispanic/Latino, on the other hand, expressed less support, and, correspondingly, more support for individual (internal) responsibility.

While explaining the reasoning behind these tendencies is difficult without more information about the visitor sample, the fact that the variation exists suggests that judgments of responsibility for preventing visitor injury may not be universally held. Moreover, these differences support considerable research in social psychology and communication that has demonstrated differences in attributional judgment by cultural background, with implications for developing effective, culturally-sensitive communication strategies (e.g., Cushner & Brislin, 1996; Menon, Morris, Chiu, & Hong, 1999; Oetzel, DeVargas, Ginossar, & Sanchez, 2007). While this research attends most centrally to *causal* attribution, it may be nonetheless pertinent to *prevention* attribution, and thus applicable to understanding attributions of responsibility for ensuring safety. For instance, in making causal attributions, individuals from a Western (i.e., U.S., European) background tend to look towards characteristics of the individual (i.e., internal causes) whereas those from an Eastern (i.e., Asian), traditionally "collectivist" cultural background gravitate more towards external attributions (e.g., Krull, 1993; Menon et al., 1999). In the context of the parks studied, the differences observed provide some evidence that visitors may arrive at a park with certain pre-defined assumptions about their role in ensuring their own personal safety, as well as tendencies towards making causal attributions—beliefs that may render them more or less receptive to park communication encouraging them to prevent accidents and injuries. While most employees and volunteers seem to recognize the potential for difference among their clientele, fewer have found solutions to address these differences while providing necessary park information.

While no known NPS-initiated research has examined attributions of responsibility for visitor safety by visitor race or ethnicity, recent agency-funded studies do shed light on differences in perceptions of the overall safety of national parks by racial/ethnic group. Concerned with how such demographic characteristics might influence a visitor's park experience, in the last decade, the NPS has conducted nationally representative telephone surveys of randomly selected park visitors and non-visitors across the U.S. (Solop, Hagen, & Ostergren, 2003; Taylor, Grandjean, & Gramann, 2011). Unsurprisingly, results of these and other studies indicate that visitors to national parks are disproportionately non-Hispanic White, with Hispanic Americans and African-Americans tending to be under-represented, as compared to the general U.S. population. For the purposes of this dissertation, however, the more interesting contribution of such research is the attention to perceptual variations by cultural group. For instance, Taylor et al. (2011) found differences in perceptions of whether national parks are "safe places to visit" by race and ethnicity; whereas 10% of the overall sample agreed that NPS units are *not* safe, 5% of Whites, 24% of Hispanics, 16% of African-Americans, and 5% of Asians answered this way; these differences were statistically significant by a chi-square test ($p < .05$). Familiarity with national park units also differed significantly by race/ethnicity; whereas 30% of the overall sample agreed that, "I just don't know that much about NPS units", the same was true of 26% of Whites, 34% of Hispanics, 56% of African-Americans, and 34% of Asians. Interestingly, the authors posit that differences associated with varying knowledge and perceptions of parks may exist at a more fine-grained level than racial or ethnic group. Most tellingly, Taylor and colleagues found significant differences in response between Hispanics who were interviewed in Spanish and those who were interviewed in English, even after taking several steps to account for differences in connotation and language. They interpret these differences as:

> … Most plausibly due to social, economic, and/or cultural variation between the two groups of Hispanic respondents. Those who speak only Spanish may include more recent immigrants with lower levels of acculturation and less awareness of the National Park System's status in U.S. society. It also may be that less acculturated Hispanic Americans are less comfortable around uniformed government employees, including park rangers, as was conjectured in the focus group (p. 15).

The idea of "two groups" of Hispanic respondents aligns, in many ways, with both my experiences with and employees' interpretations of the visitor base at DEWA. From witnessing multigenerational family barbeques at the park's beaches, to speaking with visitors in Spanish, I interacted with park visitors who appeared to be recently immigrated to those who appeared to be fully acculturated; in some cases, upon contacting a visitor group, I was directed to speak with a younger child—the member of the family most comfortable communicating in English. Moreover, while many DEWA visitors are Spanish-speaking, this sharing of a native language masks wide differences in country and culture of origin. Though anecdotal, these experiences confirm to some extent that identification by race/ethnic group or by native language *on its own* may be an inadequate measure on which to group park visitors for management purposes.

Management implications. As a basis for tailoring park communication, classifying visitors by recreational activity may be a relatively low cost, straightforward method of distinguishing between audiences who may hold distinct beliefs about their own responsibility, and thus might require different messages from the park. At the same time, while DEWA (and presumably, other park units) have taken steps towards acknowledging the diversity of its visitor base, bilingual signs and brochures may address only the surface of what may be deeper beliefs, attitudes, and perceptions, including attributions of responsibility for ensuring safety. Researchers' appeals to the NPS and other federal land management agencies (e.g., U.S. Forest Service) to examine and respond to the communication needs of multicultural user groups are not new (e.g., Simcox & Hodgson, 1993; Dahl, 1993; Chavez, Winter, & Absher, 2008); however, such calls to action may be insufficient to enact change without the contribution of other factors, such as adequate research funding and field personnel. But as Simcox and Hodgson (1993, pp. 131-132) argue, “While implementing such programs will be costly, the trade-off may be increased resource degradation and user conflicts as a result of an inability to diffuse information effectively.” Results from this dissertation, combined with the findings of cultural psychology and communication, suggest that a systematic understanding of the general demographics of a park’s visitor base, including race/ethnicity, native language, and sex at minimum, should be a necessity for park managers. Recognizing that there are likely hurdles, both political and monetary, to collecting this information, efforts should be made towards gathering and analyzing these data in a systematic fashion, and on an annual basis. This information, in turn, will provide the baseline for constructing more complex approaches that account for fine-grained differences within groups that, on the surface, may have many similarities.

Shared responsibility

As reported in Chapter 5, the majority of *all* respondents (visitors, employees, and volunteers) perceived that responsibility for preventing visitor injury rested almost entirely with the individual, with very few respondents perceiving this responsibility as “shared” between park visitors and staff. By comparison, interviewees (employees and volunteers) were much more likely to describe the responsibility to ensure visitor safety as “shared,” and even in some cases as an equal responsibility. To some extent, we might explain this apparent mismatch as due to the fact that, for employees (as was true for visitors), attributions of responsibility seemed to vary by employee “type,” following the findings of Espiner (2000). As such, the job titles and responsibilities of the individuals interviewed may have mattered considerably in the types of responses I received. As Chapter 5 illustrated, employees in the Administration and Natural &

Cultural Resources Divisions were less supportive of NPS' responsibility to prevent visitor injuries/accidents, as compared to those in the Visitor & Resource Protection Division; as was discussed in Chapter 5, we can speculate that such differences in belief may be related to each group's distinct job descriptions, including the amount of direct involvement with visitors and obligation to participate in search & rescue procedures.

While the perceived division of overall responsibility due to the NPS and the park visitor may not be universal, employees did seem to share a common perspective on how they envisioned their duty to manage park risk. As Chapter 6 described, following the "3E" approach (e.g., Baker, 1973), employees and volunteers described their "educational" responsibility as:

- Providing information about "known" risks.
- Helping to develop meanings of and connections with the park.
- Providing face-to-face contacts with visitors, both to disseminate information, and to sustain the historical and cultural significance of the ranger to the agency.
- Adapting to and keeping abreast of changing forms of information technology that may be useful and appropriate in park settings.
- Partnering with, and/or relying on other agencies and organizations to educate their visitor base (e.g., on how to recreate safely in the park).
- Tailoring messages to meet the needs of various visitor "types," including those who are oriented towards "risky" recreation, and those who do not speak English as a first language.
- Reacting to a visitor base that may or may not attend to "official" forms of communication.

At the same time, interviewees noted their responsibility to (1) provide solutions for "known hazards" in areas to which park personnel "invite" visitors and (2) balance the value of undeveloped wilderness with the possibility of negligence ("engineering"). Finally, employees and volunteers described the need to allow access or enforce closures in park areas, despite experiencing threats to their own authority and self-identity ("enforcement"). While acknowledging their own responsibilities, employees also recognized that visitors, too, should be held responsible for preparing themselves for a park visit (e.g., seeking out information, gathering the appropriate equipment), as well as exercising "situational awareness" and making informed decisions while in the park.

The tendency to "individualize" responsibility (Beck, 1992; Bickerstaff, Simmons, & Pidgeon, 2008) for avoiding park-related risks appears to be engrained in the larger occupational community of the NPS (see Van Maanen & Barley, 1984), one that upholds the (sometimes unstated) belief that "brainless" tourists should be held responsible for their unfortunate fates (see also Green, 1997a); however, when encouraged to think more broadly about issues of responsibility for visitor safety, most employees and volunteers conveyed that safety, like many environmental risks and public health concerns, may be more "collective" than individual (Bickerstaff et al., 2008), with responsibilities due to multiple parties (see Chapter 6). Interestingly, the inclination to see safety as primarily a personal responsibility also emerged strongly among visitor survey respondents. Whereas research on public audiences' attributions of responsibility for protecting against environmental risks, such as air pollution or climate change, has demonstrated citizens' propensities to pass on the responsibility to other institutional actors, such as lawmakers or industry affiliates (e.g., Bickerstaff & Walker, 2002; Eden, 1993; Petts, 2005), overall, visitor respondents were less inclined to pass the buck to the NPS for ensuring their safety (see Chapter 5). While visitors' attributions of responsibility for preventing injuries/accidents seemed to vary by demographic characteristics (as described above), in general, most seem to view the maintenance of one's health and safety as under personal control (e.g., Bickerstaff et al., 2011; Kirkwood & Brown, 1995; Lupton, 1993, 1994).

Returning to NPS Director's Order 50C, in which visitor injury prevention is described as a "shared responsibility between the park staff, park partners, and park visitors" (U.S. DOI, 2010, p. 60), how have the results of this dissertation helped to illuminate how this "shared" responsibility is perceived by park staff and what, in practice, it may entail? Is a "shared responsibility" one in which multiple parties take on equal, but different responsibilities in pursuit of the common goal of reducing visitor injuries/accidents? Unlike the context of a theme park or a zoo, where one's safety can be all but guaranteed through the use of engineering and enforcement, in a national park, responsibility to prevent visitor injury, as described by interviewees, was seen as temporal, distributed, and spatial (see Figure 7.1). Responsibility to prevent injury begins *before* the park visit, as visitors are expected to gather information, prepare themselves physically, and gather necessary equipment; as interviewees explained, in this stage, responsibility rests, for the most part, on the shoulders of the visitor. Once beyond the park gates, however, responsibility appears to shift. While visitors remain responsible to maintain situational awareness, as well as to select activities that are within their physical abilities, park managers now take on a certain degree of responsibility, such as to mitigate known risks and to provide park-related information. At this point, while responsibility can be viewed as shared or collective, importantly, the onus of responsibility on visitor or park manager seems to shift based on the physical landscape. Following the observation of Tuler and Golding (2002), in more "frontcountry" settings, such as campgrounds or visitor centers, interviewees seemed to attribute responsibility for preventing visitor injury to their own actions (e.g., upkeep of infrastructure), whereas in "backcountry" or wilderness settings, they placed more of this burden on the visitor him or herself.

Assumptions underlying "shared" responsibility. In thinking about interviewees' conception of the temporal, distributed, and spatial attributes of a shared responsibility to prevent visitor injury, two assumptions held by interviewees deserve mention. First, while many employees and volunteers seemed to recognize the limitations of the "education" approach, such as the difficulty in reaching visitors who are not "motivated" to seek out information about the park (Heberlein, 1974), they nonetheless depend on these methods as a central approach to their risk management efforts. Moreover, while interviewees articulated their desire to tailor messages, they also described the more likely scenario of pushing out information— blanketing the visitor base with standardized information and hoping for the best. This "deficit model" (Durant, Evans, & Thomas, 1989; Rennie & Stocklmayer, 2003; Wynne, 1993) default seemed to reflect the working assumption that providing visitors with "adequate" information will ensure that they follow rules, act appropriately, and avoid injury. A top-down, deficit model approach seemed likewise present in interviewees' descriptions of using new technology, such as social media, to communicate with visitors. In their ability to disseminate one-way messages, from the NPS to an (undifferentiated) audience base, an electronic Tweet and a wooden sign may be largely equivalent, despite utopian discourse to the contrary; in their current application by the NPS, neither allows the audience to talk back. The idea that "experts" (or in this case, NPS managers) and the lay public (park visitors) can—and should—listen to and learn from one another in regard to localized, current, and often controversial socioscientific issues instead epitomizes the Public Engagement with Science (PES) model (e.g., Burns, O'Connor, &

Stocklymayer, 2003; Kerr, Cunningham-Burley, & Tutton, 2007; Lazinger, 2007; Leshner, 2003). From a PES perspective, all citizens hold values with respect to socioscientific issues deserving of legitimization and expression. Participation in deliberative processes, whether citizen science projects or citizen juries, in turn, can also foster public trust in "official" decision-making bodies, such as government agencies (Irwin & Michael, 2003). By this logic, NPS communication that limits the public's ability to participate or "talk back" may, unintentionally, limit visitors' trust in the agency's ability to manage risk in national parks.

A second assumption present in employees' comments relates to the geography of the park itself. When describing their risk management efforts, interviewees seemed to delineate their responsibility by location: more developed areas required more of their attention (in terms of the 3Es) than backcountry trails or designated wilderness. Yet whether visitors perceive similar gradations in the park's—and their own—responsibility remains an empirical question. When frontcountry areas can include short trails, and wilderness areas can be dotted with primitive structures, the designation between "park-maintained" and "visitor on his own" may be less than black-and-white. Instead, we might characterize a national park as "liminal" space (Shields, 1991; Van Gennep, 1960): a less differentiated, transition zone of responsibility, straddling the developed and the undeveloped. First introduced in anthropology, the concept of liminality describes the idea of being in transition from one developmental state to another, such as during a "rite of passage" (Van Gennep, 1960; Turner, 1974). For sociologists and cultural geographers, however, liminality offers a way to conceptualize people's experiences in places, both familiar and foreign (e.g., Bevan, 2011; Currie, 1997; Freidus & Romero-Daza, 2009; Phipps, 1999; Shields, 1991). Tracing historical changes in the meanings of popular tourist locations, Shields (1991, p. 118), for instance, wrote of Brighton Beach, as " 'betwixt and between' the sublime chaos of the sea and the ordered landscape of England." Indeed, scholars in leisure studies have used the concept of liminality to describe the experiences of traveling and being a tourist, including engaging in activities one might avoid at home (e.g., Currie, 1997; Phipps, 1999).

In a national park, we can apply the concept of liminality on at least two levels: First (and as explored in Chapter 6), visitors, as tourists, may be "in between" their accustomed habits and activities of home and the varied new opportunities and experiences that a national park represents. As Currie (1997, p. 894) writes, upon entering a "liminoidal" state separate from their home environments, tourists:

> ...are liberated from the normal mode of societal action and interaction. The rules of society no longer apply to tourists; they are temporarily allowed to create their own rules within which to operate.

Likewise, Freidus and Romero-Daza (2009, p. 686) explain tourists' existence as liminal when they "'vacate' their lives but do not fully integrate into the tourist spaces since their time there is clearly marked and they are expected to eventually return home." At the same time, attributes of the physical environment into which tourists enter may construct the appearance of a place straddling the boundary of managed and unmanaged, civilized and wild. This second application of liminality suggests that attributions of responsibility may vary geographically, based on physical cues in the landscape, such as picnic tables, handrails, paved roads, or outhouses. Future research should attempt to determine how best to develop communication strategies that convey this sense of transition from one "zone" to another, where expected responsibilities might differ.

Figure 7.1. A Proposed Framework for "Shared Responsibility" for Preventing Visitor Injury

<table>
<tr><th rowspan="3">DISTRIBUTED</th><th colspan="4">TEMPORAL</th></tr>
<tr><th rowspan="3">Before Park Visit</th><th colspan="2">During Park Visit
(SPATIAL)</th><th rowspan="3">After Park Visit</th></tr>
<tr><th>Developed Areas</th><th>Undeveloped Areas</th></tr>
<tr><td></td><td colspan="2">**Visitors and park staff may not share a common understanding of "developed" and "undeveloped" (e.g., frontcountry/backcountry); for visitors, may be influenced by physical cues in the landscape**</td></tr>
<tr><td rowspan="2">Visitors</td><td rowspan="2">• Seek information
• Gather clothing, gear, supplies
• Know rules of the park
• Consider goals of park visit (e.g., risk-seeking, type of activity, etc.)</td><td>• Maintain situational awareness
• Attend to and respect physical capabilities and limits
• Make informed decisions
• Seek information</td><td>• Maintain situational awareness
• Attend to and respect physical capabilities and limits
• Recognize and accept inherent park risks</td><td rowspan="2">• Incorporate lessons learned from present visit to influence future experiences</td></tr>
<tr><td colspan="2">**Visitors may change their expectations and/or behaviors based on the "limnoidal" experience of being in a park**</td></tr>
<tr><td rowspan="2">Employees and Volunteers (NPS)</td><td rowspan="2">• Promote public awareness and understanding of the park, including its rules and inherent sources of risk
• Consider differences based on: activity choices, demographics, and familiarity with parks (i.e., first-time vs. repeat visitors) in designing communication.</td><td>• Attend to and reduce "known" risks, especially in popular areas
• Provide information
• (If possible) Enforce park rules
• (As appropriate) Encourage or discourage certain activities (i.e., "visitor proficiency profiling").</td><td>• (As appropriate) Provide information (e.g., signs).
• (If possible) Enforce park rules</td><td rowspan="2">• In the case of a visitor accident, conduct investigation; consider the complexity of attribution of responsibility
• Attend to the ways in which the news media covers the event; consider developing and maintaining partnerships in order to influence coverage.</td></tr>
<tr><td colspan="2">**Information made available to park visitors may not directly, and without complication, lead to knowledge acquisition and behavior change.**
Visitors and park staff may neither anticipate nor value park-related risk in the same way.</td></tr>
</table>

Management implications. Though stated in an agency directive, what is meant by a "shared" responsibility to prevent visitor injury may require more explicit attention to ensure a mutually agreed-upon translation on the ground. Further attention is needed to investigate whether parks should—and if they presently do—communicate about visitor safety as a "shared" responsibility in information available to both visitors and employees (e.g., website, signs, employment policies, etc.). NPS officials should consider creating and disseminating a "framework for shared responsibility," such as outlined in Figure 7.1, that clarifies how responsibility for preventing visitor injury is temporal, distributed, and spatial in order to: (1) foster common understanding of this risk management directive across the Park System and its diverse park units, (2) illuminate potential assumptions implicit in risk management decisions, and (3) establish a basis for creating safety-related messages targeted at visitors.

Relating prevention and causal attribution

In this chapter, as in this dissertation, the concepts of causal and prevention attribution have been considered separately as distinct outcome variables, with the former informed primarily by the social psychological literature, and the latter by more sociological approaches; however, it is worth re-examining whether these two variables, indeed, measure separate constructs. Would we expect an individual who perceives a visitor accident to be caused principally by the characteristics of the victim to also view park visitors as primarily responsible for preventing such accidents? As described in Chapter 5, I did observe significant correlations between these attributional beliefs in the expected direction—that is, internal causal attributions were correlated with beliefs about internal responsibility for preventing visitor accidents, and external causal attributions were correlated with beliefs about external (i.e., NPS) responsibility for preventing visitor accidents; however, these correlations were small to moderate in size, rather than large, lending some evidence that these variables measured separate constructs. Closer attention to the temporal nature of the attributional belief may be warranted: whereas causal attribution refers to past events (i.e., the visitor who fell and injured himself last month), prevention attribution, as I have defined it, refers to present or future events (i.e., avoiding being involved in an accident on this park visit or future visits). In a reflective review of the history of social psychological approaches to attribution theory, Weiner (2008) suggests that the theoretical approach has been used both to examine causes of past events as well as those that may occur in the future, which has led to some confusion:

> Should beliefs about the future (e.g., “if I try hard then I will succeed”; “I can control my weight, and, thus, will improve my health”; “I have the strength to take charge of my life and, thus, will be accepted in the program I want”) be considered under the rubric of attribution theory? Or rather, does attribution theory instead look backward: “I succeeded; it is because I tried hard”; “I improved my health; it was caused by losing weight”; “I was accepted for the program of my choice; it was because I took charge of my life.” The former hypotheses embrace the future, teleology, and reasons; the latter relations concern the past outcomes, mechanism, and causes. Heider did not disentangle the two groupings, embracing them both within the large framework of causal thinking. I suspect this has left the field with some enduring problems and confounds, but also many possibilities and avenues for study (Weiner, 2008, p. 155).

One approach to understanding the potential differences between causal and prevention attributional beliefs, also an avenue for future study, may lie with Construal Level Theory (CLT) (e.g., Liberman, Sagistrano, & Trope, 2002; Liberman & Trope, 1998; Trope & Liberman, 2010), which, at its core, suggests that “temporal distance systematically changes the way events are represented” (Trope & Liberman, 2003, p. 407). As the theory explains, we can expect that psychological distance will differ based on spatial, temporal, social, and authenticity (i.e., real vs. hypothetical) factors; this distance, in turn, can influence how we make attributions of responsibility. For instance, events presented as hypothetical, in the future (i.e., temporally distant), spatially distant (e.g., in another country), or involving distant others are referred to as being at a *higher* construal level and will tend to elicit simplified, internal causal attributions: the propensity to see the individual as blameworthy, rather than other external factors. On the other hand, events presented as “closer” in spatial, temporal, and social terms (e.g., a “real” event, occurring nearby, in the present, involving family or friends) represent a *lower* construal level and would be more likely to elicit more complex causal attributions: seeing both internal and external factors/circumstances as causal factors. Therefore, when asked to think about distant future events, individuals tend to under-weight external factors (Trope & Liberman, 2003). CLT thus provides another lens through which to examine the potential framing of safety-related messages to park visitors. For instance, messages could be framed to prime lower construal levels (e.g., presented in the present, in the context of the park, etc.), so as to encourage visitors to think about a visitor accident as not just caused by an individual's actions, but also by various other external factors (e.g., weather, park infrastructure, etc.) (See below for further discussion on message development).

Sense of Place

This dissertation also explored how variables central to sense of place (i.e., place attachment and place meaning) related to causal and prevention attribution in the context of a national park. In addition to illuminating how place meanings in national parks may be both human- and "nature"-based, the results also suggest that one's agreement with such meanings, as well as level of attachment, may matter in making attributions of responsibility for ensuring safety.

"Blended" place meaning

As outlined in Chapter 4, results of a factor analysis (varimax rotation) suggested that five of the eight place meaning survey items loaded highly on a single factor. These items appeared to describe both "nature" and human-based place meanings, including seeing the park as a wildlife habitat, a historical place, somewhere to be preserved for future enjoyment, a community of visitors and staff, and an unpredictable landscape. Though I had expected items related to place meaning to load onto two separate factors, one representing more nature-based place meanings, and a second to represent more human-based place meanings, I instead found a single-factor solution. While contrary to my expectation, these "blended" place meanings might in fact be a more realistic reflection of how publics interpret special places: what Cantrill (1998, p. 312) referred to as a "continuum between environmentally- versus socially-salient features." Exploring SOP among residents of the Lake Superior region of Michigan, Cantrill (1998, pp. 312-313, emphasis in original) described how respondents generally agreed that natural and social meanings of the place were mutually contingent:

> To some, Munising is perceived as being situated in a *peopled* place that just happens to be found amid a variety of pleasing physical characteristics… Others view their "home" as located within a *natural* environment that includes people, some of who may share a preference for acting in the best interests of and being in the out-of-doors.

Many scholars have rejected the nature-culture dualism, preferring instead to speak of "socionatures" or "naturecultures" (e.g., Davison, 2008; White, 2006). Environmental communication scholars, too, have recognized the "hybridity" of the material and discursive, suggesting that this tension underlies much of the study encompassed by this sub-discipline (e.g., Marafiote & Plec, 2006; Milstein, 2009; Rogers, 1998). Though some have criticized communication about national parks, and wilderness more generally, for perpetuating a false separation of "nature" from humankind (e.g., Cronon, 1996; DeLuca, 2010; Ross-Bryant, 2010), survey results suggest that this dualistic interpretation was not operative for respondents. It is possible that this nature/culture "hybridity" follows NPS efforts to communicate about these issues jointly, as is evident in the text of its websites and through the comments of interviewees. Though the use of cross-sectional survey research does not allow us to draw causal conclusions—i.e., exposure to communication leads to the development of place meanings, rather than the reverse— study results nonetheless provide evidence that conceptualizing meanings as a dynamic negotiation of the material (i.e., biophysical) and the social (i.e., “peopled”) may be applicable to how user groups encounter national parks (see also Byrne, in press).

SOP and attribution theory

In regard to causal attribution, these blended place meanings, as well as place attachment, appeared to be positively related to judging internal causes of the hypothetical accident as important, as well as environmental conditions (Chapter 4). Given the dual roles of humans and the physical landscape in contributing to the meaning of parks, these attributional judgments appear logical. Similarly, as Chapter 5 illustrated, there was a negative relationship between place meaning (as well as place attachment) and support for external (i.e., NPS) responsibility for preventing visitor injury. One interpretation of these findings is that, as individuals come to understand the park in the park in this blended way, as well as believe the park to be central to their life, they also tend to view their responsibility (both in causing and preventing accidents) in ways that are more likely “sanctioned” by park personnel. As has been described above, seeing visitors as at least equally responsible—and usually more responsible—than park staff appears to be the default belief among most park personnel.

Management implications. As was true for experience in national parks (see above), a visitor’s level of attachment to and understanding of a national park also appears to matter in how he or she comes to make attributions about the cause or prevention of visitor injuries/accidents. Based on anecdotal evidence and on empirical research in the sense of place and community sociology literature (see, e.g., Moore & Graefe, 1994; Relph, 1976; Stedman, 2002; Theodori & Luloff, 2000; Tuan, 1977), first-time visitors may be *less* attached to the park as well as less in agreement with the “standard” meaning of the park. In turn, managers should anticipate that this user group might be less likely to align with more experienced visitors, as well as employees or volunteers, in terms of attributing responsibility for safety. While in some ways an expected or "obvious" finding, no other known research has linked sense of place with attribution theory. Moreover, empirical evidence that establishes probable differences in beliefs between first-time and repeat park visitors lends much needed support to park managers' decisions to target particular "types" of visitors.

Perception, Evaluation, and Communication of Risk

Results from this dissertation also make several beginning steps towards linking risk perception and attribution theory. Importantly, they suggest that the nature of the risk, the perceived context in which it is encountered, as well as the sources used to communicate about it, matter in judgments of causal and prevention attribution.

Perceived controllability of risk

As described in Chapter 4, survey measures meant to capture voluntariness and controllability of risk ended up loading on a single factor, which I chose to label "controllability of risk." While the internal reliability was acceptable (Cronbach's alpha = .67), it is possible that items pertaining to this concept should be revised in future work. Ideally, separate, reliable scales should be found to represent voluntariness and controllability of risk, and it may be necessary to pattern these more closely on those used by Slovic (1987). Nonetheless, the negative correlations found between controllability of risk and external (i.e., NPS) causal attribution, as well as between controllability of risk and attribution of responsibility for ensuring safety, support attention to the importance of controllability in influencing attributions (Weiner, 1996; see Chapters 4 and 5). Where Weiner (1996) approached controllability in a cognitive sense—e.g., one has control over the decision to study for a test, but not over one's IQ— this dissertation drew on Slovic's (1987) related notion of control as related to exposure: whether or not one perceives that he has control over his exposure to a given risk, such as inclement weather. Results indicated that using controllability in the Slovic (1987) sense produced attributions that mirror Weiner's (1996) predictions: that is, the more control an individual perceived he had over his exposure to a given risk, the less he held others (i.e., NPS) as responsible for either ensuring his safety or for causing his accident (see also above).

Perceived desirability of risk

The idea of risk as desirable (Machlis & Rosa, 1990) played a central role in both individuals' attributions of responsibility for causing and preventing injuries/accidents, and in their valuation of risk in national parks more generally. As Chapter 6 described, many interviewees viewed risk in national parks as desirable and valuable, though these perceptions also seemed contingent upon the circumstances in which risk was encountered. Interviewees spoke of experiencing park-related risks, as well as voluntary risk-taking, for instance, as a pathway to self-development, self-reliance, and citizenship, a perspective echoing that of Sax (1980). Following this pattern, survey respondents who viewed risk as desirable were less likely to support external (i.e., NPS) responsibility for preventing visitor injury/accidents (Chapter 5). Somewhat differently, survey respondents who viewed risk as desirable were also more likely to see challenging environmental conditions and bad luck as important causal factors in the hypothetical visitor accident (Chapter 4). We can speculate that individuals more willing to seek out risk in outdoor settings, such as through recreation, may be at the same time, more familiar with its potential to contribute to negative outcomes; moreover, they appear more willing to accept these misfortunes as "acts of God" rather than "user errors" predicated on their own decisions. The idea that park-related risks and risk-taking may be sought out by some while shunned by others broadly follows past research in cultural theory. For instance, ethnographic work has led researchers to conclude that, even within a single organization, acceptability of risk and risk exposure can vary by such attributes as occupational role and hierarchical status (Rayner, 1986).

Management implications. Since perceived controllability of park-related risks matters in the development of causal attributions, more attention is needed to how this variable can be represented in park communication. In order to achieve "shared" attributions of responsibility for causing and/or preventing visitor accidents, message strategies might aim to strike a balance between inspiring an "exaggerated" sense of control over one's exposure to risk in a national park (i.e., similar to an optimistic bias), and inspiring feelings of no control over one's risk exposure (i.e., similar to fatalism).

While the idea of risk as desirable emerged in both survey and interview data, and was expressed by visitors, employees, and volunteers, some caution is necessary in extending these results to management decisions. As discussed in Chapter 6, self-reflective employees and volunteers acknowledged that their personal tolerance for risk, as well as their comfort level in undeveloped settings such as wilderness areas, was likely not shared with all visitors who may enter the park gates. Therefore, the utopian promise of parks as places to take risks in order to develop self-reliance and personal responsibility—Sax's (1980) "moral education"—may not be a commonly shared vision. Is viewing a park visit as a chance to have a picnic, rather than to scale a cliff, somehow a "lesser" use of a national park? Park managers should attend to the ways in which employees and volunteers may, based on their own preferences, personal biographies, and tolerances for risk, tend to value certain park uses over others, and how this valuation may be, intentionally or not, passed on to park visitors. With growing attention to attracting traditionally under-represented, first-time visitors to parks, Sax's (1980) vision may be an inadequate—or even inappropriate—management goal. Greater discussion is warranted to explore if, and/or how, the goals of initiatives such as "Healthy Parks, Healthy People" may unintentionally conflict with pre-existing, normative beliefs among park staff, such as that mountains *should* exist "without handrails."

Exposure to/reliance on park-related communication

As Chapters 4 and 5 described, this dissertation also explored the influence of risk communication, including information reliance and exposure, on attribution of responsibility. Interestingly, the more a visitor reported relying on official information sources, the more likely he was to make internal causal attributions in the case of a hypothetical visitor accident. On the other hand, reliance on official information sources was also positively related to support for external (i.e., NPS) responsibility for ensuring visitor safety. In terms of safety information (i.e., information specifically covering potential risks in the park, such as driving conditions) the more an individual received, the more likely he was to view challenging environmental conditions as causal factors in an accident; since the survey item included specific attention to "park hazards (e.g., wildlife, drowning, earthquakes, rock slides, etc.)" and "weather conditions," this result is largely unsurprising. At the same time, receiving more safety information also made a visitor more likely to see himself as responsible for ensuring his own safety at the park.

Management implications. Because this dissertation did not include a formal investigation of the content of the information sources referenced, we can only speculate as to whether visitors' attributions tended to follow those represented in park communication (e.g., see Kahlor et al., 2002; Viswanath & Finnegan, 1996). In future research, a content analysis of the official, formal sources listed on the survey, including park signs, pamphlets, and museum exhibits, would help determine whether visitors may be forming their attributions, in part, from their exposure to certain types of park communication. For instance, do the messages that do exist emphasize personal responsibility over external (i.e., NPS) responsibility for ensuring safety? (How) might messages about the same topic, such as interactions with wildlife, differ by park unit? At the least, however, the results appear to indicate some difference in attributions depending on the source of the information, official or unofficial, which seems to support existing research in the area of health information-seeking (e.g., Doria et al., 2006; Ford & Kaphingst, 2009).

Safety Culture

This dissertation also operated under the premise that understanding how employees make causal attributions, as well as attributions of responsibility for preventing visitor accidents, may relate, in part, to how they view their own safety on the job (Chapter 6). Interviewees described how a "positive" safety culture came to be enacted in the workplace, as well as how this culture might influence visitor safety.

"Positive" safety culture

Echoing the findings of the extant literature in this area (e.g., Cooper & Phillips, 2004; Nielsen et al., 2008; Wilson-Donnelly et al., 2005), interviewees seemed to understand a "positive" safety culture as one in which a balance exists between managers' and on-the-ground workers' responsibilities to create the conditions for safe working practices. Based on interviewees' comments, these cultures were formed (and re-formed) through communication practices, both formal (e.g., trainings) and informal (e.g., conversations among employees). While concluding that NPS employees are no different than the factory workers, oil rig workers, and utility workers investigated in the safety culture literature is appealing, doing so would overlook the complexity of park employees' occupational setting. Qualities unique to park employees (e.g., the high rate of turnover, their propensity for risk-taking), park jobs (e.g., the need to be proficient in multiple skills and trades), and park managers (e.g., variable attention to safety as a management goal) create apparent challenges to achieving the kind of positive safety culture of which interviewees spoke.

Multiple safety cultures

Results from the interviews also provided insight into the fact that parks, by virtue of their amalgam of employees and visitors, seem to support not one, but many safety cultures. As interviewees pointed out, a “visitor safety culture”—to the extent that one can or should exist—is, by definition and necessity, different than an “employee safety culture.” In explaining the relationship between these cultures, interviewees described a hypothesized “trickle down effect,” whereby the attention to safety among employees leads to improvements in visitor safety. As employees described, part of the trickling down of safety culture may be via the modeling of various “safe” or “unsafe” actions, similar to what Rickard (2011) described as commonplace instances in which an occupational workers’ nonverbal communication—the construction worker without a helmet, the exterminator without a mask, for instance—functions as risk communication to onlookers. Such modeling can be normative, and can validate *or* invalidate the official safety rules that employees uphold and visitors are asked to follow; as DEWA interviewees mentioned, a law enforcement ranger without a life vest can hardly demand that a visitor to wear one and expect to maintain his authority and credibility.

The extent to which multiple safety cultures may exist in a single location, by virtue of job title or responsibility level, has received considerable attention in the safety science literature (e.g., Findley, Smith, Gorski, & O’Neill, 2007; Harvey, Bolam, & Gregory, 1999; Mearns, Flin, Gordon, & Fleming, 1998; McDonald, Corrigan, Daly, & Cromie, 2000; Pidgeon, 1998). Such research refers to organizational “subcultures,” wherein “desirable” attention to safety may be more or less pronounced. In a survey of both managers and lower level employees at two nuclear power plants, each operated by the same company, Harvey et al. (1999) found differences in expressions of safety culture not only between managers and all employees, but also between employees at the two plants. Arguing that safety culture cannot "be viewed as a single entity" (Harvey et al., 1999, p. 11), the authors concluded that:

> …Most, if not all, organizations have at least two safety cultures. It is inherent in organizational hierarchies that those at the top determine policy and those lower down implement it; there are also differences in the way employees see things when they are based in different functional areas (Harvey et al., 1999, p. 12).

Less clear from existing research, however, are the ways in which such cultures might interact with or mutually reinforce one another. Moreover, if multiple safety cultures can exist among an organization's employees and managers, how might such cultures impact the attitudes, perceptions, and behaviors of its paying clientele? Given, as this dissertation has shown, a diverse visitor base—some seeking risk, some avoiding it, some new visitors, some returning year after year, etc.—is the development of a shared "visitor safety culture" even possible? Clearly, more research is needed to examine the extent to which attention to safety among an organization may influence the safety of its clientele, as well as to identify the mechanisms by which such influence may occur.

Management implication. Interview findings suggest the need for more attention to how employees and volunteers in particular park divisions and/or administrative levels of a given park understand their responsibility to prevent both visitor *and* employee injuries/accidents. Differences of opinion as to whether a park, or the entire NPS, places more emphasis on visitor or employee safety—as well as the amount of emphasis these institutions *should* place on either— were apparent in the interviews, and, in some cases, hinted at feelings of frustration or even contempt towards management. Moreover, interviewees' widespread belief that efforts to improve employee safety directly influence visitor safety may be likewise problematic: could the assumption that engaging in employee safety efforts leads to improved visitor safety compromise necessary attention to efforts targeted more directly to visitors? These and other questions will require further inquiry, as well as deliberate consideration.

Summary

The expansive list of findings and recommendations just discussed (also presented in Table 7.1), while instructive, run the risk of distracting the reader from the larger conclusions of this dissertation. In thinking about responsibility for public safety in places like national parks and the role of communication, what does this dissertation research contribute to the scholarly literature and the wider public policy conversation? I see the broader conclusions and contributions of this research as running along two axes, the theoretical and the pragmatic. From a pragmatic perspective, this dissertation has provided a snapshot of how one institution, the National Park Service, manages risk for a diverse set of employees and audience of public users. By integrating research in risk perception, tourism/leisure studies, and environmental psychology to existing work in attribution theory, this dissertation provides new evidence of how previously unconsidered variables tend to predict differences in how individuals attribute the causes of, and responsibility for preventing, unintentional injury. Some of these variables, such as the extent to which one views park-related risks as controllable, tend to predict expected, rather than groundbreaking, results; those who perceive risks as controllable are more likely to hold the victim responsible for her unfortunate fate, a finding aligning with traditional social psychological attribution research. Yet, for a government agency like the NPS, such results are instructive in that they reinforce the adage (among communication scholars) that public communication should not be envisioned as "one size fits all," especially in locations where encountering risk may be a goal of the visitor experience. As will be discussed below, understanding how individuals attribute responsibility for safety can be used by an agency like the NPS as a platform for designing messages about safety, as well as for influencing prescribed and proscribed visitor behavior.

From a theoretical perspective, a larger stated goal of this research was to link two different ontological and epistemological approaches to considering attribution of responsibility. How successful was the pairing of the concepts of causal and prevention attribution in this dissertation? Like most scholarly work, the present study seemed to raise just as many questions as it answered. Moving forward, CLT may be a viable approach to differentiating and explaining differences in how individuals attribute responsibility for causing versus preventing accidents, using the temporal context of an already past or to-be-determined future event. Yet, with its roots deeply in psychological theory, does CLT provide ample (or any) attention to the societal-level factors that scholars such as anthropologist Mary Douglas view as critical to understanding the interplay between risk and responsibility? More concretely, does the operationalization of "prevention attribution" via standardized survey questions, such as were used in this dissertation, maintain loyalty to its original conceptualization by Douglas and others? While this dissertation drew inspiration from two relatively disparate literatures, it stops short of integrating the concepts of both literatures into a single predictive model; this project—neither a small nor uncontroversial task—remains a future goal.

Future Research

After presenting several alternative methodological strategies to conducting future research in this realm, such as using a "mixed mode" survey or visitor focus groups, I explore two main directions for future research: one based on messages and messaging strategies and a second based on more sociocultural approaches to risk and risk management.

Survey methodology

Future research with park visitor and employee audiences might be improved by an attention to alternative methodologies. First, as suggested in Chapter 3, researchers have noted that the response rate of online surveys may be improved by offering respondents both a mail (i.e., paper) *and* an Internet option. More recently, researchers have argued that this so-called "mixed mode" approach—for instance, using a sampling frame of mailing addresses and providing *all* respondents with a printed pre-survey invitation listing a website as an optional method of completing the survey—allows for the greatest possible sample validity (e.g., see Dillman, Reips, & Matzat, 2010; Graefe et al., 2011; Lesser et al., 2011; Sexton et al., 2011; Smyth et al., 2010). While employees can be reached via mail at a park headquarters address, identifying a sampling frame for park visitors would not be as straightforward. A potential option, and one that has been practiced by the NPS in past social science research, is to sample the general public more broadly, thus capturing both park visitors *and* non-visitors, which simultaneously provides the option of comparing these groups (see Taylor et al., 2011). Second, future research might also benefit from employing methods beyond interviews and surveys, such as group interviews or focus groups. Given that most visitors come to parks in groups of family and friends, speaking with these individuals together, rather than separately, might better capture the social dynamics at play, such as how decisions about group-based behavior (e.g., where to hike or camp, how to locate needed information) might be made. In order to address potential issues of recall, a researcher might approach visitor groups while they are at the park, such as directly after an interpretive program at a visitor center or a campground. Alternatively, researchers might use a random sampling strategy, such as selecting the first 30 cars through the entrance gate at a randomly selected day and time, and then inviting these groups (or a representative of the group) to participate in a group interview or focus group at some time during their park visit; incentives, such as a free meal, payment, or a gift certificate might increase participation rate.

Future research involving park visitors and employees/volunteers should also account for seasonal variation in these audiences. Due to time and resource limitations, the current study sampled MORA and OLYM respondents during the winter/early spring, and DEWA respondents during the summer months. Anecdotal evidence based on conversations with park personnel, as well as my own first-hand experience, leads me to expect that visitor populations at the Washington parks likely differ substantially by season; for instance, the summer months tend to draw more visitors from out-of-state (or country) who visit MORA or OLYM as part of a multi-day vacation "destination" rather than (as may be true for more local, repeat visitors), a weekend excursion. Moreover, the proportion of non-permanent staff increases during the summer, creating a distinct population of employees who may have worked in several parks over the years or, alternatively, may be just beginning their careers with the NPS. Sampling strategies should better reflect these potential differences.

Accident scenario

In future studies, one might also pay closer attention to the design of the accident scenario (or scenarios). While they were not intended to be controlled experimental manipulations, it is possible that certain elements of each of the scenarios influenced survey respondents in unintended ways. As discussed above, and evidenced by many of the free response answers, individuals tended to assume that the solo hiker described in the "Hellroaring Creek" scenario had purposefully ventured off-trail, even though the scenario did not explicitly state this. In the future, pre-testing scenarios with a group of park employees and visitors (rather than just undergraduate students) may identify potential interpretive issues such as these. Meant to mimic a press release, and modeled after actual incidents in national parks, the length, complexity, and purposive “ambiguity” of the scenarios distinguished them from previous examples used in other experimental studies based on defensive attribution (e.g., Walster, 1966). While the face validity of these scenarios appeared to be high—comments from visitor, volunteer, and employee respondents suggested that they found the accidents to be highly plausible in a park setting—it is possible that a shorter, simpler form might be employed in future research in order to better separate and measure individual variables.

Future studies

In each of the sections of this chapter, I have discussed several avenues for pursuing questions raised by this dissertation. In a broad sense, these can be parsed into two main areas: (1) on the message level; and (2) on the sociocultural level. While the former category is perhaps more well suited to quantitative methods and influenced by a social psychological approach to research, the latter will likely rely on qualitative methods and a more sociological approach to risk and risk management (see Figure 7.2.). For the sake of continuity, the examples presented below suggest research in the context of national parks; however, it is important to note that such research is meant to be theoretically grounded, and thus able to span a larger substantive realm.

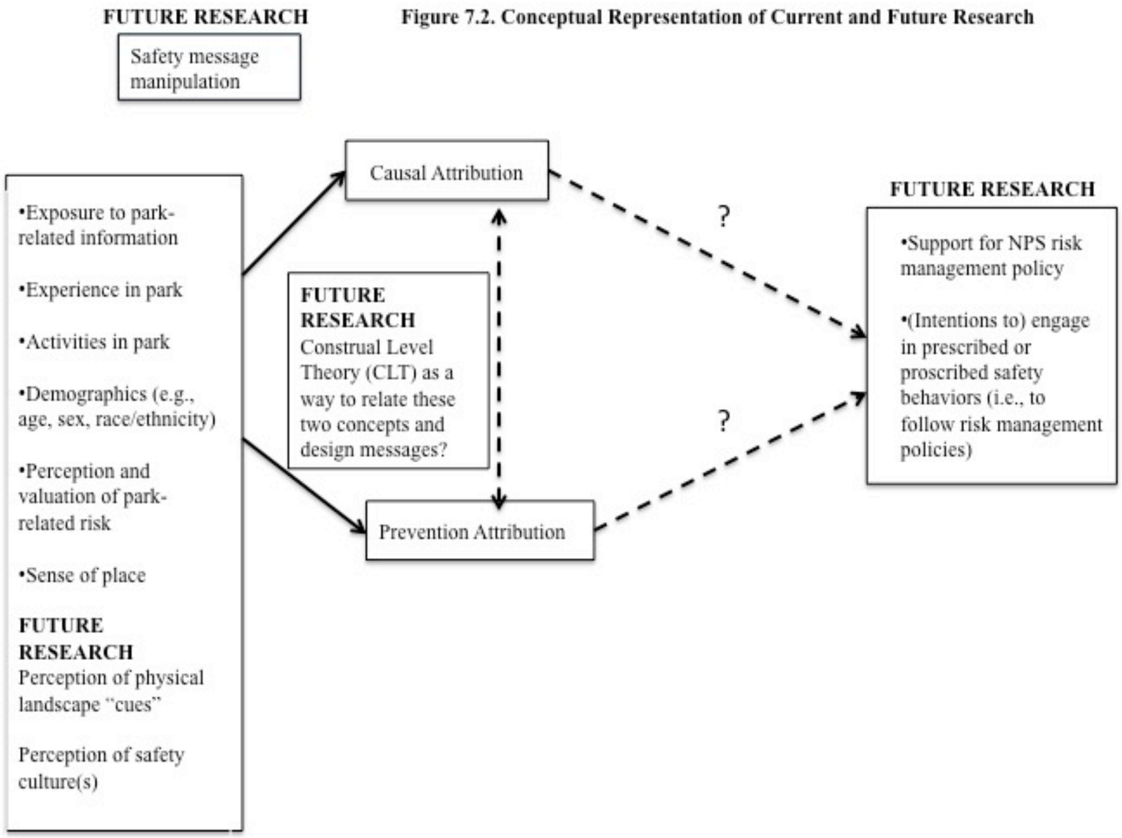


Figure 7.2. Conceptual Representation of Current and Future Research

Message-level research. In terms of message-level research, two potential areas deserve mention. First, future research could investigate existing official and unofficial park risk- and safety-related communication, including pamphlets, signs, websites, radio announcements, and movies at a park unit or group of park units. Using a content analysis methodology, one could investigate how the NPS, as well as other information sources, currently represent responsibility for ensuring visitor safety. Critical-cultural communication studies investigating the "individualization" of certain health afflictions in public health campaigns (e.g., Becker, 1993; Brownell, 1991; Wang, 1992) might be utilized as examples, and to develop a coding scheme (see also Kirkwood & Brown, 1995). Results would help establish a baseline for the kinds of messages that visitors might currently receive from the NPS and other partnering agencies, and help us better understand the contribution of information to the development of attributions of responsibility.

A second research goal, based on the results of this study, would be to explore the appropriateness of various risk- and safety- message content and design (e.g., relevant “frames” used) in national park settings and in other contexts in which encountered risks may be novel or unfamiliar to certain individuals or groups of individuals. Knowing how audiences such as park visitors attribute responsibility for causing and preventing park accidents can inform future studies that aim to influence public support for various risk management strategies in national parks and other public recreational contexts, such as city and state parks (e.g., Iyengar, 1989; Weiner, 2006). In such places, messages might be constructed such that visitors are more likely to think about responsibility for their own safety in institutionally supported ways—i.e., in the case of the NPS, to envision responsibility for preventing injuries/accidents as “shared” between visitors and park employees. Within the context of public health, Niederdeppe, Bu, Borah, Kindig, and Robert (2008) have proposed a research framework for using various message strategies, including framing, narrative, and visual images, to influence perceptions of obesity as a condition caused not just by personal decisions (e.g., caloric intake, inadequate exercise), but also by social determinants (e.g., affordability of healthy food, access to places to exercise).

Extrapolating to the context of visitor safety, we can envision developing messages to be displayed in parks that emphasize both the complexity of causal factors that potentially contribute to visitor accidents (e.g., decisions/characteristics of the visitor, as well as conditions of the park and actions of park managers), as well as the collective or “shared” nature of the responsibility to prevent such instances. Given that interviewees tended to see the NPS’ responsibility to ensure visitor safety as temporal, distributive, and spatial, messages can manipulate these variables accordingly. Using the research agenda described by Niederdeppe et al. (2008) as a starting point, as well as the literature on Construal Level Theory and "attribution re-training," Table 7.2 provides an overview of research questions related to potential messaging strategies, and Figure 7.3 lists example messages to be used in park settings; clearly, future empirical research is necessary to determine their scope and effectiveness.

Table 7.2. Sample Research Questions by Message Design Strategy[1]

Message Strategy	Research Question
Framing	1. Do messages that emphasize aspects of both internal and external (i.e., NPS) responsibility result in "shared" attributions of responsibility for causing/preventing visitor accidents? In what context(s) would such messages be effective and/or appropriate? 2. Do messages that frame visitor safety in terms of past events (e.g., "ten visitors died last year at the park") result in greater "shared" attributions of responsibility than those that are framed in terms of present or future events (e.g., "this year, 10 visitors will die in the park")? In what context(s) would such messages be effective and/or appropriate? 3. Do messages that employ "thematic frames" lead to more "shared" attributions of responsibility for causing/preventing visitor accidents than messages that employ "episodic frames" (Iyengar, 1991)? 4. Do physical cues in the park environment (e.g., buildings, roads, handrails, etc.) influence the effectiveness of messages that emphasize aspects of individual and/or external responsibility? 5. Can message campaigns (and/or other interventions) that target employees/volunteers and visitors "re-align" each group's causal/prevention attributions to be more similar to one another?
Narrative	6. Can messages that use narratives about the contributions of external causes to visitor safety (e.g., the role of the NPS in providing safety infrastructure, the role of environmental conditions, etc.) offset the finding that both visitors and employees tend to attribute the cause of visitor accidents solely to characteristics/actions of the visitor him/herself (i.e., "victim blaming")? 7. Can messages that use narratives about visitor safety convey the complexity of causes (e.g., individual decisions, built environment, biophysical environment, etc.) that contribute to visitor accidents, or are multiple narratives necessary to emphasize the contribution of each of these potential causes?
Visual Images	8. What type of visual images might be most effective in conveying a "shared" responsibility for visitor safety? What type of visual images might limit "victim blaming"? 9. What type of visual images might convey the (non)controllability of park-related risk? How might such images affect attributions of responsibility for causing/preventing park accidents?

Note. [1]Table format, message strategy categories, and some of the research questions based broadly on Niederdeppe et al. (2008)

Figure 7.3. Sample Safety Messages[1]

Message 1: Past event framing
The employees and volunteers of Zion National Park are committed to maintaining the Angel's Landing Trail for your safety and enjoyment; however, loose sand or pebbles on stone are very slippery. **Last year**, five visitors **died** after falling on this trail.
We ask that you:
- Wear shoes with sturdy soles
- Stay on the trail
- Stay back from cliff edges
- Pay attention to posted warnings
- Keep children in your sight

Message 2: Present/future event framing
The employees and volunteers of Zion National Park are committed to maintaining the Angel's Landing Trail for your safety and enjoyment; however, loose sand or pebbles on stone are very slippery. **This year**, five visitors **will die** after falling on this trail.

We ask that you:
- Wear shoes with sturdy soles
- Stay on the trail
- Stay back from cliff edges
- Pay attention to posted warnings
- Keep children in your sight

Note. [1]Messages adapted from the Zion National Park website; see http://www.nps.gov/zion/planyourvisit/your-safety.htm

Cultural research. Future research that I have deemed sociocultural would attend more directly to the concepts of safety culture and liminality (Van Gennep, 1960) with respect to unique organizational and geographical contexts like national parks. As discussed in this chapter, the idea that national parks may be experienced as liminal places "betwixt and between" the developed and the undeveloped deserves further scrutiny. Do material "cues" (e.g., restrooms, sidewalks) imply certain understandings about the attribution of responsibility for safety in a given area of a park? How might official communication in these areas support (or challenge) these notions? Understanding the ways in which attributions of responsibility might vary within a geographical landscape would likely pose logistical challenges; however, one could envision presenting visitors with journals or interactive mobile devices upon entering the park and asking them to respond to various prompts about their experience as they visited several locations or landmarks. Alternatively, or in addition, researchers might approach visitors recently returned from park visits, and ask them (via in-depth interview or a journaling activity) to reflect on their recent trip; using the context of the day-to-day might provide a useful comparison: for instance, who (or what) is responsible for your safety in your workplace, vs. when you were in the national park?

A second research focus would further investigate the potential interplay of safety "cultures" within a client-oriented organization. (How) does the safety culture—or cultures—of an organization affect its clientele? Can a safety culture take hold among transient clientele: a population where only a portion of the individuals may be "regulars": those accustomed (and/or "attached") to the place? What is the role of communication in this negotiation of worker, manager, and "customer" safety culture? These and other questions present interesting opportunities to merge theoretical and empirical findings from the management, communication, and safety science disciplines.

Concluding Thoughts

> Stories about accidents are vehicles for reaching a consensus about proper responsibilities and the apportioning of blame (Green, 1997a, p. 186).

From the fatally wounded ranger, to the escaped shooter, to the four lost hikers, the prevalence of "accidents" in national parks encourage us to consider larger questions of risk and responsibility in federal protected areas. That serious injuries and fatalities occur (and continue to occur) may be reason enough, from a public health perspective, to direct increased attention and resources to promoting visitor safety in national parks; however, as a communication scholar, I find justification as well in the fact that such injuries and deaths are often sensationalized, leading to amplification of risk perceptions and (from some park managers' perspective) unwanted media and public scrutiny. In considering the future of U.S. parks and open spaces, determining how diverse audiences of visitors and managers envision their responsibilities for causing and preventing accidents will be critical. As this dissertation has shown, such attributions of responsibility are associated with normative judgments about how we value, manage, and communicate about such special places—judgments that cannot be taken lightly.

APPENDIX A

ANALYSIS OF VISITOR INJURIES AT MOUNT RAINIER NATIONAL PARK, 2001-2010 (ABRIDGED VERSION)

Laura N. Rickard
Mount Rainier National Park SCA Public Risk Management Intern, Spring 2011
May 2011

Introduction & Methods

Overview

As part of their ongoing effort to address visitor safety, the Mount Rainier National Park (MORA) management team sought to learn more about the nature of visitor injuries in the last ten years at the park. By compiling and analyzing these data, they hoped to better design and implement the park's emergency services programs, as well as to determine how to allocate park resources to enhance prevention efforts in the park. Allowing a Student Conservation Association (SCA) Public Safety Intern—a "third party" unaffiliated with park management—to review the data might also help provide feedback on the park's injury reporting system to date. To guide the project, Chief Ranger Chuck Young provided the following list of questions to be answered:

- What are the most common injuries park visitors are experiencing?
- What have been the most prevalent causes of these injuries?
- Where in the park have the injuries been occurring?
- What recreational activities were the injured visitors participating in when they got hurt?
- Are there any trends that can be teased out of these data?

Data sources

I collected MORA visitor injury data from 2001-2010 from several sources:

1. EMS Run Reports: The most prevalent source of visitor injury data at the park, EMS run reports are completed by NPS medical caregivers (i.e., first responders, EMTs) after an incident and then filed each year. These reports vary in the degree of detail, but usually include:

- Patient sex, age, and address (e.g., city, state, country)
- Location of the incident (or where the patient received treatment)
- Events leading up to the injury
- Description of the injury (and probable diagnosis)
- Description of treatment and next steps (e.g., ambulance transfer to a local hospital)

These reports were hand-written, but some included attached, typed pages to further clarify the incident and its management. While most EMS reports were filed together by year, in some cases these reports were kept in other places, such as with motor vehicle accident files (if the injury resulted from the MVA). Importantly, while many of these reports contained suspected diagnoses (e.g., sprained ankle, stroke, etc.), in most cases they were not confirmed by other responding medical personnel, such as the emergency room nurses, physicians, and other personnel who may have cared for the patient after his/her treatment by NPS employees. In addition, cases of fatal injuries are limited to those in which the park visitor died within the boundaries of MORA; for example, if a patient in cardiac arrest died in an ambulance or helicopter while en route to a hospital in Seattle, this incident would *not* be recorded as a park fatality. (Also, for most cases, the park does not have this information). Given these limitations, the fatal and non-fatal injury data should be viewed as best estimates.

2. Search and Rescue (SAR) Reports: More complex incidents, such as those involving a technical rescue or an extended search for a lost party, are assigned a name and case incident number and are filed each year. These reports usually involve a more extensive narrative outlining the circumstances of the incident, and some were accompanied by EMS run reports. In addition, a SAR report might include:

- Media coverage of the incident
- Maps of search areas in the parks or templates of "missing person" posters
- Maps or photographs of the incident scene
- Notes on interviews with the injured party's friends/relatives
- (In the case of a fatality) A coroner's report

3. Case Incident Log: Each year, all incidents that take place in the park, whether law enforcement stops, personnel training, medical responses, or other events, are assigned a unique case incident number and filed in the log. Therefore, any report of a visitor injury should have been recorded, and the log functioned as a guide for me to locate EMS and SAR reports. In some cases, especially in the earlier years investigated (e.g., 2001-2003), some references to injuries listed in the Case Incident Log could not be located in report form. The absence of these reports can be attributed to several possibilities, such as:

- A NPS employee requested a case incident number for a reported visitor injury, only to find that the situation was already resolved.
- The NPS employee responding to the incident failed to file a report.
- The NPS employee responding to the incident could not locate the injured party (a "false alarm"), and thus did not offer medical care.

When no report existed, it was impossible to determine which of these possibilities had occurred, and also whether the injury had affected a park visitor, NPS employee, or park concession employee. For the purposes of inclusion, all entries listed in the Case Incident Log between 2001 and 2010 that made reference to a medical incident/emergency went into the dataset.

Data input

After locating each year's EMS run sheets and SAR reports, I then transferred relevant information to an Excel spreadsheet. This spreadsheet, designed by epidemiologists Dr. Sara Newman and Jennifer Cheng at the NPS Division of Risk Management, included the following fields of information:

- **Case incident number**
- **Date** of incident (day, month, year)
- **Time** of day the incident occurred, using a 24-hr clock
- **Age and date of birth** of patient
- **Sex** of patient
- **Residence** (city, state, country) of patient
- **Recreational activity** that the patient was participating in
- **Cause of injury**, including *all* causes if multiple factors existed (e.g., exposure to cold, avalanche, fall, etc.)
- **A narrative description of the incident**, paraphrased from the report(s)
- **Location of the incident**, both general (e.g., "Paradise frontcountry") and more specific (e.g., Jackson Visitor Center)
- **Traumatic injury** (e.g., sprain, fracture) and body area(s) (e.g., torso, lower extremities)
- **Medical injury** (e.g., cardiac condition, hypothermia)
- **Environment type** (e.g., glacier, trail)
- **Outcome** (i.e., fatal or non-fatal injury)

- **Suicide** (yes/no)

Data analysis

After compiling the above data in Excel, I then imported the data into PASW Statistics (version 18.0) for further analysis. I used this software to calculate descriptive statistics (e.g., frequencies, means, etc.), to run Pearson Chi-Square and T-tests, and to create graphs and charts. (I also used Excel to create graphs). Chief Ranger Chuck Young, Sara Newman and Jennifer Cheng assisted throughout the process of analyzing and presenting these data.

Results

Q1. What was the prevalence of visitor injuries, fatal and non-fatal, at MORA between 2001 and 2010?

Table 1: Number of Visitor Injuries, Fatal and Non-Fatal, 2001-2010

	Number of Visitor Injuries		
Year	**Non-fatal**	**Fatal**	**Total**
2001	90	5	95
2002	104	9	113
2003	115	2	117
2004	87	9	96
2005	103	5	108
2006	98	0	98
2007	47	5	52
2008	81	3	84
2009	139	2	141
2010	135	5	140

Between 2001 and 2010, the prevalence of <u>fatal</u> visitor injuries ranged between a low of zero people fatally injured per million recreational visitors in 2006 to a high of 7.39 people fatally injured per million recreational visitors in 2004 (see Tables 1 and 2). As seen in Figure 1, despite some variation, the prevalence of fatal visitor injury remained quite stable between 2001-2010. The prevalence of non-fatal visitor injuries, however, appeared to vary more, ranging from a low of 44.86 people non-fatally injured in 2007, to a high of 120.7 people non-fatally injured in 2009 (see Table 2). It is important to note that the this calculation lends equal weight to non-fatal injuries, regardless of their relative “severity”; in other words, a non-fatal injury entailing

Table 2: Visitor Non-fatal and Fatal Injury Prevalence, 2001-2010

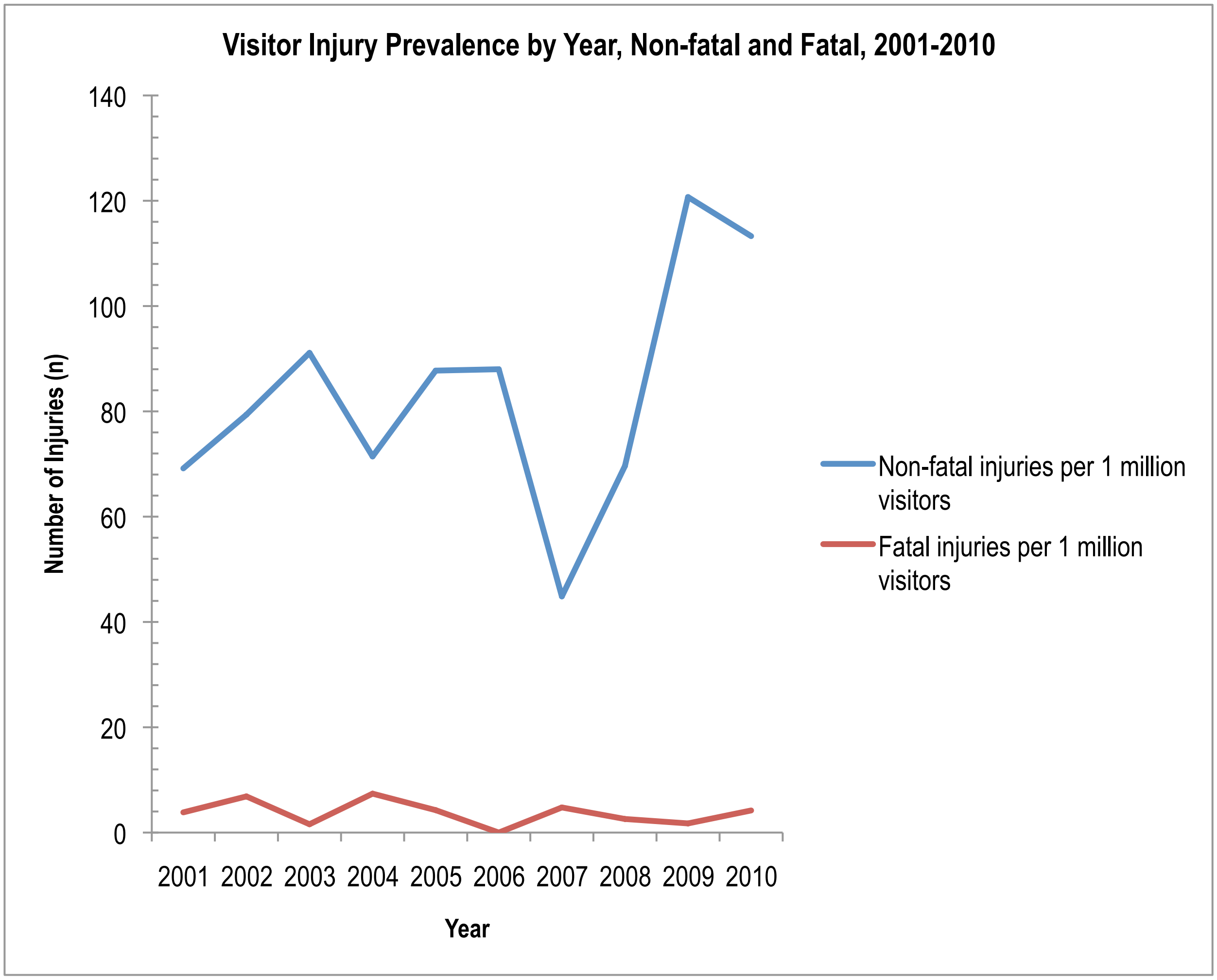
		Injuries per million visitors	
Year	**Recreational Visitors**	**Non-fatal**	**Fatal**
2001	1, 301, 103	69.17	3.84
2002	1, 310, 390	79.37	6.87
2003	1, 262, 351	91.10	1.58
2004	1, 217, 750	71.44	7.39
2005	1, 173, 897	87.74	4.26
2006	1, 113, 601	88.00	0
2007	1, 047, 685	44.86	4.77
2008	1, 163, 227	69.63	2.58
2009	1, 151, 654	120.70	1.74
2010	1, 191, 754	113.28	4.20

multiple trauma and a hospital stay was classified the same as a minor sprained ankle. Also, the relatively low number of reported non-fatal injuries in 2007 may be attributed to the fact that several popular areas of park were closed to the public for several months of the early part of the year due to significant flooding damage.

Between 2007 and 2009, while the number of recreational visitors appeared to be relatively stable, the injury prevalence increased; however, we can't necessarily conclude that the burden of injury has increased in the park for a number of reasons. First, we may have limitations in the "numerator" of our injury data over the past ten years. That is, we cannot rule out the possibility that an increasing prevalence of non-fatal injuries may be a result of better *reporting* on the park of MORA personnel. If this were true, 2008 and 2009 might be more accurate representations of the *actual* non-fatal injury rate at the park, whereas earlier years might underestimate this number.

Second, we lack data on the number of visitors participating yearly in some of the more popular recreational activities at the park, such as day hiking; without this information, we lack an "accurate denominator" that would allow for more valid analysis across the years. Perhaps, for instance, twice as many park visitors took day hikes to Camp Muir in 2008, as compared to 2009. At present, our prevalence calculations only capture visitation in general, as opposed to visitation by recreational activity type or location in the park. (Since visitation was measured the same way over the ten-year period, we can, however, still compare across years). In addition, we cannot know for sure whether an increasing prevalence of non-fatal injuries may be related to efforts to attract new visitors to the park. That is, have visitors unfamiliar with the park increased in recent years? Are these individuals more likely to be injured? Unfortunately, while our data included some limited demographic information, such as the home address of the patient, we lack information such as the individual's familiarity with the park and/or with the activity s/he was participating in at the time of the injury. Despite these limitations to the numerator and denominator of our data, the prevalence numbers reported still provide valuable information about the burden of visitor injury at the park.

Figure 1



Q2. What are the most common injuries park visitors are experiencing?

Traumatic injury

Based on how the park EMS run sheets report data, as well as the classification established by NEMSIS and in the sports and recreation literature, injuries were defined as either traumatic or medical. Traumatic injuries were physical conditions resulting from interaction with something outside of a person's body, such as a hand crushed by a sled, or an ankle rolled after an individual slips on a log. As shown in Table 3, the five most common non-fatal traumatic visitor injuries were (1) superficial/contusions, (2) fractures, (3) sprains/strains, (4) open wounds, and (5) dislocations (see also Table 4). Table 3 also provides example narratives taken from EMS run sheets in the data to illustrate each of the common traumatic visitor injuries. The most common traumatic injuries associated with visitor fatalities included (1) open wounds, (2) fractures, and (3) injuries to internal organs (see Table 5 and Figure 2). Of both non-fatal and fatal visitor injuries, a significant percentage was classified as "unspecified" (22.5% and 36.4%, respectively)—that is, the traumatic injury was not described in an EMS or SAR report. In these cases, information about the nature of the injury was unavailable, either due to an omission of the reporting, or because, in some cases, the reporting party did not have the information.

Table 3: Top Five Non-fatal Traumatic Visitor Injuries, 2001-2010

Traumatic Injury	Definition	Example Narrative
1. Superficial/contusions	Injuries involving relatively minor soft tissue damage (e.g., surface abrasions) or bruises.	*Patient was involved in a rollover MVA; sustained minor abrasions and lacerations to left knee and hands.*
2. Fracture	Any broken bone throughout the body.	*Patient fell while stepping off the footbridge; complained of swelling in both ankles. Possible fracture of both ankles.*
3. Sprains/strains	Injuries involving ligament sprains or muscle strains.	*Patient fell while hiking, rolling her right ankle. Complained of pain in right ankle, minor swelling, and deformity.*
4. Open wound	Injuries involving more significant soft tissue damage (e.g., large laceration, near amputation).	*Patient was practicing a self-arrest when she fell on the adze of her ice axe, cutting her hand. She sustained a deep laceration with possible ligament damage to hand (between left thumb and forefinger).*
5. Dislocation	Injuries occurring when bones in a joint become displaced or misaligned.	*Patient slid on trail, causing her knee to "bend the wrong way." Possible dislocation.*

Figure 2

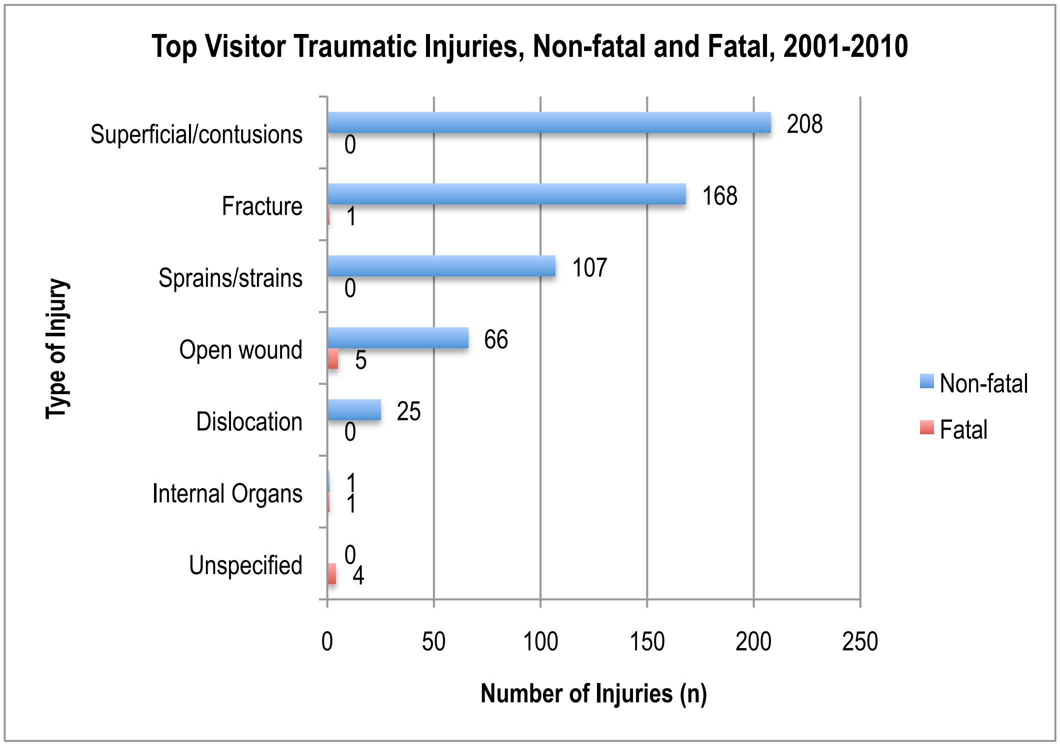


Table 4: Traumatic Non-fatal Visitor Injuries, 2001-2010

	Responses	
	N	Percent
Superficial/contusions	208	27.4%
Fracture	168	22.1%
Sprains/strains	107	14.1%
Open wound	66	8.7%
Dislocation	25	3.3%
Burns	8	1.1%
Crushing	2	.3%
Blood vessels*	2	.3%
Amputations	1	.1%
Internal Organs	1	.1%
Unspecified	171	22.5%
Total	759	100.0%

*Injuries associated with blood vessels, such as bloody noses.

Table 5: Trauma Associated with Fatal Visitor Injuries, 2001-2010

	Responses	
	N	Percent
Open wound	5	45.5%
Fracture	1	9.1%
Internal Organs	1	9.1%
Unspecified	4	36.4%
Total	11	100.0%

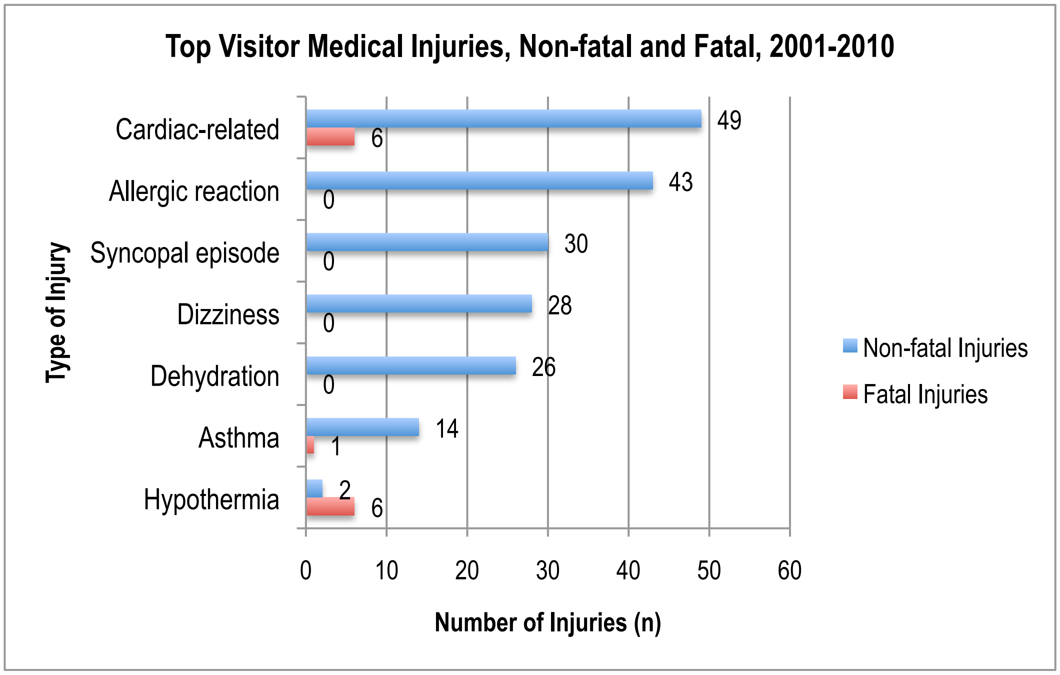
Medical injury

Based on the criteria explained above, medical injuries were classified as those that develop within the body, such as chest pains from a heart attack or dehydration from a depletion of the body's fluids. As shown in Table 6, the five most common non-fatal medical visitor injuries were cardiac-related, allergic reactions, syncopal episodes, dizziness, and dehydration (see also Table 7). The most common medical injuries associated with visitor fatalities included cardiac-related, hypothermia, and asthma (see Table 8 and Figure 2). When information about the medical injury was limited or unavailable, injuries were classified as "unspecified." These cases made up only a small proportion of all reported medical injuries, non-fatal and fatal (4.2% and 0%, respectively). When viewing this list of injuries, it is important to recognize that many of could be related to one another, and/or symptomatic of a more significant medical injury. For instance, syncopal episodes and dizziness could be related to the onset of AMS or dehydration. Unfortunately, I lacked detailed information on many of the cases, as well as a "definitive" diagnosis of the injury.

Table 6: Top Five Non-fatal Medical Visitor Injuries, 2001-2010

Common Medical Injury	Definition	Example Narrative
1. Cardiac-related	Injuries related to heart/circulatory system, e.g., chest pains, heart palpitations, etc.	*Patient was hiking when she started feeling dizzy, short of breath, and experienced a rapid pulse. She also complained of "crushing" substernal chest pain.*
2. Allergic reaction	Injuries related to hypersensitivity to allergens, such as insects, environmental pollutants, or animals.	*Patient was hiking when her eyes began to swell and she had difficulty breathing. She appeared to be having an anaphylactic reaction to a bee sting.*
3. Syncopal episode	Sudden loss of consciousness, general caused by insufficient oxygen to the brain (i.e., fainting).	*Patient passed out while standing in line at the snack bar. Had been hiking and had not eaten much during the day. Reaction may have been due to over-exertion from hiking and lack of food/water, plus elevation.*
4. Dizziness	Impaired spatial perception/stability, sometimes occurring prior to a syncopal episode.	*Patient woke up and "the room was spinning." Had a history of dizzy spells. Patient vomited.*
5. Dehydration	Insufficient fluids, resulting in a variety of symptoms (e.g., thirst, reduced urine output, rapid heart rate, disorientation, etc.)	*Patient had been hiking since earlier in the day and had not had anything to eat or drink. He stated that he had a tendency to have low blood sugar. Complained of weakness.*

Figure 3



Top Visitor Medical Injuries, Non-fatal and Fatal, 2001-2010
Type of Injury
Cardiac-related
Allergic reaction
Syncopal episode
Dizziness
Dehydration
Asthma
Hypothermia
49
6
43
0
30
0
28
0
26
0
14
1
2
6
0
10
20
30
40
50
60
Number of Injuries (n)
Non-fatal Injuries
Fatal Injuries

Table 7: Medical Non-fatal Visitor Injuries, 2001-2010

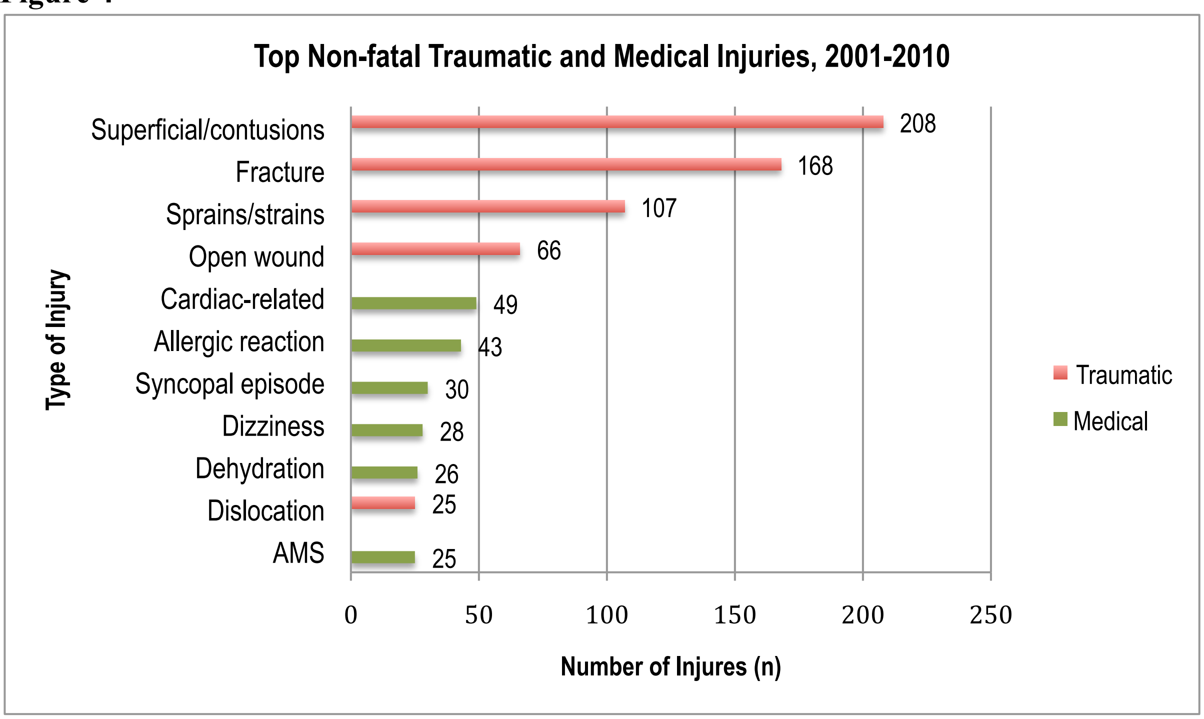
	Responses	
	N	Percent
Cardiac-related	49	14.5%
Allergic reaction	43	12.8%
Syncopal episode	30	8.9%
Dizziness	28	8.3%
Dehydration	26	7.7%
AMS	25	7.4%
Gastrointestinal problem	22	6.5%
Asthma	14	4.2%
Hypothermia	11	3.3%
Seizure	11	3.3%
Abdominal pain	9	2.7%
Diabetic	8	2.4%
HAPE/HACE	6	1.8%
Eye Injury	5	1.5%
Stroke	5	1.5%
Swelling	4	1.2%
Excessive alcohol/drugs	3	.9%
Exhaustion	3	.9%
Migraine	3	.9%
Nonspecific fever	3	.9%
Emotional/psychological	2	.6%
Frostbite	2	.6%
Hyperthermia	2	.6%
Near-drowning or immersion	2	.6%
Pneumonia	2	.6%
Airway obstruction	1	.3%
Diverticulitis	1	.3%
Nausea	1	.3%
Sinus headache	1	.3%
Skin infection	1	.3%
Unspecified	14	4.2%
Total	337	100.0%

Table 8: Medical Injuries Associated with Fatal Visitor Injuries, 2001-2010

	Responses	
	N	Percent
Cardiac-related	6	46.2%
Hypothermia	6	46.2%
Asthma	1	7.7%
Total	13	100.0%

I next considered the top non-fatal traumatic and medical injuries together. Figure 4 provides a visual depiction of the top 11 non-fatal traumatic and medical injuries, considered jointly, as experienced by MORA visitors between 2001 and 2010. While traumatic and medical injuries were about evenly divided in the list, traumatic injuries clearly dominated in *frequency*, with superficial/contusions, fractures, sprains/strains, and open wounds filling the top four places. As Figure 4 illustrates, apart from dislocations, non-fatal traumatic injuries far outweigh the number of top non-fatal medical injuries.

Figure 4



Q3. What is the relationship between age and visitor injuries/fatalities?

Of the injury records that included the age of the patient (N=894), ages ranged from 1 to 95 years old, with a mean of 41.71 years and a median of 42 years (*SD* = 21.31). As seen in the histogram below (see Figure 5), the age data appear almost normally distributed. Interestingly, though, it would seem that the data are somewhat bimodal, in that there are two "peaks" in the data: one around 30 years old and another around 50 years old. As will be described below, I took these age ranges into account when devising a grouping strategy for further analysis of the data.

Figure 5

Q4. What are the most prevalent non-fatal visitor injuries by age group?

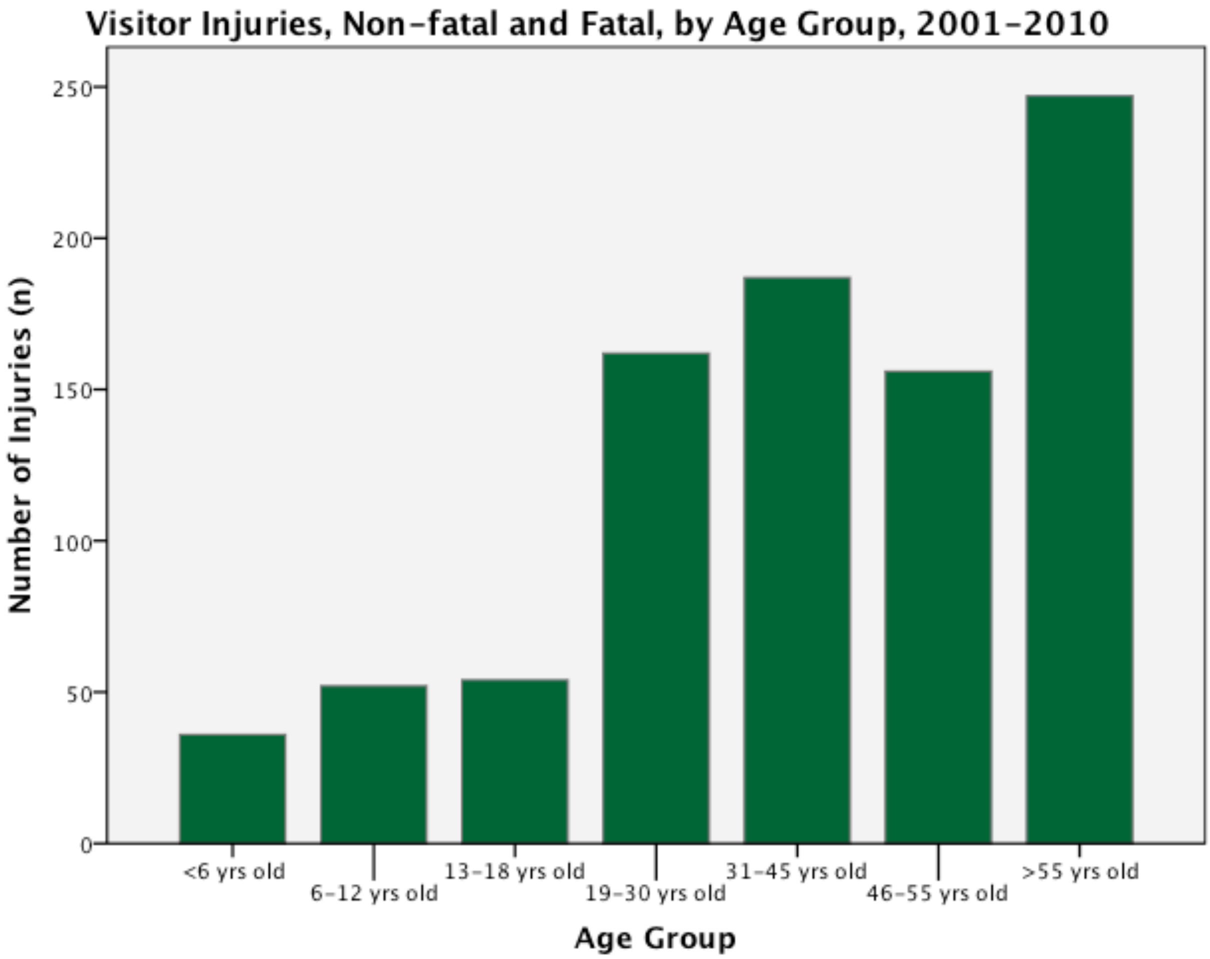
In order to better understand the nature of visitor injuries by age, I decided to split all visitors into seven age categories, determined, in part, by past research on visitor use in national parks. These groups were:

- **Group 1:** Visitors under 6
- **Group 2:** Visitors ages 6-12
- **Group 3:** Visitors ages 13-18
- **Group 4:** Visitors ages 19-30
- **Group 5:** Visitors ages 31-45

- **Group 6:** Visitors ages 46-55
- **Group 7:** Visitors above 55

As seen in Figure 6, visitors ages 56 and above experienced the greatest number of reported injuries, whereas visitors ages 5 and under suffered the least. The two “peaks” mentioned above, with respect to incidence of reported visitor injuries, appears to correspond roughly to group 5 (“peak 1”) and groups 6 and 7 (“peak 2”). (The analyses below explore this idea further). In analyzing these data, it is important to bear in mind that we lack corresponding data on visitation in each of the visitor “groups”; that is, we do not know whether *more* visitors over age 55 may, in fact, be visiting MORA as compared to other age groups.

Figure 6



I next analyzed the most prevalent types of non-fatal injuries, both traumatic and medical, by each of the seven age groups. As illustrated in Table 9, across all groups, superficial/contusions emerged as the most common reported non-fatal injury, though the percentage of this injury of all reported injuries in the age group varied from a low of 23.8% (ages 56 and above) to a high of 46.2% (ages 5 and under). For each of the top non-fatal visitor injuries at MORA, Table 9 shows how the prevalence of each varied by age group. The cells highlighted in yellow convey which age group experienced the given injury type most frequently as a percentage of the occurrence of the 11 injuries considered below (i.e., superficial/contusions, fractures, sprains/strains, open wound, cardiac-related, allergic reactions, syncopal episodes, dizziness, dehydration, dislocations, and AMS) in the age group. For example:

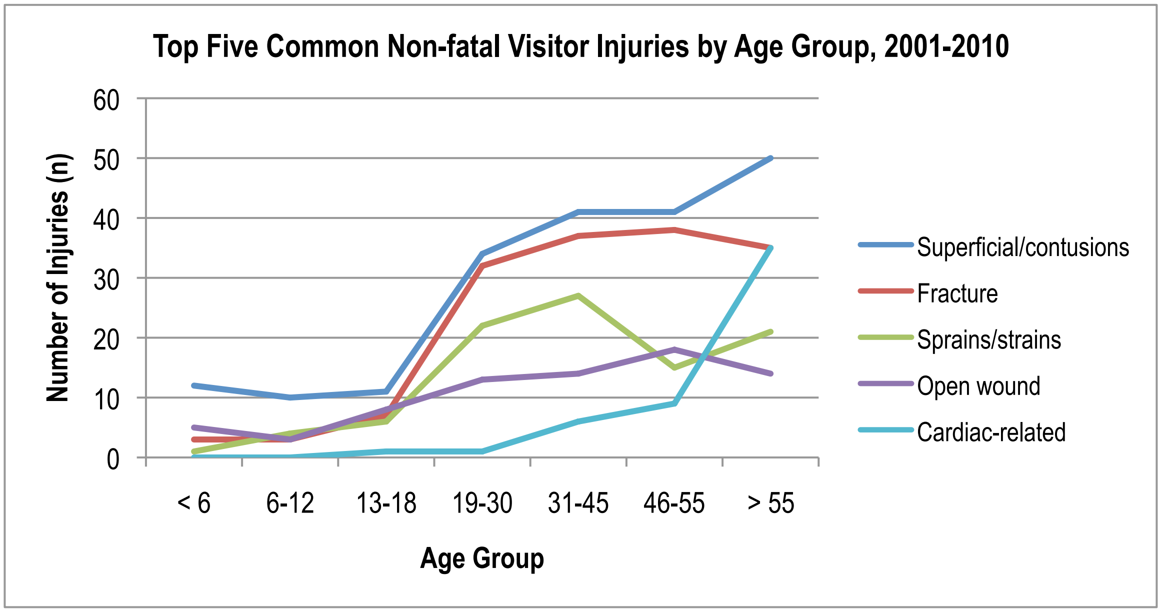
- *Superficial/contusions* accounted for 46.2% of the injuries listed below for visitors **under 6 years old**.
- *Fractures* accounted for 26.6% of the considered injuries listed below for visitors ages **46-55**.
- *Sprains/strains* accounted for 17.1% of the considered injuries listed below for visitors **31-45**.
- *Open wounds* accounted for 19.2% of the considered injuries listed below for visitors **6 and under**.
- *Cardiac-related injuries* accounted for 16.7% of the considered injuries listed below for visitors **older than 55**.
- *Allergic reactions* accounted for 20% of the considered injuries listed below for visitors **ages 6-12**.

Table 9: Common Non-fatal Traumatic and Medical Visitor Injuries by Age Group, 2001-2010

Type of Injury	*Number of non-fatal injuries per age group (n)*							
	<6	**6-12**	**13-18**	**19-30**	**31-45**	**46-55**	**>55**	**TOTAL**
Superficial/contusion	12 (46.2%)	10 (33.3%)	11 (25.0%)	34 (25.6%)	41 (25.9%)	41 (28.7%)	50 (23.8%)	199
Fracture	3 (11.5%)	3 (10.0%)	7 (15.9%)	32 (24.1%)	37 (23.4%)	38 (26.6%)	35 (16.7%)	155
Sprains/strains	1 (3.8%)	4 (13.3%)	6 (13.6%)	22 (16.5%)	27 (17.1%)	15 (10.5%)	21 (10.0%)	96
Open wound	5 (19.2%)	3 (10.0%)	8 (18.2%)	13 (9.8%)	14 (8.9%)	18 (12.6%)	14 (6.7%)	75
Cardiac-related	0 (0%)	0 (0%)	1 (2.3%)	1 (.75%)	6 (3.8%)	9 (6.3%)	35 (16.7%)	52
Allergic reaction	4 (15.4%)	6 (20.0%)	4 (9.1%)	6 (4.5%)	4 (2.5%)	4 (2.8%)	9 (4.3%)	37
Syncopal episode	0 (0%)	1 (3.3%)	3 (6.8%)	2 (1.5%)	4 (2.5%)	4 (2.8%)	16 (7.6%)	30
Dizziness	0 (0%)	2 (6.7%)	1 (2.3%)	3 (2.3%)	5 (3.2%)	2 (1.4%)	15 (7.1%)	28
Dehydration	0 (0%)	1 (3.3%)	2 (4.5%)	6 (4.5%)	7 (4.4%)	3 (2.1%)	7 (3.3%)	26
Dislocation	1 (3.8%)	0 (0%)	1 (2.3%)	7 (5.3%)	7 (4.4%)	5 (3.5%)	3 (1.4%)	24
AMS	0 (0%)	1 (3.3%)	0 (0%)	7 (5.3%)	6 (3.8%)	4 (2.8%)	5 (2.4%)	23
TOTAL	26 (100%)	30 (100%)	44 (100%)	133 (100%)	158 (100%)	143 (100%)	210 (100%)	745

Figure 7 provides a graphic depiction of the top five most common non-fatal visitors injuries (traumatic and medical) by age group.

Figure 7



Q5. What are the sex and age differences in visitors injured at MORA?

Female visitors who were injured or killed were, on average, slightly older than the male visitors who were injured or killed. For non-fatal injuries, the mean age of female visitors was 42.4 (SD=21.43), while the mean age of male visitors was 41.3 (SD=21.61). For fatal injuries, the mean age of females was 41.5 (SD=17.89) years old, and for males, 38.6 years old (SD=15.63) (see Table 10). The mean age difference of male vs. female visitors for both non-fatal and fatal injuries was not statistically significant. (For non-fatal injuries, $t(854) = -.72$, $p = .47$ and for fatal injuries, $t(36) = -.41$, $p = .68$). That is, female visitors who were injured and killed between 2001-2010 at MORA were *not statistically* more likely to be older than the male visitors who were injured or killed.

Table 10: Mean Age of Non-fatal and Fatal Injured Visitors by Sex, 2001-2010

Outcome		Sex	N	Mean Age	Std. Deviation	Std. Error Mean
Non-fatal injury	**Age**	M	459	41.34	21.606	1.009
		F	397	42.40	21.425	1.075
Fatal injury	**Age**	M	32	38.56	15.629	2.763
		F	6	41.50	17.886	7.302

Q6. Are male visitors more likely than female visitors to be injured/killed in the park?

Using the cases in which sex was known (N= 895 non-fatal injuries and N= 42 fatal injuries), men were more likely than women to be fatally injured in the park; this difference was statistically significant, as shown through a Pearson Chi-Square analysis (χ^2 (1, N = 937) = 14.10, p =.000) (see Table 11).

Table 11: Cross-tabulation of Injury Type by Sex

			Sex		Total
			F	M	
Outcome	**Non-fatal injury**	Count	413	482	895
		% within Outcome	46.1%	53.9%	100.0%
	Fatal injury	Count	7	35	42
		% within Outcome	16.7%	83.3%	100.0%
Total		Count	420	517	937
		% within Outcome	44.8%	55.2%	100.0%

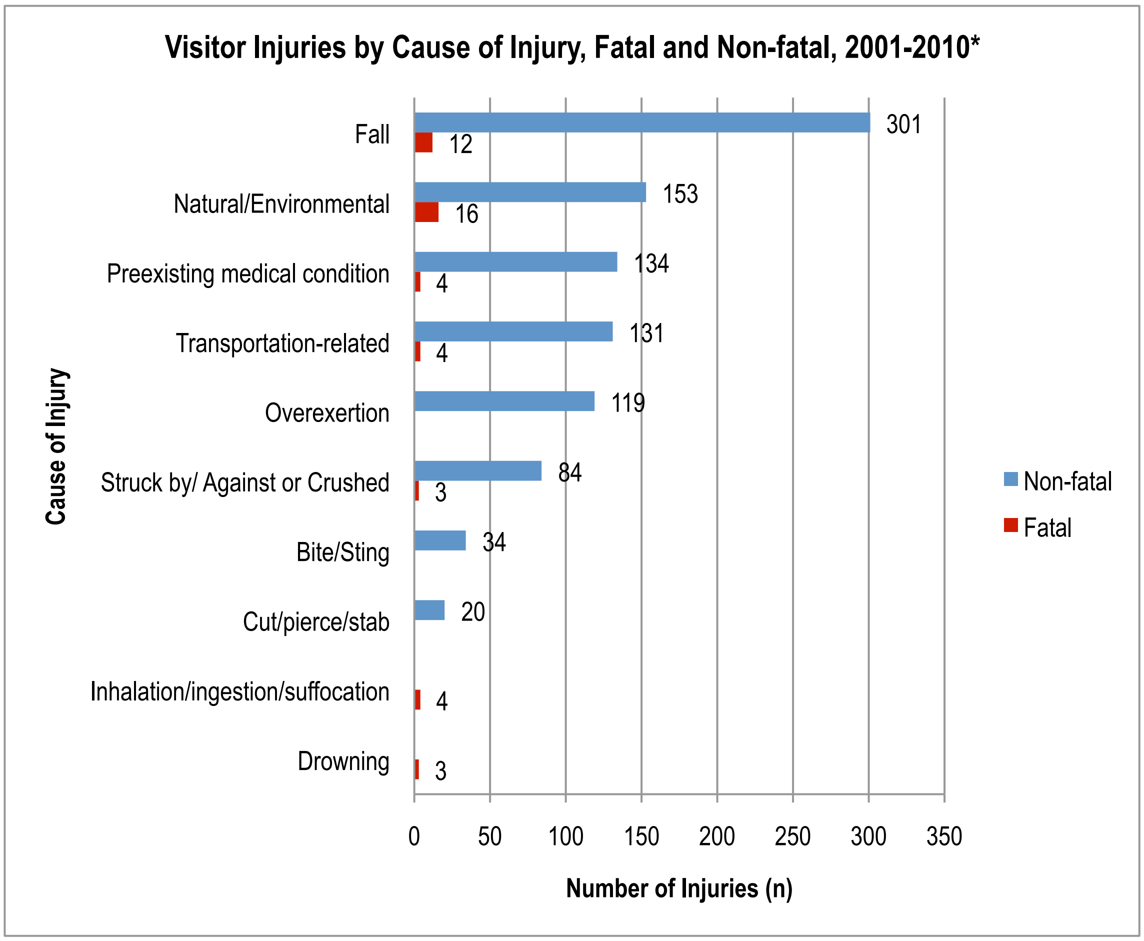
Q7. What have been the most prevalent causes of injuries and fatalities?

Each incident could have multiple contributing factors (i.e., injury causes). For instance, a visitor might slip and fall on a trail (fall), then roll his ankle (overexertion of ligament), and also strike his head on a boulder in the process (struck by/against or crushed). Therefore, when I analyzed each incident, I included *all* possible causes based on the information available, including the following:

- **Falls:** An injury received when a person descends abruptly due to the force of gravity and strikes a surface at the same or lower level (i.e., including both ground-level falls, and falls from greater height)
- **Preexisting medical condition:** The patient was suffering from a preexisting medical condition at the time of the incident, such as high blood pressure or diabetes. This category was also used to denote individuals who had a history of previous, related injury, such as an individual who had sprained his ankle twice in the last year or an individual who had suffered a stroke six months prior to her park visit.
- **Transportation-related cause:** Injury involving modes of transportation, such as cars, motorcycles, bicycles, or airplanes.
- **Overexertion:** Working the body or body part too hard, causing damage to muscle, tendon, ligament, cartilage, joint, or peripheral nerve (e.g., common cause of strains, sprains, and twisted ankles).
- **Struck by/Against or Crushed:** Injury resulting from being struck by (hit) or crushed by a human, animal, or inanimate object or force other than a vehicle or machinery; injury caused by striking (hitting) against a human, animal, or inanimate object or force other than a vehicle or machinery.
- **Natural/Environmental**: Injury resulting from exposure to adverse natural and environmental conditions (such as severe heat, severe cold, lightning, sunstroke, large storms, and natural disasters) as well as lack of food and water.
- **Inhalation/Ingestion/Suffocation:** Inhalation, aspiration, or ingestion of food or other object that blocks the airway or causes suffocation. (Note that suffocation can result from being buried in an avalanche).

"Unknown" was used to denote instances in which no information was provided on the EMS run sheet or in the SAR report, and/or the NPS caregiver did not know the cause. The category "other specified causes" was used to refer to injury associated with any other causes that do not fit another category. Figure 8 illustrates the top causes of visitor injuries, both non-fatal and fatal, between 2001 and 2010.

Figure 8



Note. In the category *Natural/Environmental*, 22 were classified as *dehydration*, 6 were classified as *avalanche*, 6 were classified as *cold exposure*, and 48 were classified as *altitude.* Cases in which the cause of injury was unknown were not considered in this analysis.

Q8. <u>Where</u> in the park have injuries and fatalities been occurring?

In order to figure out where injuries and fatalities have been occurring, I first divided the entire park into 30 general areas. It is important to note that EMS run reports and SAR reports varied substantially in terms of the amount of detail devoted to the location of injuries and fatalities, with some reporting simply a general park region (e.g., "Longmire") and others more specific locales (e.g., "1.5 miles up the Rampart Ridge Trail"). Moreover, while some reports noted where the injury itself occurred, others noted only where the patient received care, such as at a ranger station or visitor center. In these cases, it was often difficult to discern where the injury itself took place. (In some cases, in fact, the injury had occurred a day or two prior, and in a different region of the park).

With these limitations in mind, the five most common areas of the park for reported non-fatal visitor injuries were: (1) Paradise frontcountry (e.g., picnic areas, Jackson Visitor Center, etc.), (2) Paradise area trails, (3) Upper mountain (i.e., any location above 10,000 ft on Mount Rainier, including Camp Muir), (4) Longmire area trails, and (5) Paradise-Longmire Road. (Despite the name of the last category, I included in this designation all incidents that occurred anywhere between the Nisqually entrance and Paradise on the main road). The five most common areas of the park for reported visitor *fatal* injuries were: (1) Upper mountain, (2) Highway 410, (3) Sunrise area trails, (4) Paradise frontcountry, and (5) Longmire area trails. Figure 9 provides a visual depiction of these and other park areas that account for the top ten most common general park areas where both non-fatal and fatal visitor injuries occurred.

Using the general areas described above, I created two meta-categories: frontcountry and backcountry locations (see Appendix I for a synopsis of this classification). I then analyzed the frequency of injuries and fatalities in frontcountry versus backcountry settings. Results indicated the following (see Table 12 and Figures 10 and 11):

- 40.54% of non-fatal visitor injuries occurred in the frontcountry, as compared to 20.51% of fatal injuries.

- 59.46% of non-fatal injuries occurred in the backcountry, as compared to 79.49% of fatal injuries.

A Pearson Chi-Square analysis suggests that fatal injuries were more likely to occur in backcountry settings ($\chi^2(1, N = 747) = 6.202, p = .013$)(see Table 12).

Figure 9

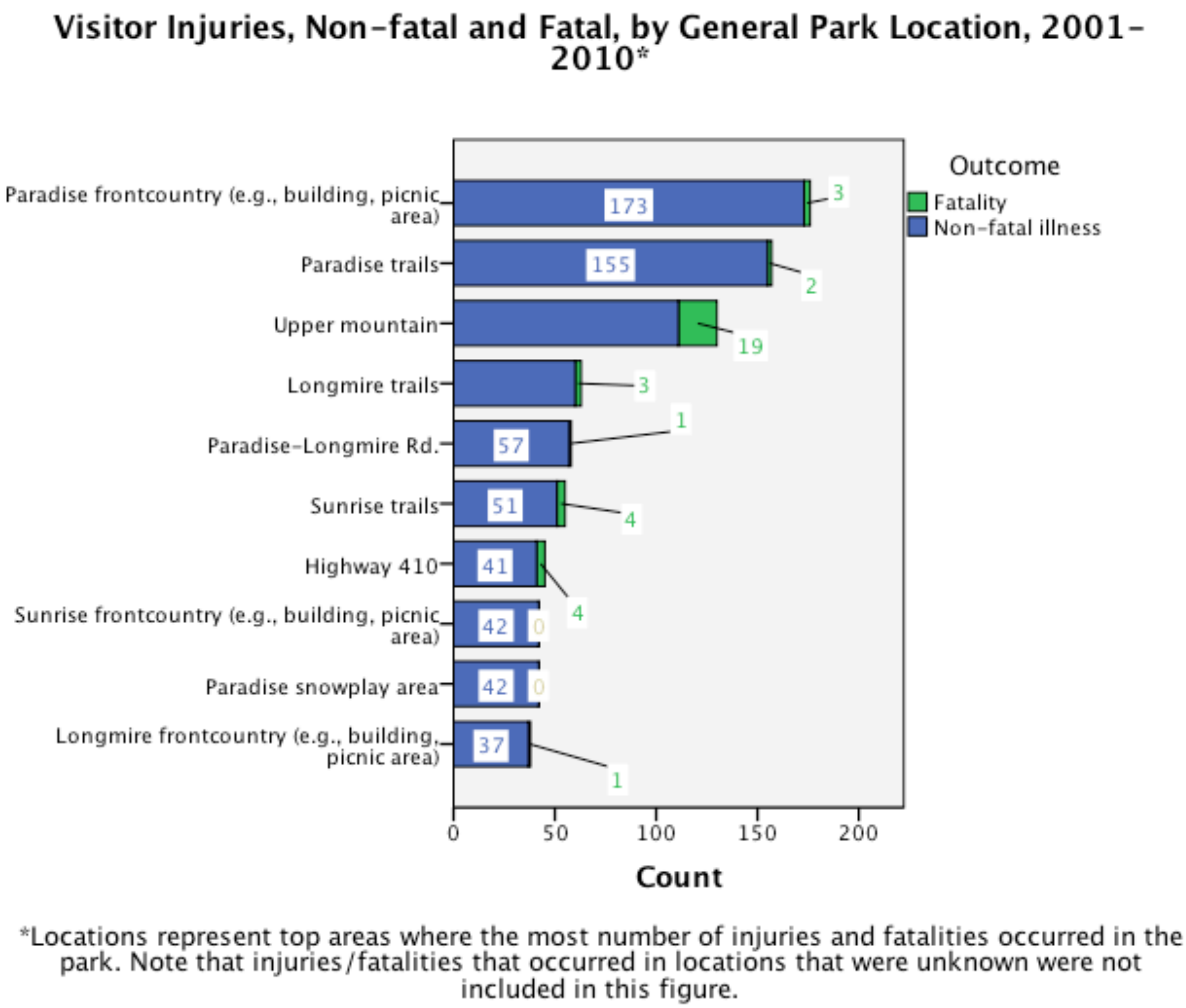


Figure 10: Non-fatal Visitor Injuries by Backcountry/Frontcountry, 2001-2010

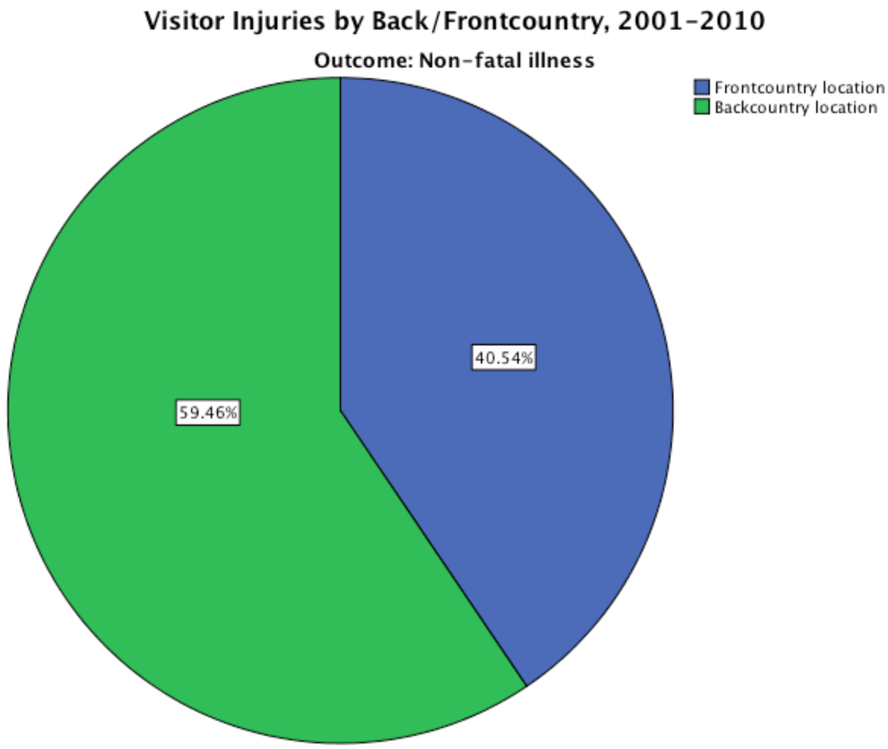


Figure 11: Visitor Fatalities by Back/Frontcountry, 2001-2010

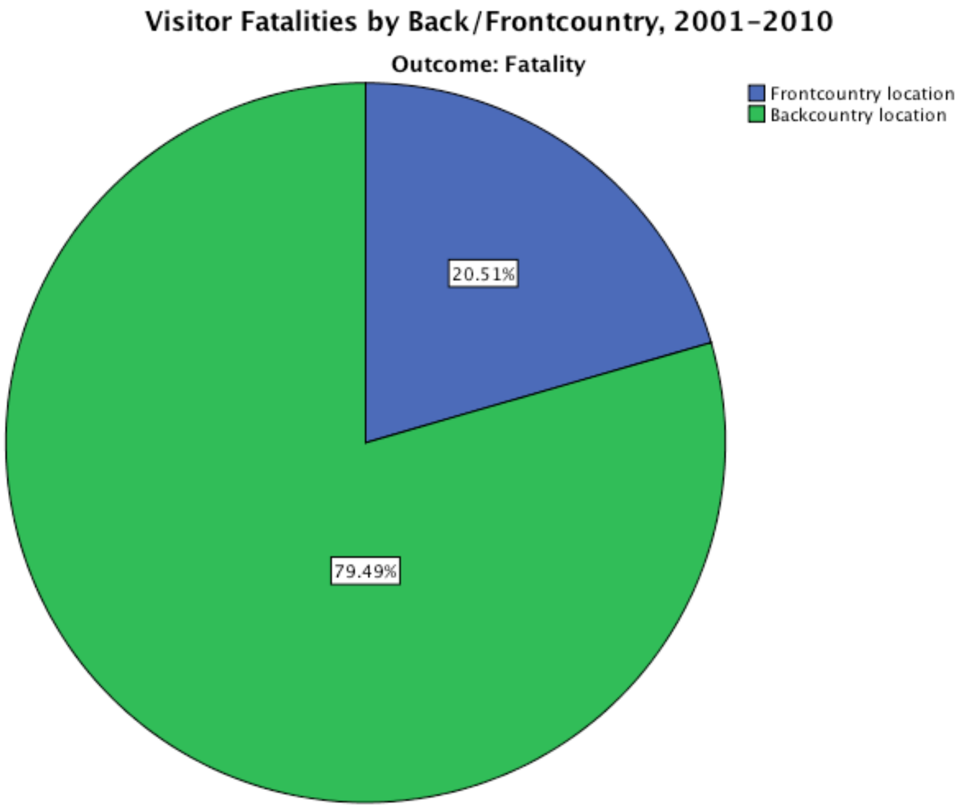


Table 12: Cross-tabulation of Injury Type by Location, 2001-2010

			Type of Location		
			Frontcountry location	Backcountry location	Total
Outcome	**Non-fatal injury**	Count	287	421	708
		% within Type of Location	97.3%	93.1%	94.8%
	Fatal injury	Count	8	31	39
		% within Type of Location	2.7%	6.9%	5.2%
Total		Count	295	452	747
		% Type of Location	100.0%	100.0%	100.0%

Q9. What recreational activities were the visitors participating in when they got hurt?

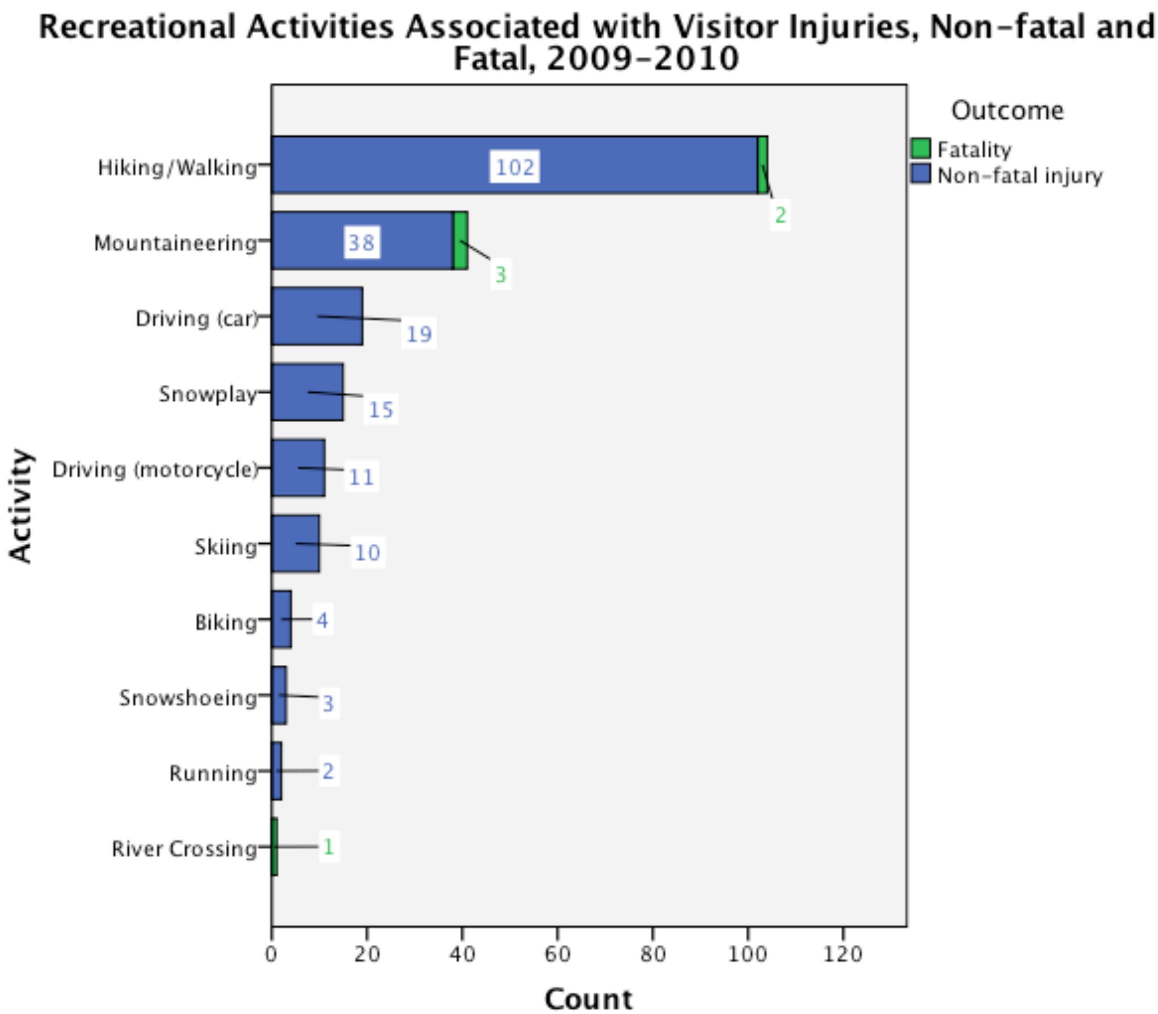
According to the data, visitors were engaged in the following recreational activities when they were non-fatally injured: (1) hiking or walking, (2) mountaineering (i.e., using specialized equipment, such as ice axes and crampons, and usually traveling above 10,000 ft on the upper mountain, (3) driving a car (this category included both drivers *and* passengers of vehicles), (4) driving a motorcycle, and (5) snowplay (i.e., sledding or sliding on the snow, often—but not exclusively—in the park's designated "snowplay area" at Paradise). For fatal injuries, the top recreational activities included: (1) mountaineering, (2) hiking/walking, (3) river crossing, (4) driving a car, and (tied for 5th place), boating, skiing, and snowshoeing (see Figure 12).

Many reported activities associated with visitor injuries, such as whittling a walking stick or playing Frisbee at a campground, did not fit in any of the pre-determined categories. Such activities accounted for the "other" category, which made up 9.6% of all cases. Another large proportion of all reported injuries did not include sufficient information to determine an activity at the time of the injury, and these were classified as "unknown" (21.2% of all cases).

I also analyzed the relationship between age group and recreational activity associated with injury (non-fatal and fatal). By looking at the row percentages in Table 13, we can better understand the proportion of injuries that occurred in each which age group(s), as associated with the top ten most common recreational activities. As shown in Table 13, the prevalence of injury associated with these activities ranged by age group. For example, as illustrated by the yellow highlighted cells in Table 13:

- *Visitors over 55* accounted for 38.6% of all reported injuries associated with **hiking/walking.**
- *Visitors ages 31-45* accounted for 37.9% of all **mountaineering**-related injuries.
- *Visitors ages 31-45* accounted for 29.4% of all **automobile**-related injuries.
- *Visitors ages 46-55* accounted for 31% of all **motorcycle**-related injuries.
- *Visitors ages 6-12* accounted for 40% of all **snowplay**-related injuries

Figure 12



Recreational Activities Associated with Visitor Injuries, Non-fatal and Fatal, 2009-2010
Outcome
Fatality
Non-fatal injury
Activity
Hiking/Walking
Mountaineering
Driving (car)
Snowplay
Driving (motorcycle)
Skiing
Biking
Snowshoeing
Running
River Crossing
102
2
38
3
19
15
11
10
4
3
2
1
0
20
40
60
80
100
120
Count

Table 13: Cross tabulation of Number of Non-fatal and Fatal Injuries per Age Group by Activity, 2001-2010

Activity	*Number of non-fatal and fatal injuries per age group (n)*							
	<6	6-12	13-18	19-30	31-45	46-55	>55	TOTAL
Hiking/walking	8 (2.3%)	10 (2.8%)	14 (4.0%)	53 (15.1%)	59 (16.8%)	72 (20.5%)	136 (38.6%)	352 (100%)
Mountaineering	0 (0%)	0 (0%)	0 (0%)	30 (31.6%)	36 (37.9%)	22 (23.2%)	7 (7.4%)	95 (100%)
Driving a car	2 (2.9%)	3 (4.4%)	2 (2.9%)	13 (19.1%)	20 (29.4%)	11 (16.2%)	17 (25.0%)	68 (100%)
Driving a motorcycle	0 (0%)	1 (1.7%)	0 (0%)	10 (17.2%)	16 (27.6%)	18 (31.0%)	13 (22.4%)	58 (100%)
Snowplay	5 (11.1%)	18 (40%)	6 (13.3%)	7 (15.6%)	8 (17.8%)	1 (2.2%)	0 (0%)	45 (100%)
Skiing	0 (0%)	0 (0%)	1 (6.3%)	5 (31.3%)	4 (25.0%)	2 (12.5%)	4 (25.0%)	16 (100%)
Biking	0 (0%)	0 (0%)	1 (8.3%)	3 (25%)	1 (8.3%)	5 (41.7%)	2 (16.7%)	12 (100%)
Snowshoeing	0 (0%)	1 (12.5%)	0 (0%)	1 (12.5%)	5 (62.5%)	0 (0%)	1 (12.5%)	8 (100%)
Running	2 (33.3%)	0 (0%)	3 (50%)	0 (0%)	0 (0%)	0 (0%)	1 (16.7%)	6 (100%)
Snowboarding	0 (0%)	0 (0%)	1 (20%)	2 (40%)	2 (40%)	0 (0%)	0 (0%)	5 (100%)
River Crossing	0 (0%)	1 (33.3%)	0 (0%)	0 (0%)	1 (33.3%)	1 (33.3%)	0 (0%)	3 (100%)
TOTAL	17	34	28	124	152	132	181	

Q10. What is the relationship between injury causes and recreational activities?

Excluding the categories of "other" and "unknown," I looked at the relationship between the top five causes of non-fatal and fatal injuries and the recreational activity that the visitor was participating in at the time. To do so, I performed a cross-tabulation of activity by cause, which results in a matrix (see Table 14) with counts and percentages in each cell. Based on this analysis, we see that:

- **Natural/Environmental** most commonly co-occurred with: (1) hiking/walking, (2) mountaineering, and (3) snowshoeing.
- **Falls** co-occurred with: (1) hiking/walking, (2) mountaineering, and (3) snowplay.

- **Overexertion** co-occurred with: (1) hiking/walking, (2) mountaineering, and (3) skiing.
- **Struck by/against or crushed** co-occurred with: (1) snowplay, (2) mountaineering, and (3) hiking/walking.
- **Pre-existing medical conditions** co-occurred with: (1) hiking/walking, (2) mountaineering, and (3) driving a car.
- **Transportation-related causes** co-occurred with: (1) driving a car, (2) driving a motorcycle, and (3) riding a bicycle.

Table 14: Cross-tabulation of Non-fatal and Fatal Visitor Injury Cause by Activity

Activity	Cause of Injury: Natural or Environ-mental	Fall	Over-exertion	Struck by/ Against or Crush	Preexist medical condition	Transport related cause	Total
Hiking or Walking	103 (58.5%)	198 (73.1 %)	80 (76.2%)	6 (9.7%)	68 (78.2%)	0 (0%)	455
Mountain-eering	65 (36.9%)	40 (14.8 %)	14 (13.3%)	18 (29.0%)	9 (10.3%)	0 (0%)	146
Driving (car)	0 (0%)	0 (0%)	0 (0%)	2 (3.2%)	5 (5.7%)	70 (52.6%)	77
Driving (motor-cycle)	0 (0%)	0 (0%)	0 (0%)	1 (1.6%)	1 (1.1%)	57 (42.9%)	59
Snowplay	0 (0%)	10 (3.7 %)	3 (2.9%)	29 (46.8%)	2 (2.3%)	0 (0%)	44
Skiing	3 (1.7%)	9 (3.3 %)	4 (3.8%)	3 (4.8%)	1 (1.1%)	0 (0%)	20
Biking	0 (0%)	4 (1.5 %)	2 (1.9%)	2 (3.2%)	0 (0%)	6 (4.5%)	14
Snowshoeing	5 (2.8%)	4 (1.5 %)	2 (1.9%)	0 (0%)	1 (1.1%)	0 (0%)	12
Running	0 (0%)	5 (1.8 %)	0 (0%)	1 (1.6%)	0 (0%)	0 (0%)	6
River Crossing	0 (0%)	1 (.37 %)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1
Total	176 (100%)	271 (100 %)	105 (100%)	62 (100%)	87 (100%)	133 (100%)	834

APPENDIX B

ONLINE SURVEY INSTRUMENT

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Welcome and thank you for visiting our survey!

The following questions ask you to select a response (or responses) from a list of responses, or, in some cases, to type in a response. There are no "right" or "wrong" answers; please choose the answer (or answers) that best reflect your understanding of the question. You may save your answers and come back to the survey at any time.

You are logged in for the first time!

Continue to Survey

If you have questions or require technical assistance with this survey, please email the Survey Research Institute or call 1-888-367-8404.

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress 0% 20% 40% 60% 80% 100%

Exploring visitor safety and risk communication in national parks

You are invited to participate in a research study about visitor safety in national parks.

Background Information: This project will examine how National Park Service (NPS) staff and national park visitors think about safety in national parks. The goal is to better understand the role played by park staff in communicating risk and safety-related issues with the public, as well as to understand how and where park visitors may receive and interpret risk and safety-related park information.

Procedures: If you agree to be in this study, we will ask you to complete the online survey, envisioned to last about 20-30 minutes, in which we will ask about your recent national park visit, your opinions about the park, and your views on safety issues in the park. At any point, you may stop, save your answers, and return to the survey at a later point in time.

Risks and Benefits of being in the Study: We do not anticipate any risks to you for participating in this study, other than those encountered in day-to-day life. If we correspond via email, there is a chance that a third-party could read our correspondence. Indirect benefits of participation are a contribution to our understanding of visitor safety in national park settings.

If you participate in the study, you may choose to enter a lottery for a gift certificate to REI upon completing this survey. If you choose to enter, your odds of winning depend on how many other participants are involved. I anticipate the odds to be no lower than 1 in fifty (2%) and likely higher. There will be 85 separate, random drawings at the end of the project. I will contact all winners individually.

Payment for Participation: You will not receive any payment for taking part in the study.

Voluntary Nature of Participation: Your decision whether or not to participate will not affect your current or future relations with Cornell University, nor with the National Park Service. There are no "right" or "wrong" answers; instead, you should report what you feel is the best answer to the question. You may refuse to fill out and/or submit the survey, skip any questions that you do not wish to answer, or discontinue participation at any time with no effect.

Confidentiality: Your participation in this survey is strictly confidential. No personal information about you (such as your name or email address) will be reported or released in any way to any party. In any sort of report I might publish, I will not include any information that will make it possible to identify you. All data will be securely stored in the investigator's locked office on our password-protected computers. Hard copies of data will remain in the investigator's office. All data will be destroyed (i.e., shredded or erased) when their use is no longer needed but not before a minimum of five years after data collection. Please note that online surveys are not entirely secure. It is possible, therefore, that your responses could be read by someone else. As a precaution, I will not ask any personally identifiable information, such as your name.

Contacts and Questions: The researchers conducting this study are:

Laura Rickard, Graduate student, Department of Communication, 212 Kennedy Hall, Cornell University, Ithaca, New York 14853. Phone: 401-258-7252; Email: lnr3@cornell.edu

Katherine McComas, Associate Professor, Department of Communication, 313 Kennedy Hall, Cornell University, Ithaca, New York, 14853. Phone: 607-255-6508

If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) at 607-255-5138 or access their website at http://www.irb.cornell.edu. You may also report your concerns or complaints anonymously through Ethicspoint or by calling toll free at 1-866-293-3077.

Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.

I have read the above information about the survey and agree to participate in the study.

Previous Next
Finish Later

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress 0% 20% 40% 60% 80% 100%

Sense of Place

First off, we'd like to ask you about your experiences of being in EXAMPLE PARK, as well as what the park means to you.

Overall, my experiences in EXAMPLE PARK have been:

1 Unremarkable [q2a]	2	3	4	5 Remarkable
1 Negative [q2b]	2	3	4	5 Positive
1 Easy to forget [q2c]	2	3	4	5 Unforgettable

Previous Next
Finish Later

If you have questions or require technical assistance with this survey, please email the Survey Research Institute or call 1-888-367-8404.

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress 0% 20% 40% 60% 80% 100%

Sense of Place

EXAMPLE PARK is:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
[q3a] A place mostly for vacationers	○	○	○	○	○
[q3b] A place to be preserved for future generations	○	○	○	○	○
[q3c] A community of visitors, employees, and volunteers	○	○	○	○	○
[q3d] A wildlife habitat	○	○	○	○	○
[q3e] An unpredictable landscape	○	○	○	○	○
[q3f] A place with historical value	○	○	○	○	○
[q3g] A place threatened by humans	○	○	○	○	○
[q3h] A recreation area	○	○	○	○	○

Previous Next
Finish Later

If you have questions or require technical assistance with this survey, please email the Survey Research Institute or call 1-888-367-8404.

Progress
0% 20% 40% 60% 80% 100%

Sense of Place

To what extent do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
[q4a] EXAMPLE PARK means a lot to me.	○	○	○	○	○
[q4b] I identify strongly with EXAMPLE PARK.	○	○	○	○	○
[q4c] No other place can compare to EXAMPLE PARK.	○	○	○	○	○
[q4d] I feel that I can really be myself at EXAMPLE PARK.	○	○	○	○	○
[q4e] Few people know EXAMPLE PARK like I do.	○	○	○	○	○
[q4f] Being at EXAMPLE PARK says a lot about who I am.	○	○	○	○	○
[q4g] The things I do at this park I would enjoy doing just as much at a similar site.	○	○	○	○	○

Previous Next
Finish Later

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress
0% 20% 40% 60% 80% 100%

Your Park Experience

[SRI Note: The following question will display only for VISITORS]

We'd like to know what you did at the park. Please answer the questions below with respect to your most recent visit to the park, the one in which you signed up to complete this survey.

Which activities did you take part in? (Select all that apply)

- [ ] [q5_1] Visiting a visitor center, permitting office, or museum
- [ ] [q5_2] Attending a ranger-led program or hike
- [ ] [q5_3] Camping in a designated campground
- [ ] [q5_4] Playing in the snow, sledding, or snowshoeing
- [ ] [q5_5] Riding a snowmobile
- [ ] [q5_6] Fishing or hunting
- [ ] [q5_7] Swimming
- [ ] [q5_8] Motorized boating
- [ ] [q5_9] Non-motorized boating (e.g., canoeing, kayaking, rafting)
- [ ] [q5_10] Biking
- [ ] [q5_11] Mountaineering
- [ ] [q5_12] Technical rock climbing/bouldering
- [ ] [q5_13] Riding a horse, mule, etc.
- [x] [q5_14] Day hiking on trails
- [x] [q5_15] Backpacking in the backcountry
- [ ] [q5_16] Skiing or snowboarding
- [ ] [q5_17] Other [q5_spec] - please specify:

Previous Next
Finish Later

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress
0% 20% 40% 60% 80% 100%

Your Park Experience

[SRI Note: All questions at this page will display only for VISITORS who participated in more than 1 activities]

[q6] Which activity did you spend the most time doing? -- Select --

[q7] How prepared did you feel for participating in the activity you selected above?

1	2	3	4	5
Not at all prepared		Somewhat prepared		Completely prepared

[q8] Why did you answer this way? (Type below).

Previous Next
Finish Later

Progress: 0% 20% 40% 60% 80% 100%

Your Park Experience

[SRI Note: All questions at this page will display only for VISITORS]

[SRI Note: The following question (q9) will display only if VISITOR participated in more than 1 activities

[q9] Of the activities you took part in, which would you say was the most memorable? -- Select --

How many people were with you on this visit to the park?

[q10a] **Total number of people in your personal group including yourself**
[q10b] Number of children 5 or under
[q10c] Number of children ages 6 to 12
[q10d] Number of teenagers ages 13-17
[q10e] Number of adults 18-65
[q10f] Number of adults older than 65

(Include yourself in the categories above).

Which of the following best describes your group?

- ☐ [q11a] Family members
- ☐ [q11b] Friends
- ☐ [q11c] Organized tour group
- ☐ [q11d] Other [q11_spec] - please specify:

Previous Next
Finish Later

Progress 0% 20% 40% 60% 80% 100%

Information-seeking

[SRI Note: All questions at this page will display only for VISITORS]

We'd like to know how you used different information sources about the park. If this was your first time visiting the park, please answer with respect to this visit. If you've been to the park more than once, think about all of the times you may have relied on information about the park during this or any of visits in the past two years.

How much would you say you relied on the following sources for information about the park? (For each line, check one response).

National Park Service Information Sources

	Not at all	Very Little	Some	A lot	Not applicable
[q12a] Attending an interpretive program (e.g., ranger talk)	○	○	○	○	○
[q12b] Reading National Park Service brochures, newspapers, or maps	○	○	○	○	○
[q12c] Visiting a National Park Service website (e.g., www.nps.gov or www.nps.gov/mora)	○	○	○	○	○
[q12d] Viewing signs, exhibits, or movies in the park	○	○	○	○	○
[q12e] Listening to the Traveler Information Systems (TIS) (AM radio station in the park)	○	○	○	○	○
[q12f] Interacting with National Park Service staff, such as rangers, throughout the park	○	○	○	○	○
[q12g] Other [q12_1_spec] - please specify:	○	○	○	○	○

Information Sources other than National Park Service

	Not at all	Very Little	Some	A lot	Not applicable
[q12h] Visiting a local chamber of commerce, private businesses, or visitor center outside of the park	○	○	○	○	○
[q12i] Reading guidebooks, such as hiking guides.	○	○	○	○	○
[q12j] Interacting with climbing guides, boating guides, or other recreational trip leaders	○	○	○	○	○
[q12k] Interacting with staff at restaurants, gift shops, or hotels in the park	○	○	○	○	○
[q12l] Interacting with other park visitors, family members, or friends	○	○	○	○	○
[q12m] Other [q12_2_spec] - please specify:	○	○	○	○	○

Previous Next
Finish Later

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress 0% 20% 40% 60% 80% 100%

Information-seeking

[SRI Note: All questions at this page will display only for VISITORS]

What topics did you receive information about?

	How much information did you receive about this topic?			
	None	**Very Little**	**Some**	**A lot**
[q13a] Park hazards (e.g., wildlife, drowning, earthquakes, rock slides, etc.)	○	○	○	○
[q13b] Park regulations (e.g., swimming or boating restrictions)	○	○	○	○
[q13c] Weather conditions	○	○	○	○
[q13d] Road conditions/closures	○	○	○	○

Previous Next
Finish Later

Progress 0% 20% 40% 60% 80% 100%

Park Accidents

[SRI Note: This page will display for all EMPLOYEES and only those VISITORS who participated in at least one activity.]

Each week, on average three park visitors are killed and 14 are seriously injured in national parks throughout the United States. Knowing how park visitors think about accidents might help park managers prevent these injuries and deaths. In the following section, we'll ask you to share your opinions about this topic.

The following is a news report of an incident that occurred in a national park. All names and identifying information have been changed.

[SRI Note: The follwoing scenario will display only for EMPLOYEES or VISITORS who participated in any of these activities (Biking,Mountaineering,Technical rock climbing/bouldering,Riding a horse, mule, etc.,Day hiking on trails,Backpacking in the backcountry,Skiing or snowboarding,Other)]

GARDINER, Montana (AP)— On the afternoon of Oct. 17, a park visitor was seriously injured after falling near the Hellroaring Creek area of Yellowstone National Park while on a three-day backpacking trip. Reports indicate that he suffered a concussion, bruised ribs, and a wrist fracture. The victim, 35-year-old Roger Ellison of Bozeman, MT, fell down a waterfall a distance of approximately 15 feet. He was able to stop himself from falling off of a 60-foot cliff face to the creek bottom below. Onlookers say he was trying to photograph a plant when he lost his footing on the wet rock. He was hiking on an established park trail at the time, and had been issued a permit to camp overnight in the area. Ellison was by himself, but was able to shout to a group of hikers on the trail above, who then contacted park officials. Members of the park's search and rescue team responded to the scene. Ellison was lowered down the 60-foot cliff face to the creek bottom. He was carried out to the trailhead and then transported by ambulance to the park hospital.

[SRI Note: The follwoing scenario will display only for VISITORS who participated ONLY in any of these activities (Visiting a visitor center, permitting office, or museum , Attending a ranger-led program or hike , Camping in a designated campground, Playing in the snow, sledding, or snowshoeing , Riding a snowmobile, Fishing or hunting, Swimming, Motorized boating, Non-motorized boating (e.g., canoeing, kayaking, rafting),Other).]

GARDINER, Montana (AP)—A park visitor was seriously injured on the afternoon of Oct. 17 while visiting the Mammoth Hot Springs area of Yellowstone National Park. Reports indicate that he suffered a concussion, bruised ribs, and a wrist fracture. Roger Ellison, 35, of Bozeman, Montana was on a one mile-long nature walk led by a National Park Service (NPS) ranger when he lost his footing. He was hiking on an established park trail at the time. According to an onlooker, Ellison tripped on a steep, uneven section of the trail and tumbled over a low rock ledge covered by brush. Other members of the group witnessed Ellison's fall. They grabbed the back of his coat to prevent him from falling further down the hill. The NPS ranger organized park visitors to stabilize Ellison on the ground before he could be moved to the nearby visitor center. He was later taken to the park hospital.

Please answer the following questions:

[q14] What do you think caused this incident?

[q15] Has an incident like this ever happened to you or someone you know?

- Yes
- No
- Don't know/Not sure

In your opinion, how important were the following factors in causing Mr. Ellison's injury?

	Not at all Important 1	2	Somewhat important 3	4	Extremely Important 5
[q17a] Challenging environmental conditions (e.g., uneven terrain)					
[q17b] Lack of park safety infrastructure (e.g., guard rails)					
[q17c] Lack of park rules, or lack of enforcement of existing park rules					
[q17d] Poor decisions or actions of park employees					
[q17e] Mr. Ellison's excessive risk-taking					
[q17f] Mr. Ellison's unpreparedness for the activity					
[q17g] Mr. Ellison's over-estimation of his abilities					
[q17h] Bad luck, fate, chance, etc.					

Previous Next
Finish Later

Park Accidents

[SRI Note: This page will display only for EMPLOYEES]

[q16] In the past year, about how many visitor safety incidents have you been involved in, either at this park or other national parks?

- None
- Less than 10
- Ten or more

Previous Next
Finish Later

Progress 0% 20% 40% 60% 80% 100%

Park Accidents

[SRI Note: This page will display for all EMPLOYEES and only those VISITORS who participated in at least one activity.]

[q18] Given the circumstances described in the news report, the park's response to this incident was:

1	2	3	4	5
Not at all appropriate		Somewhat appropriate		Extremely appropriate

[q19] To what extent do you believe Mr. Ellison or the park was responsible for preventing this incident from occurring?

1	2	3	4	5
Entirely Mr. Ellison's responsibility		Both equally responsible		Entirely the park's responsibility

6. Neither Mr. Ellison nor the park's responsibility

7. This incident was not preventable

Previous Next
Finish Later

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress
0% 20% 40% 60% 80% 100%

Risk Management

The following questions ask you to think about your safety in EXAMPLE PARK, as well as what National Park Service can do to manage visitors' safety.

How important are the following reasons for being at EXAMPLE PARK?

	Not at all Important 1	2	Somewhat important 3	4	Extremely Important 5
[q20a] To take risks	○	○	○	○	○
[q20b] To experience thrills	○	○	○	○	○
[q20c] To have an adventure	○	○	○	○	○
[q20d] To be challenged	○	○	○	○	○
[q20e] To experience excitement	○	○	○	○	○

Previous Next
Finish Later

If you have questions or require technical assistance with this survey, please email the Survey Research Institute or call 1-888-367-8404.

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress 0% 20% 40% 60% 80% 100%

Risk Management

Read the following statements. Choose one number per line that best reflects your opinion.

1 People **cannot control** whether or not they are harmed by the hazards they face in EXAMPLE PARK. [q21a]	2	3	4	5 People can control whether or not they are harmed by the hazards they face in EXAMPLE PARK.
1 The National Park Service **cannot control** whether or not people are harmed by the hazards they face in EXAMPLE PARK. [q21b]	2	3	4	5 The National Park Service can control whether or not people are harmed by the hazards they face in EXAMPLE PARK.
1 Whether or not a person is exposed to park hazards is **not** his or her choice. [q21c]	2	3	4	5 Whether or not a person is exposed to park hazards is his or her choice.
1 The National Park Service **cannot choose** which hazards people might be exposed to in parks. [q21d]	2	3	4	5 The National Park Service can choose which hazards people might be exposed to in parks.
1 In EXAMPLE PARK, people **cannot choose** whether or not they are exposed to most hazards. [q21e]	2	3	4	5 In EXAMPLE PARK, people can choose whether or not they are exposed to most hazards.
1 If they are exposed to hazards in EXAMPLE PARK, people **cannot** prevent harm to themselves and others. [q21f]	2	3	4	5 If they are exposed to hazards in EXAMPLE PARK, people can prevent harm to themselves and others.

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress 0% 20% 40% 60% 80% 100%

Risk Management

How much do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
[q22a] If I thought I would be putting myself in danger, I would not visit EXAMPLE PARK.	○	○	○	○	○
[q22b] While visitors are at the park, their safety is the responsibility of those who manage the area.	○	○	○	○	○
[q22c] National Park Service management should **not** prevent access to areas that might be dangerous.	○	○	○	○	○
[q22d] Those who manage EXAMPLE PARK have an obligation to inform visitors about all things that might affect their safety.	○	○	○	○	○
[q22e] If visitors will not accept responsibility for their own safety, they should not visit EXAMPLE PARK.	○	○	○	○	○
[q22f] It is the responsibility of the National Park Service to prevent visitors from undertaking activities that may pose a serious risk to them, no matter how popular the activities are.	○	○	○	○	○
[q22g] Besides providing appropriate safety information and warnings, the National Park Service should not limit or prohibit activities that may pose serious risks to the participants.	○	○	○	○	○

Previous Next

Finish Later

Progress 0% 20% 40% 60% 80% 100%

More about You

Finally, we'd like to know a little bit more about you.

[q23] I am:

- Male
- Female

[SRI Note: The following question (q24) will display only for VISITORS

[q24] How long did you spend in EXAMPLE PARK during your most recent visit?

- Half a day or less (1-4 hours)
- More than half a day to one full day (more than 4 hours in a single day)
- More than one day (including returning to the park on more than one day during your most recent visit)

Previous Next
Finish Later

Progress

0% 20% 40% 60% 80% 100%

More about You

[SRI Note: The following question (q25) will display only for VISITORS

[q25] Including this visit, about how many times have you visited this park in the last year?

- Once
- 2-5 times
- 6-10 times
- More than 10 times

[q26] **Approximately how many other national parks have you ever visited?**

Previous Next
Finish Later

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress 0% 20% 40% 60% 80% 100%

More about You

[q27] What is the highest level of formal education you have completed?

- Less than high school
- High school graduate
- Trade or technical school
- Some college
- 2 year college graduate
- 4 year college graduate
- Post-graduate work

[q28] Do you currently live in the U.S.?

Yes No

[SRI Note: The following question (q29) will display if the respondent lives in the U.S.

[q29] What state do you currently live in? -- Select --

[SRI Note: The following question (q30) will display if the respondent does not live in the U.S.

[q30] **In what country do you live?**

Previous Next
Finish Later

Progress 0% 20% 40% 60% 80% 100%

More about You

[q31] What do you consider yourself?

- White or Caucasian
- Black or African-American
- Asian
- American Indian or Alaska Native
- Native Hawaiian or other Pacific Islander
- Hispanic or Latino
- Other, including multi-ethnic and/or multi-racial [q31_spec] Please specify:

[q32] Your native language is:

- English
- Spanish
- Other [q32_spec] Please specify:

[q33] **What year were you born?**

Previous Next
Finish Later

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress
0% 20% 40% 60% 80% 100%

More about You

[SRI Note: This page will display only for EMPLOYEES]

[q34a] I am:

- Employee
- Volunteer

[SRI Note: The following two questions (q34 and q35a) will display if the respondent is an employee

[q34] Which of the following best describes your position at the park?

- Seasonal employee
- Year-round employee

[q35a] In which park division do you work?

[SRI Note: The following question (q35b) will display if the respondent is a volunteer

[q35b] Please describe your involvement at the park

Overall, how long have you worked and/or volunteered in this park?

[q36a] years

[q36b] months

Overall, how long have you worked and/or volunteered for the NPS?

[q37a] years

[q37b] months

Previous Next

Finish Later

Cornell University
Survey Research Institute

Exploring visitor safety and risk communication in national parks

Progress 0% 20% 40% 60% 80% 100%

More about You

[q38] Is there anything else you'd like us to know? Use this space for comments, feedback, etc.

[egiftSignup] Would you like to be entered into a drawing to win a gift certificate from REI?

◯ Yes ◯ No

[SRI Note: If the respondent would you like to be entered into a gift certificate drawing display the following]

[email_egift] **Please provide an email address that we can use to email you a gift certificate if your address is picked.**

If you choose to enter, your odds of winning depend on how many other participants are involved. We anticipate the odds to be no lower than 1 in fifty (2%) and likely higher. There will be 85 separate, random drawings at the end of the project. We will contact all winners individually.

Please feel free to contact the researchers conducting this study, Laura Rickard, at lnr3@cornell.edu or Katherine McComas, at kam19@cornell.edu, if you have any questions or comments. Thank you!

Previous | Submit Survey | Finish Later

APPENDIX C

LETTER TO MORA COMMUNITY[15]

I'd like to take this opportunity to introduce myself to the Mount Rainier National Park community. I am a graduate student at Cornell University working as a Student Conservation Association (SCA) intern at MORA this winter/spring; if I haven't met you already--either in the last few days, or when I was here in Summer 2009-- I hope to do so soon.

Because you have worked as employees and volunteers at MORA, I believe you have a unique and important perspective to share. Therefore, I'd like to invite you to take part in an online survey about visitor safety. There are no "right" or "wrong" answers to these questions, and your responses will be kept confidential. Your comments will inform my research at Cornell, as well as help to provide NPS with feedback on how to address visitor safety issues in the future.

In the next few weeks, you will be receiving an email invitation to access the survey. You may skip questions that you do not wish to answer, or discontinue participation at any time with no effect. (You can also fill out some questions, and then return to the survey at a later point). I estimate that the survey will take about 20 minutes to complete. Once you finish, you'll have the option of entering into a drawing for a gift certificate to REI.

Two other parts of my research deserve mention. First, I will be contacting some of you in the next few weeks to ask you to participate in an interview, also relating to safety in the park. Second, you may see me at Paradise or the Carbon River area speaking with visitors, whom I will be recruiting to take a similar online survey.

If you have any questions or comments about any of the above, please do not hesitate to contact me. I look forward to interacting with you all in the next few months!

Best wishes,

Laura Rickard
(401) 258-7252
lnr3@cornell.edu

[15] Sent by email to all MORA employees by Chief Ranger Chuck Young in February 2011; also posted at the same time on the MORA volunteer blog by Volunteer Coordinator Kevin Bacher.

APPENDIX D

LETTER TO OLYM COMMUNITY[16]

I'd like to take this opportunity to introduce myself to the Olympic National Park community. I am a graduate student at Cornell University working as a Student Conservation Association (SCA) intern based at Mount Rainier National Park this winter/spring. I'll be at Olympic for several weeks this season, and I hope to meet many of you then.

Because you have worked as employees and volunteers at OLYM, I believe you have a unique and important perspective to share. Therefore, I'd like to invite you to take part in an online survey about visitor safety. There are no "right" or "wrong" answers to these questions, and your responses will be kept confidential. Your comments will inform my research at Cornell, as well as help to provide NPS with feedback on how to address visitor safety issues in the future.

In the next few weeks, you will be receiving an email invitation to access the survey. You may skip questions that you do not wish to answer, or discontinue participation at any time with no effect. (You can also fill out some questions, and then return to the survey at a later point). I estimate that the survey will take about 20 minutes to complete. Once you finish, you'll have the option of entering into a drawing for a gift certificate to REI.

Two other parts of my research deserve mention. First, I will be contacting some of you in the next few weeks to ask you to participate in an interview, also relating to safety in the park. I will be conducting these interviews in person when I am at Olympic. Second, you may see me at various locations in the park, such as Hurricane Ridge, speaking with park visitors, whom I will be recruiting to take a similar online survey.

If you have any questions or comments about any of the above, please do not hesitate to contact me. (You may also prefer to speak with Chief Ranger Colin Smith, who can provide a bit more background on my project). I look forward to interacting with you all in the next few months!

Best wishes,

Laura Rickard
(401) 258-7252
lnr3@cornell.edu

---

[16] Sent by email to all OLYM employees in March 2011 by Chief Ranger Colin Smith.

APPENDIX E

LETTER TO DEWA COMMUNITY[17]

I'd like to take this opportunity to introduce myself to the Delaware Water Gap community. I am a graduate student at Cornell University who will be conducting social science research at this park. I spent the winter and spring as a Student Conservation Association (SCA) Public Safety Intern at Mount Rainier NP, and also spent part of my time at Olympic NP. I'll be at DEWA for several weeks this summer, and I hope to meet many of you then.

Because you have worked as employees and volunteers at DEWA, I believe you have a unique and important perspective to share, and I'd like to invite you to take part in an online survey about visitor safety. There are no "right" or "wrong" answers to these questions, and your responses will be kept confidential. Your comments will inform my Ph.D. research at Cornell, as well as help to provide NPS with feedback on how to address visitor safety issues in the future.

In the next few weeks, you will be receiving an email invitation to access the survey. You may skip questions that you do not wish to answer, or discontinue participation at any time with no effect. (You can also fill out some questions, and then return to the survey at a later point). I estimate that the survey will take about 20 minutes to complete. Once you finish, you'll have the option of entering into a drawing for a gift certificate to REI.

Two other parts of my research deserve mention. First, I will be contacting some of you in the next few weeks to ask you to participate in an interview, also relating to safety in the park. I will be conducting these interviews in person when I am at the park, and I estimate that they will take about 40 minutes. Second, throughout the summer you may see me at various locations in the park, such as Hialeah Picnic Area, speaking with park visitors, whom I will be recruiting to take a similar online survey.

If you have any questions or comments about any of the above, please do not hesitate to contact me. (You may also prefer to speak with Chief Ranger Eric Lisnik, who can provide a bit more background on my project). I look forward to interacting with you all in the next few months!

Best wishes,

Laura Rickard
(401) 258-7252
lnr3@cornell.edu

---

[17] Sent by email to all MORA employees by Chief Ranger Eric Lisnik in June 2011.

APPENDIX F

SAMPLE RECRUITMENT POSTCARD (OLYM)

Olympic National Park Visitor Survey

When you receive an invitation, please take a moment to fill out the online survey. You can enter to win a gift certificate to REI!

Thanks for your help and support of Olympic!

Questions? Comments? Contact Laura Rickard: lnr3@cornell.edu

Cornell University

APPENDIX G

EMAIL SURVEY INVITATION

FROM: Laura Rickard
SUBJECT: National park visitor survey

Dear [[name]],

I am contacting you to invite you to take part in a study about visitors in national parks. In this survey, I will ask you about your experiences in_____National Park, as well as your opinions about safety. Your comments will inform my PhD research at Cornell University, as well as help to provide the National Park Service with feedback on how to address visitor safety issues in the future.

Please take a moment to answer this survey to help us better understand your experiences and opinions. Your participation in this survey is voluntary and please be assured that all the information you provide will be kept strictly confidential and will never be used in any way to permit identification of you.

To access the survey, please use the following URL:
http://sri.cornell.edu/XXXXXX

****This is a unique URL only for you; please do not forward this link to anyone else.**

If you have any questions about the survey, please do not hesitate to contact staff at the Cornell University Survey Research Institute at 607-255-3786 or surveyresearch@cornell.edu. In addition, my contact information is listed below.

Thank you very much for your time.

Best wishes,
Laura Rickard

Graduate Student, Department of Communication, Cornell University
(401) 258-7252
lnr3@cornell.edu

APPENDIX H

EMAIL SURVEY INVITATION REMINDER

FROM: Laura Rickard
SUBJECT: National park survey—REMINDER

Dear [[name]],

As you may recall, I have contacted you to ask you to take part in a study about visitors in national parks. In this survey, I will ask you about your experiences in_____National Park, as well as your opinions about safety. Your input matters to me, and I hope you'll consider participating.

Please take a moment to answer this survey to help us better understand your experiences and opinions. Your participation in this survey is voluntary and please be assured that all the information you provide will be kept strictly confidential and will never be used in any way to permit identification of you.

To access the survey, please use the following URL:
http://sri.cornell.edu/XXXXXX

****This is a unique URL only for you; please do not forward this link to anyone else.**

If you have any questions about the survey, please do not hesitate to contact staff at the Cornell University Survey Research Institute at 607-255-3786 or surveyresearch@cornell.edu. In addition, my contact information is listed below.

Thank you very much for your time.

Best wishes,
Laura Rickard

Graduate Student, Department of Communication, Cornell University
(401) 258-7252
lnr3@cornell.edu

APPENDIX I

SURVEY CONVERSION (DEWA VISITORS)

INVITATION:

FROM: Laura Rickard
SUBJECT: First 50 people to complete survey by 8/22 receive a gift certificate!

Dear [[name]],

By now you've received an invitation to take a survey about visitors in Delaware Water Gap National Recreation Area.

I understand that you are busy and would therefore like to *offer you a $10 gift certificate* to Amazon.com to thank you for participating. The first 50 eligible persons to complete the survey by August 22nd will receive this gift certificate.

Your participation in this survey is voluntary and please be assured that all the information you provide will be kept strictly confidential and will never be used in any way to permit identification of you.

To access the survey, please use the following URL:
http://sri.cornell.edu/XXXXXX

****This is a unique URL only for you; please do not forward this link to anyone else.**

If you have any questions about the survey, please do not hesitate to contact staff at the Cornell University Survey Research Institute at 607-255-3786 or surveyresearch@cornell.edu. In addition, my contact information is listed below.

Thank you very much for your time, and I look forward to your participation!

Best wishes,
Laura Rickard

Graduate Student, Department of Communication, Cornell University
(401) 258-7252
lnr3@cornell.edu

APPENDIX J

INFORMED CONSENT (EMPLOYEE/VOLUNTEER INTERVIEWS)

Exploring visitor safety and risk communication in national parks

You are invited to participate in a research study about visitor safety in national parks. You were selected as a possible participant because of your job/position. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

Background Information: This project will examine how National Park Service (NPS) staff and national park visitors think about human safety in national parks. The goal is to better understand the role played by park staff in discussing risk and safety-related issues with the public, as well as to understand how and where park visitors may receive and interpret risk and safety-related park information.

Procedures: If you agree to be in this study, I will ask you to participate in an interview, envisioned to last about 40 minutes, in which I will ask about your views on safety issues in the parks and how and what you communicate with the public about these views. If you feel comfortable doing so, you may be asked to participate in this interview with one or more of your co-workers. With your permission, this interview may be audio-taped.

Risks and Benefits of Being in the Study: I do not anticipate any risks for you participating in this study, other than those encountered in day-to-day life. If we correspond via email, there is a chance that a third-party could read our correspondence. Indirect benefits of participation are greater awareness of the communication challenges faced by NPS employees and volunteers as well as their role in influencing public understanding of health and environmental risks.

Payment for Participation: You will not receive any payment for taking part in the study.

Voluntary Nature of Participation: Your decision whether or not to participate will not affect your current or future relations with Cornell University, nor with the National Park Service. Your participation is voluntary, and you may refuse to participate before the interview begins, withdraw or ask questions at any time, and/or skip any questions with no effect.

Confidentiality: The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify you. All data will be securely stored in the investigator's locked office on the investigator's password-protected computer. Hard copies of data will remain in the investigator's office. All data will be destroyed (i.e., shredded or erased) when their use is no longer needed but not before a minimum of five years after data collection.

Permission to Use Recording Device: Please sign below if you are willing to have this interview audio-taped. You may still participate in this study if you are not willing to have the interview recorded.

Signature ___________________________________ Date ________________________

Contacts and Questions: The researchers conducting this study are:

Laura Rickard, Graduate student, Department of Communication, 212 Kennedy Hall, Cornell University, Ithaca, New York 14853. Phone: 401-258-7252; Email: lnr3@cornell.edu

Katherine McComas, Associate Professor, Department of Communication, 313 Kennedy Hall, Cornell University, Ithaca, New York, 14853. Phone: 607-255-6508

If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) at 607-255-5138 or access their website at http://www.irb.cornell.edu. You may also report your concerns or complaints anonymously through Ethicspoint or by calling toll free at 1-866-293-3077. Ethicspoint is an independent organization that serves as a liaison between the University and the person bringing the complaint so that anonymity can be ensured.

You will be given a copy of this form to keep for your records.

Statement of Consent: I have read the above information and have received answers to any questions I asked. I consent to participate in the study.

Signature ___________________________________ Date ________________________

Your name (printed)____

Signature of person obtaining consent________________Date________

Printed name of person obtaining consent______________Date_____________

This consent form will be kept by the researcher for at least three years beyond the end of the study and was approved by IRB on November 23, 2010.

APPENDIX K

INTERVIEW PROTOCOL

[Introduce self and project and thank individual for participating. Review the informed consent form and seek permission to audiotape interview.]

Introductory information

1) How did you come to be an employee/volunteer at ________park?

2) Tell me about your experience working/volunteering at the park.
   - How long have you worked/volunteered here? Have you worked/volunteered at other national parks?
   - How would you describe your position at the park—for instance, do you see your time here as serving the public, a part-time job, a full-time career, etc.?

Attribution of responsibility and safety

3) In thinking about <u>visitor</u> safety, what do you think counts as an "accident"? Can you think of an example?
   - How do you decide who is responsible for accidents occurring? (Or, *can* you decide?)

4) How does this park address safety issues, both in relation to employees *and* visitors?
   - To what extent is safety emphasized in this park? Can you think of an example to explain what you mean?

5) In your opinion, what is the park's role in ensuring the safety of its visitors? What about the visitor's role?
   - What should park visitors know about risk/safety issues in the park?
   - Does a visitor's background influence what he or she should need to know about these issues?

6) Is any amount of risk "acceptable" in a national park? Why or why not?
   - (How) can we distinguish between "acceptable" and "unacceptable" levels of risk?

Risk communication

7) Tell me about the ways in which visitors receive safety/risk information.
   - How effective are these methods for getting across the safety/risk information?
   - Is there a particular topic/issue that you feel is not currently being well publicized in the park?
   - Is there an information source/method that doesn't currently exist, that should exist?

8) To what extent is talking to the public about safety/risk issues a part of your job?
   - Have you discussed these issues? What has "worked"? Not worked?
   - Have you received any training in talking about safety/risk issues with public audiences? If not, would you *like* to have training?

- Are there any other individuals at the park that you can think of who play a role in disseminating risk/safety information by word-of-mouth?

[Thank the participant, making sure to leave appropriate time for questions, debriefing, and/or other comments, i.e., "Is there anything else you would like to add that we didn't get to in this interview?"]

REFERENCES

Agnew, J. (1987). *The United States in the world economy*. Cambridge: Cambridge University Press.

Albert, R. C. (1987). *Damming the Delaware: The rise and fall of Tocks Island Dam*. University Park, PA: The Pennsylvania State University.

Anderson, C. A. (1983). The causal structure of situations: The generation of plausible causal attributions as a function of type of event situation. *Journal of Experimental Social Psychology, 19*, 185-203.

Baas, J. M., Ewert, A., & Chavez, D. J. (1993). Influence of ethnicity on recreation and natural environment use patterns: Managing recreation sites for ethnic and racial diversity. *Environmental Management, 17*(4), 523-529.

Baker, S. P. (1973). Injury control. In P. E. Sartwell (Ed.), *Preventive medicine and public health, 10th ed* (pp. 987-1002). New York: Appleton-Century-Crofts.

Barnett, J., & Breakwell, G. M. (2001). Risk perception and experience: Hazard personality profiles and individual differences. *Risk Analysis, 21*(1), 171-177.

Baxter, J. (2009). A quantitative assessment of the insider/outsider dimension of the cultural theory of risk and place. *Journal of Risk Research*, *12*(6), 771-791.

Baxter, L. A., & Babbie, E. (2003). *The basics of communication research*. Boston, MA: Wadsworth/Cenage Learning.

Beck, U. (1992). *Risk society*. London: Sage.

Becker, H. S. (1996). *Tricks of the trade: How to think about research while you're doing it*. Chicago: The University of Chicago Press.

Becker, M. H. (1993). A medical sociologist looks at health promotion. *Journal of Health and Social Behavior, 34*(1), 1-6.

Beedie, P., & Hudson, S. (2003). Emergence of mountain-based adventure tourism. *Annals of Tourism Research, 30*(3), 625-643.

Bevan, M. (2011). Living in non-permanent accommodation in England: Liminal experiences of home. *Housing Studies, 26*(4).

Bickerstaff, K., Simmons, P., & Pidgeon, N. (2006). Situating local experience of risk: Peripherality, marginality and place identity in the UK foot and mouth disease crisis. *Geoforum, 37*(5), 844-858.

Bickerstaff, K., Simmons, P., & Pidgeon, N. (2008). Constructing responsibilities for risk: Negotiating citizen-state relationships. *Environment and Planning A*, 40, 1312-1330.

Bickerstaff, K., & Walker, G. P. (2002). Risk, responsibility, and blame: An analysis of vocabularies of motive in air-pollution(ing) discourses. *Environment and Planning A, 34*, 2175-2192.

Billig, M. (2006). Is my home my castle? Place attachment, risk perception, and religious faith. *Environment and Behavior, 38*(2), 248-265.

Blehm, E. (2006). *The last season.* New York: Harper Collins.

Braksiek, R. J., & Roberts, D. J. (2002). Amusement park injuries and deaths. *Annals of Emergency Medicine, 39*(1), 65-72.

Brehm, J., Eisenhauer, B., & Krannich, R. (2006). Community attachments as predictors of local environmental concern. *American Behavioral Scientist, 50*(2), 142-165.

Broom, G. M., & Dozier, D. M. (1990). *Using research in public relations: Applications to program management*. Englewood Cliffs, NJ: Prentice-Hall.

Brownell, K. D. (1991). Personal responsibility and control over our bodies: When expectation exceeds reality. *Health Psychology, 10*(5), 303-310.

Bulman, R. J., & Wortman, C. B. (1977). Attributions of blame and coping in the 'real world': Severe accident victims react to their lot. *Journal of Personality and Social Psychology, 35*(5), 351-363.

Burger, J. M. (1981). Motivational biases in the attribution of responsibility for an accident: A meta-analysis of the defensive attribution hypothesis. *Psychological Bulletin, 90*(3), 496-512.

Burns, T., O'Connor, J., & Stocklmayer, S. (2003). Science communication: A contemporary definition. *Public Understanding of Science, 12*(2), 183-202.

Butchart, A., Kruger, J., & Lekoba, R. (2000). Perceptions of injury causes and solutions in a Johannesburg township: Implications for prevention. *Social Science & Medicine, 50*(3), 331-344.

Byrne, J. (in press). When green is White: The cultural politics of race, nature and social exclusion in a Los Angeles urban national park. *Geoforum*.

Byrne, S., & Hart, P. S. (2009). The boomerang effect: A synthesis of findings and a preliminary theoretical framework. *Communication Yearbook, 33*, 3-38.

Cantrill, J. G. (1998). The environmental self and a sense of place: Communication foundations for regional ecosystem management. *Journal of Applied Communication Research, 26*(3), 301-318.

Caponecchia, C. (2010). It won't happen to me: An investigation of optimism bias in occupational health and safety. *Journal of Applied Social Psychology, 40*(3), 601-617.

Carey, J. (1989). *Communication as culture: Essays on media and society*. Boston: Unwin Hyman.

Charmaz, K. (2001). Grounded theory. In R. Emerson (Ed.), *Contemporary field research: Perspectives and formulations* (2nd ed.) (pp. 335-352). Prospect Heights, IL: Waveland Press.

Chavez, D. J., Winter, P. L., & Absher, J.D. (Eds). (2008). Recreation visitor research: Studies of diversity. Gen. Tech. Rep. PSW-GTR-210. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station.

Cheng, A. S., Kruger, L. E., & Daniels, S. E. (2003). "Place" as an integrating concept in natural resource politics: Propositions for a social science research agenda. *Society and Natural Resources, 16*, 87–104.

Cherryholmes, C. H. (1992). Notes on pragmatism and scientific realism. *Educational Researcher, 21*(6), 13-17.

Cho, H., & Salmon, C. T. (2007). Unintended effects of health communication campaigns. *Journal of Communication, 57*(2), 293-317.

Cohn, P., Williams, D. R., & Carroll, M. (2008). Wildfire risk and attribution: Viewpoints of wildland-urban interface residents. In W. Martin, C. Raish, & B. Kents (Eds.), *Wildfire risk: Human perceptions and management implications* (pp. 23-43).Washington, DC: Resources for the Future.

Cooper, M. D. (2000). Towards a model of safety culture. *Safety Science, 36*(2), 111-136.

Cooper, M. D., & Phillips, R. A. (2004). Exploratory analysis of the safety climate and safety behavior relationship. *Journal of Safety Research, 35*(5), 497-512.

Couper, M. P., & Miller, P. V. (2008). Web survey methods: Introduction. *Public Opinion Quarterly, 72*(5), 831-835.

Cox, R. (2010). *Environmental communication and the public sphere* (2nd edition). Thousand Oaks, CA: Sage.

Crittenden, K. S. (1989). Presidential address on causal attribution in sociocultural context: Toward a self-presentational theory of attribution processes. *The Sociological Quarterly, 30*(1), 1-14.

Crittenden, K. S. (1983). Sociological aspects of attribution. *Annual Sociological Review, 9*, 425-446.

Crittenden, K. S., & Bae, H. (1994). Self-effacement and social responsibility: Attribution as impression management in Asian cultures. *American Behavioral Scientist, 37*(5), 653-671.

Cresswell, T. (2004). *Place: A short introduction*. Oxford: Blackwell Publishing.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed method approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Cronon, W. (1996). The trouble with wilderness; or, Getting back to the wrong nature. In W. Cronon (Ed.), *Uncommon ground: Rethinking the human place in nature* (pp. 69-113). New York: W. W. Norton & Co.

Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco: Jossey-Bass Publishers.

Currie, R. R. (1997). A pleasure-tourism behaviors framework. *Annals of Tourism Research, 24*(4), 884-897.

Cushner, K. C., & Brislin, R. W. (1996). *Intercultural interactions: A practical guide* (2nd Ed.). Thousand Oaks, CA: Sage.

Dahl, R. F. (1993). Principles for effective cross-cultural communication. In A. W. Ewert, D. J. Chavez, & A. W. Magill (Eds.), *Culture, conflict, and communication in the wildland-urban interface*. Boulder, CO: Westview Press.

Dann, G. M. S. (1996). *The language of tourism: A sociolinguistic perspective*. London: CAB International.

Dantzker, H. C., Chandrasekaran, D., & Snedeker, S. M. (in press). Exploring cancer risk perceptions of turf and lawn pesticide professionals in New York State. *Environment and Behavior.*

Davison, A. (2008). The trouble with nature: Ambivalence in the lives of urban Australian environments. *Geoforum, 39*, 1284-1295.

DeJoy, D. M. (1985). Attributional processes and hazard control management in industry. *Journal of Safety Research, 16*(2), 61-71.

DeJoy, D. M. (1994). Managing safety in the workplace: An attribution theory analysis and model. *Journal of Safety Research, 25*(1), 3-17.

DeJoy, D. M. (1989). The optimism bias and traffic accident risk perception. *Accident Analysis & Prevention, 21*(4), 333-340.

DeJoy, D. M., Schaffer, B. S., Wilson, M. G., Vandenburg, R. J., & Butts, M. M. (2004). Creating safer workplaces: Assessing the determinants and role of safety climate. *Journal of Safety Research, 35*(1), 81-90.

DeLuca, K. M. (2010). Salvaging wilderness from the tomb of history: A response to *The National Parks: America's Best Idea. Environmental Communication: A Journal of Nature and Culture, 4*(4), 484-493.

Desai, V. M., Roberts, K. H., & Ciavarelli, A. P. (2006). The relationship between safety climate and recent accidents: Behavioral learning and cognitive attributions. *Human Factors, 48*(4), 639-650.

Dhir, V. L., & Kanekar, S. (1994). Indian merchant navy officers' judgments of causality, blameworthiness, and punishment for a shipping accident. *Applied Psychology: An International Review, 43*(1), 75-87.

Didla, S., Mearns, K., & Flin, R. (2009). Safety citizenship behavior: A proactive approach to risk management. *Journal of Risk Research, 12*(3-4), 475-483.

Dillman, D. A., Dolsen, D. E., & Machlis, G. E. (1995). Increasing response to personally-delivered mail-back questionnaires by combining foot-in-the-door and social exchange methods*. Journal of Official Statistics, 11*, 129-139.

Dillman, D. A., Reips, U. D., & Matzat, U. (2010). Advice in surveying the general public over the Internet. *International Journal of Internet Science, 5*(1), 1-4.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method*. Hoboken, NJ: John Wiley & Sons, Inc.

Dimmock, K. (2009). Finding comfort in adventure: Experiences of recreational SCUBA divers. *Leisure Studies, 28*(3), 279-295.

Doria, M. F., Abubakar, I., Syed, Q., Hughes, S., & Hunter, P. R. (2006). Perceived causes of sporadic cryptosporidiosis and their relation to sources of information. *Journal of Epidemiology and Community Health, 60*(9), 745-749.

Dorn, L., & Brown, B. (2003). Making sense of invulnerability at work: A qualitative study of police drivers. *Safety Science, 41*(10), 837-859.

Doucette, J., & Cole, D. (1993). *Wilderness visitor education: Information about alternative techniques.* USDA Forest Service General Technical Report INT-295.

Douglas, M. (1992). *Risk and blame: Essays in cultural theory.* London: Routledge.

Douglas, M. (1990). Risk as forensic resource. *Daedalus, 119*(4), 1-16.

Dov, Z. (2008). Safety climate and beyond: A multi-level, multi-climate framework. *Safety Science, 46*(3), 376-387.

Duda, M. D., & Nobile, J. L. (2010). The fallacy of online surveys: No data are better than bad data. *Human Dimensions of Wildlife, 15*(1), 55-64.

Dunn, R., & Gublis, J. M. (1976). The risk revolution. *Parks and Recreation, 11*, 12-18.

Durant, J., Evans, G., & Thomas, G. (1989). The public understanding of science. *Nature, 340,* 11-14.

Eden, S. E. (1993). Individual environmental responsibility and its role in public environmentalism. *Environment and Planning A*, 25, 1743-1758.

Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication, 43*(4), 51-58.

Espiner, S. (2001). *The phenomenon of risk and its management in natural resource recreation and tourism settings: A case study of Fox and Franz Josef Glaciers, Westland National Park, New Zealand.* Unpublished doctoral dissertation, Lincoln University, Canterbury, New Zealand.

Espiner, S.R., (1999). The use and effect of hazard warning signs: Managing visitor safety at Franz Josef and Fox Glaciers. *Science for Conservation, 108*, 1-39.

Ewert, A. W. (1994). Playing the edge: Motivation and risk-taking in a high-altitude wilderness-like environment. *Environment and Behavior, 26*(1), 3-24.

Ewert, A., & Hollenhorst, S. (1989). Testing the adventure model: Empirical support for a model of risk recreation participation. *Journal of Leisure Research, 21*(2), 124-139.

Factor, R., Mahalel, D., & Yair, G. (2007). The social accident: A theoretical model and research agenda for studying the influence of social and cultural characteristics on motor vehicle accidents. *Accident Analysis & Prevention, 39*(5), 914-921.

Factor, R., Yair, G., & Mahalel, D. (2010). Who by accident? The social morphology of car accidents. *Risk Analysis, 30*(9), 1411-1422.

Farabee, Jr., C. R. (2003). *National park ranger: An American icon*. Lanham, MD: Roberts Rhinehart Publishers.

Farnum, J., Hall, T., & Kruger, L. E. (2005). *Sense of place in natural resource recreation and tourism: An evaluation and assessment of research findings*. Gen. Tech. Rep. PNW-GTR-660. Portland, OR: U.S. Department of Agriculture, Pacific Northwest Research Station.

Findley, M., Smith, S., Gorski, J., & O'Neill, M. (2007). Safety climate differences among job positions in a nuclear decommissioning and demolition industry: Employees' self-reported safety attitudes and perceptions. *Safety Science, 45*, 875-889.

Floyd, M. F., & Johnson, C. Y. (2002). Coming to terms with environmental justice in outdoor recreation: A conceptual discussion with research implications. *Leisure Sciences, 24*(1), 59-77.

Fontana, A., & Frey, J. H. (2000). The interview: From structured questions to negotiated text. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 645-672). Thousand Oaks, CA: Sage

Ford, B. M., & Kaphingst, K. A. (2009). Lay interpersonal sources for health information related to beliefs about the modifiability of cancer risk. *Cancer Causes and Control, 20*(10), 1975-1983.

Freidus, A., & Romero-Daza, N. (2009). The space between: Globalization, liminal spaces and personal relations in rural Costa Rica. *Gender, Place & Culture: A Journal of Feminist Geography, 16*(6), 683-702.

Freudenburg, W. R. (1993). Risk and recreancy: Weber, the division of labor, and the rationality of risk perceptions. *Social Forces, 71*(4), 909-932.

Galliano, S. J., & Loeffler, G. M. (1999). *Place assessment: How people define ecosystems.* Gen. Tech. Rep. PNW-GTR-462. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Galloway, G., & Lopez, K. (1999). Sensation seeking and attitudes to aspects of national parks: A preliminary empirical investigation. *Tourism Management, 20*(6), 665-671.

Ghiglieri, M. P., & Myers, T. M. (2001). *Over the edge: Death in Grand Canyon*. Puma Press.

Ghiglieri, M. P., & Farabee, C. R. (2007). *Off the wall: Death in Yosemite*. Puma Press.

Girasek, D. C. (1999). How members of the public interpret the word accident. *Injury Prevention, 5*(1), 19-25.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine de Gruyter.

Goncalves, S. M. P., da Silva, S. A., Lima, M. L., & Melia, J. L. (2008). The impact of work accidents experience on causal attributions and worker behaviour. *Safety Science, 46*(6), 992-

1001.

Graefe, A., Mowen, A., Covelli, E., & Trauntvein, N. (2011). Recreation participation and conservation attitudes: Differences between mail and online respondents in a mixed-mode survey. *Human Dimensions of Wildlife, 16*(3), 183-189.

Green, J. (1997a). *Risk and misfortune: The social construction of accidents*. London: UCL Press.

Green, J. (1997b). Risk and the construction of social identity: Children's talk about accidents. *Sociology of Health & Illness, 19*(4), 457-479.

Green, J., & Hart, L. (1998). Children's views of accident risk and prevention: A qualitative study. *Injury Prevention, 4*(1), 14-21.

Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11*(3), 255-274.

Griffin, R., & Dunwoody, S. (1997). Community structure and science framing of news about local environmental risks. *Science Communication, 18*, 362–384.

Griffin, R. J., Dunwoody, S., & Zabala, F. (1998). Public reliance on risk communication channels in the wake of a Cryptosporidium outbreak. *Risk Analysis, 18*(4), 367-375.

Grunig, J. E., & Stamm, K. R. (1973). Communication and coorientation of collectivities. *The American Behavioral Scientist, 16*(4), 567-591.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative methods. In N. Denzin & Y. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). Thousand Oaks, CA: Sage.

Guldenmund, F. W. (2010). (Mis)understanding safety culture and its relationship to safety management. *Risk Analysis, 30*(10), 1466-1480.

Guldenmund, F.W. (2000). The nature of safety culture: A review of theory and research. *Safety Science, 34*, 215–257.

Gyekye, S. A. (2003). Causal attributions of Ghanaian industrial workers for accident occurrence: Miners and non-miners perspective. *Journal of Safety Research, 34*(5), 533-538.

Hall, S. (2001). Encoding/decoding. In M. G. Durham & D. M. Kellner (Eds.), *Media and cultural studies keyworks* (pp. 166-176). Malden, MA: Blackwell Publishers.

Hamilton, V. L. (1978). Who is responsible? Towards a *social* psychology of responsibility attribution. *Social Psychology, 41*(4), 316-328.

Hamilton, V. L., & Sanders, J. (1981). The effects of roles and deeds on responsibility judgments: The normative structure of wrongdoing. *Social Psychology Quarterly, 44*, 237-254.

Harvey, J., & Weary, G. (1984). Current issues in attribution theory and research. *Annual Review of Psychology, 35*, 427-459.

Hasle, P., Kines, P., & Andersen, L. P. (2009). Small enterprise owners' accident causation attribution and prevention. *Safety Science, 47*(1), 9-19.

Haynes, T. L., Perry, R. P., Stupnisky, R. H., & Daniels, L. M. (2009). A review of attributional retraining treatments: Fostering engagement and persistence in vulnerable college students. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (pp. 227-272). New York: Springer.

Heberlein, T. A. (1974). The three fixes: Technological, cognitive, and structural. In D. R. Field, J. C. Barron, & B. F. Long (Eds.), *Water and community development: Social and economic perspective* (pp. 279-296). Ann Arbor, MI: Ann Arbor Science Publishers.

Heerwegh, D., & Loosveldt, G. (2008). Face-to-face versus web surveying in a high-Internet-coverage population. *Public Opinion Quarterly, 72*(5), 836-846.

Heggie, T. W., & Amundson, M. E. (2009). Dead men walking: Search and rescue in U.S. national parks. *Wilderness & Environmental Medicine, 20*(3), 244-249.

Heggie, T. W., & Heggie, T. M. (2009). Search and rescue trends associated with recreational travel in U.S. national parks. *Journal of Travel Medicine, 16*(1), 23-27.

Heider, F. (1958). *The psychology of interpersonal relations*. New York: Wiley.

Hofmann, D. A., & Stetzer, A. (1998). The role of safety climate and communication in accident interpretation: Implications for learning from negative events. *Academy of Management Journal, 41*(6), 644-657.

Howard, J. A., & Levinson, R. (1985). The overdue courtship of attribution and labeling. *Social Psychology Quarterly, 48*(3), 191-202.

Hugh-Jones, S., & Madill, A. (2009). ‘The air’s got to be far cleaner here’: A discursive analysis of place-identity threat. *British Journal of Social Psychology, 48*(4), 601-624.

Iyengar, S. (1996). Framing responsibility for political issues. *Annals of the American Academy of Political and Social Science, 546*(1), 59-70.

Iyengar, S. (1989). How citizens think about national issues: A matter of responsibility. *American Journal of Political Science, 33*(4), 878-900.

Iyengar, S. (1991). *Is anyone responsible? How television frames political issues*. Chicago: University of Chicago Press.

Jardine, C. G., Boyd, A. D., & Furgal, C. M. (2009). Gender and place influences on health risk perspectives in Northern Canadian Aboriginal communities. *Gender, Place, & Culture, 16*(2), 201-223.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26.

Jorgensen, B. S., & Stedman, R. (2001). Sense of place as an attitude: Lakeshore owners' attitudes toward their properties. *Journal of Environmental Psychology. 21*, 233–248.

Kahlor, L., Dunwoody, S., & Griffin, R. J. (2002). Attributions in explanations of risk estimates. *Public Understanding of Science, 11*, 243-257.

Kaplowitz, M. D., Hadlock, T. D., & Levine, R. (2004). A comparison of web and mail survey response rates. *Public Opinion Quarterly, 68*(1), 94-101.

Kasperson, J. X., Kasperson, R. E., Pidgeon, N., & Slovic, P. (2003). The social amplification of risk: Assessing fifteen years of research and theory. In N. Pidgeon, R. E. Kasperson, & P. Slovic, (Eds.), *The social amplification of risk* (pp. 13-46). Cambridge: Cambridge University Press.

Kasperson, R. E., Renn, O., Slovic, P., Brown, H. S., Emel, J., Goble, R., Kasperson, J. X. & Ratick, S. (1988). The social amplification of risk: A conceptual framework. *Risk Analysis, 8*(2), 177-187.

Kelley, H. H. (1972). Attribution in social interaction. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, & B. Weiner (Eds.), *Attribution: Perceiving the causes of behavior* (pp. 1-26). Morristown, NJ: General Learning Press.

Kelley, H. H. (1973). The processes of causal attribution. *American Psychologist, February*, 107-128.

Kelley, H. H., & Michela, J. L. (1980). Attribution theory and research. *Annual Review of Psychology, 31*(1), 457-501.

Kerr, A., Cunningham-Burley, S., & Tutton, R. (2007). Shifting subject positions: Experts and lay people in public dialogue. *Social Studies of Science, 37*(3), 385-411.

Kimhi, S., Canetti-Nisim, D., & Hirschberger, G. (2009). Terror in the eyes of the beholder: The impact of causal attributions on perceptions of violence. *Peace and Conflict, 15*(1), 75-95.

Kirkwood, W. G., & Brown, D. (1995). Public communication about the causes of disease: The rhetoric of responsibility. *Journal of Communication, 45*(1), 55-76.

Kouabenan, D. R. (1998). Beliefs and the perception of risks and accidents. *Risk Analysis, 18*(3), 243-252.

Kouabenan, D. R. (2002). Occupation, driving experience, and risk and accident perception. *Journal of Risk Research, 5*(1), 49-68.

Kouabenan, D. R. (2009). Role of beliefs in accident and risk analysis and prevention. *Safety Science, 47*(6), 767-776.

Kouabenan, D. R., & Cadet, B. (2005). Risk evaluation and accident analysis. *Advances in Psychology Research, 36*, 61-80.

Kouabenan, D. R., Gilbert, D., Medina, M., & Bouzon, F. (2001). Hierarchical position, gender, accident severity, and casual attribution. *Journal of Applied Social Psychology, 31*(3), 553-575.

Krull, D. S. (1993). Does the grist change the mill? The effect of the perceiver's inferential goal on the process of social inference. *Personality and Social Psychology Bulletin, 19*, 340-348.

Kumagai, Y., Bliss, J. C., Daniels, S. E., & Carroll, M. S. (2004). Research on causal attribution of wildfire: An exploratory multiple-methods approach. *Society & Natural Resources, 17(2)*, 113-127.

Kumagai, Y., Daniels, S. E., & Carroll, M. S., Bliss, J. C., & Edwards, J. A. (2004). Causal reasoning processes of people affected by wildfire: Implications for agency-community interactions and communication strategies. *Western Journal of Applied Forestry, 19*(3), 184-194.

Lacroix, D. V., & DeJoy, D. M. (1989). Causal attributions to effort and supervisory response to workplace accidents. *Journal of Occupational Accidents, 11*, 97-109.

Lankford, A. (2010). *Ranger confidential: Living, working, and dying in the national parks.* Guilford, CT: Globe Pequot Press.

Lazinger, M. (2007). The science and society movement and the MUSE project. *Journal of Science Communication, 6*(2), 1-4.

Lehane, P., & Stubbs, D. (2001). The perceptions of managers and accident subjects in the service industries towards slip and trip accidents. *Applied Ergonomics, 32*(2), 119-126.

Leiter, M. P., Zanaletti, W., & Argentero, P. (2009). Occupational risk perception, safety training, and injury prevention: Testing a model in the Italian printing industry. *Journal of Occupational Health Psychology, 14*(1), 1-10.

Leong, K. M., McComas, K. A., & Decker, D. J. (2007). Matching the forum to the fuss: Using coorientation contexts to address the paradox of public participation in natural resource management. *Environmental Practice, 9*(3), 196-205.

Leong, K. M., McComas, K. A., & Decker, D. J. (2008). Formative coorientation research: A tool to assist with environmental decision making. *Environmental Communication: A Journal of Nature & Culture, 2*(3), 257-273.

Lerner, M. J., & Miller, D. T. (1978). Just world research and the attribution process: Looking back and ahead. *Psychological Bulletin, 85*(5), 1030-1051.

Leshner, A. (2003). Public engagement with science. *Science, 299*, 977.

Lesser, V. M., Yang, D. K., & Newton, L. D. (2011). Assessing hunters' opinions based on a mail and a mixed-mode survey. *Human Dimensions of Wildlife, 16*(3), 164-173.

Lewis, R. E., & Tyshenko, M. G. (2009). The impact of social amplification and attenuation of risk and the public reaction to Mad Cow Disease in Canada. *Risk Analysis, 29*(5), 714-728.

Liberman, N., Sagistrano, M. D., & Trope, Y. (2002). The effect of temporal distance on level of mental construal. *Journal of Experimental Social Psychology, 38*, 523-534.

Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of Personality and Social Psychology, 75*(1), 5-18.

Lipscombe, N. (2005). Risk and adventure in leisure: Meaning and importance explored. *Australasian Parks and Leisure, Spring*, 42–47.

Loewen, B. (2009). *Pickets and dead men: Seasons on Rainier*. Seattle: Mountaineers Books.

Lofland, J., Snow, D., Anderson, L., & Lofland, L. H. (2006). *Analyzing social settings: A guide to qualitative observation and analysis* (4th ed.). Belmont, CA: Wadsworth Publishing.

Loimer, H., & Guarnieri, M. (1996). Accidents and acts of God: A history of the terms. *American Journal of Public Health, 86*(1), 101-107.

Louter, D. (2006). *Windshield wilderness: Cars, roads, and nature in Washington's national parks.* Seattle, WA: University of Washington Press.

Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill, NC: Algonquin Books.

Low, S. M., & Altman, I. (1992). Place attachment: A conceptual inquiry. In I. Altman & S. M. Low (Eds.), *Place attachment* (pp. 1-12). New York: Plenum Press.

Lund, J., & Aaro, L. E. (2004). Accident prevention: Presentation of a model placing emphasis on human, structural, and cultural factors. *Safety Science, 42,* 271-324.

Lupton, D. (1993). Risk as moral danger: The social and political functions of risk discourse in public health. *International Journal of Health Services, 23*(3), 425-435.

Lupton, D. (1994). Toward the development of critical health communication praxis. *Health Communication, 6*(1), 55-67.

Lupton, D. (1999). *Risk.* London: Routledge.

Lupton, D., & Tulloch, J. (2002a). 'Life would be pretty dull without risk': Voluntary risk-taking and its pleasures. *Health, Risk & Society, 4*(2), 113-124.

Lupton, D., & Tulloch, J. (2002b). 'Risk is part of your life': Risk epistemologies among a group of Australians. *Sociology, 36*(2), 317-334.

Lyng, S. (1990). Edgework: A social psychological analysis of voluntary risk-taking. *American Journal of Sociology, 95*(4), 851-886.

Machlis, G. E., & Rosa, E. A. (1990). Desired risk: Broadening the social amplification of risk framework. *Risk Analysis, 10*(1), 161-168.

Madgic, R. (2005). *Shattered air: A true account of catastrophe and courage on Yosemite's Half Dome.* Short Hills, NJ: Burford Books.

Malle, B. F. (1999). How people explain behavior: A new theoretical framework. *Personality and Social Psychology Review, 3*(1), 23-48.

Mannetti, L., & Pierro, A. (1991). Health care workers' reactions to AIDS victims: Perception of risk and attribution of responsibility. *Journal of Community and Applied Social Psychology, 1*, 133-142.

Manning, R. E. (2003). Emerging principles for using education/communication in wilderness management. *International Journal of Wilderness, 9*(1), 20-28.

Manning, R., Cole, D., Stewart, W., Taylor, J., & Lee, M. (2000). *Day use hiking in Grand Canyon National Park.* Arizona: Grand Canyon National Park.

Marafiote, T., & Plec, E. (2006). From dualisms to dialogism: Hybridity in discourse about the natural world. *The Environmental Communication Yearbook, 3*, 49-75.

Marris, C., Langford, I. H., & O'Riordan, T. (1998). A quantitative test of the cultural theory of risk perceptions: Comparison with the psychometric paradigm. *Risk Analysis, 18*(5), 635-647.

Masuda, J. R., & Garvin, T. (2006). Place, culture, and the social amplification of risk. *Risk Analysis, 26*(2), 437-454.

Maxwell, J. A. (1996). *Qualitative research design: Interactive approach*. Thousand Oaks, CA: Sage.

Mayring, P. (2007). On generalizability in qualitatively oriented research. *Qualitative Social Research, 8*(3), article 26.

McClure, J., Allen, M. W., & Walkey, F. (2001). Countering fatalism: Causal information in news reports affects judgments about earthquake damage. *Basic and Applied Social Psychology, 23*(2), 109-121.

McClure, J., Walkey, F., & Allen, M. (1999). When earthquake damage is seen as preventable: Attributions, locus of control and attitudes to risk. *Applied Psychology: An International Review, 48*(2), 239-256.

McClure, J., Sutton, R. M., & Wilson, M. (2007). How information about building design influences causal attributions for earthquake damage. *Asian Journal of Social Psychology, 10*, 233-242.

McComas, K. A., Lundell, H., Trumbo, C. W., & Besley, J. C. (2010). Public meetings about local cancer cluster investigations: Exploring the relative influence of conventional vs. symbolic risk messages on attendees' post-meeting concern. *Journal of Risk Research, 13*, 753-770.

McDonald, N., Corrigan, S., Daly, C., & Cromie, S. (2000). Safety management systems and safety culture in aircraft maintenance organizations. *Safety Science, 34*(1), 151–176.

McKenna, F. P. (1993). It won’t happen to me: Unrealistic optimism or illusion of control. *British Journal of Psychology, 84*, 39-50.

McLeod, J. M., & Chaffee, S. H. (1973). Interpersonal approaches to communication research. *The American Behavioral Scientist, 16*(4), 469-499.

McNulty, T. (2009). *Olympic National Park: A natural history*. Seattle, WA: University of Washington Press.

Mearns, K., Flin, R., Gordon, R., & Fleming, M. (1998). Measuring safety climate on offshore installations. *Work and Stress, 12*, 238–254.

Menon, T., Morris, M. W., Chiu, C., & Hong, Y. (1999). Culture and the construal of agency: Attribution to individual versus group dispositions. *Journal of Personality and Social Psychology, 76*(5), 701-717.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage.

Milstein, T. (2009). *Environmental communication theories*. In S. W. Littlejohn & K. A. Foss (Eds.), Encyclopedia of Communication Theory. Thousand Oaks, CA: Sage.

Moore, R., & Graefe, A. (1994). Attachments to recreation settings: The case of rail-trail users. *Leisure Sciences, 16*, 17-31.

Morgan, D. L. (2006). Practical strategies for combining qualitative and quantitative methods: Applications to health research. In Hesse-Biber, S. N., & Leavy, P. (Eds.), *Emergent methods in social research* (pp. 165-182). Thousand Oaks, CA: Sage.

National Park Service. (2009). National Park Service Public Use Statistics Office. **Retrieved June 16, 2010, from,** http://www.nature.nps.gov/stats/viewReport.cfm

National Safety Council. (2009). *Fixed-site amusement ride injury survey: 2008 update*. Prepared for the International Association of Amusement Parks and Attractions. **Retrieved June 22, 2010, from,** http://www.iaapa.org/pressroom/AmusementRideInjuryStatistics.asp

Newman, S., & Chanlongbutra, A. (2008). *Visitor safety survey results: Pacific West Region*. National Park Service.

Niederdepppe, J., Bu, Q. L., Borah, P., Kindig, D. A., & Robert, S. A. (2008). Message design strategies to raise public awareness of social determinants of health and population health disparities. *The Milbank Quarterly, 86*(3), 481-513.

Nielsen, K. J., Rasmussen, K., Glasscock, D., & Spangenberg, S. (2008). Changes in safety climate and accidents at two identical manufacturing plants. *Safety Science, 46*, 440-449.

Oetzel, J., DeVargas, F., Ginossar, T., & Sanchez, C. (2007). Hispanic women's preferences for breast health information: Subjective cultural influences on source, message, and channel. *Health Communication, 21*(3), 223-233.

Office of the Press Secretary. (2010). *Presidential memorandum: America's great outdoors.* **Retrieved May 4, 2010, from,** http://www.whitehouse.gov/the-press-office/presidential-memorandum-americas-great-outdoors

O'Neill, S. C., McBride, C. M., Alford, S. H., & Kaphingst, K. A. (2010). Preferences for genetic and behavioral health information: The impact of risk factors and disease attributions. *Annals of Behavioral Medicine, 40*, 127-137.

Ostergren, D., Solop, F. I., & Hagen, K. K. (2005). National Park Service fees: Value for the money or barrier to visitation. *Journal of Park and Recreation Administration, 23*(1), 18-36.

Page, S. J., & Meyer, D. (1997). Injuries and accidents among international tourists in

Australasia: Scale, causes and solutions. In S. Clift & P. Grabowski (Eds.), *Tourism and health* (pp. 61-79). London: Pinter.

Parker, J., & Stanworth, H. (2005). 'Go for it!' Towards a critical realist approach to voluntary risk-taking. *Heath, Risk & Society, 7*(4), 319-336.

Pelletier, A. R., & Gilchrist, J. (2005). Roller coaster related fatalities, United States, 1994-2004. *British Medical Journal, 11*(5), 309-312.

Peltzer, K., & Renner, W. (2003). Superstition, risk-taking, and risk perception of accidents among South African taxi drivers. *Accident Analysis and Prevention, 35*(4), 619-623.

Petchenik, J., & Watermolen, D. J. (2011). A cautionary note on using the Internet to survey recent hunter education graduates. *Human Dimensions of Wildlife, 16*(3), 216-218.

Petts, J. (2005). Health, responsibility, and choice: Contrasting negotiations of air pollution and immunization information. *Environment and Planning A*, 37, 791-804.

Phipps, P. (1999). Tourists, terrorists, death and value. In R. Kaur & J. Hutnyk (Eds.), *Travel worlds: Journeys in contemporary cultural politics* (pp. 74–93). London: Zed.

Pidgeon, N.F. (1991). Safety culture and risk management in organizations. *Journal of Cross-Cultural Psychology, 22*(1), 129-140.

Pidgeon, N. (1998). Safety culture: Key theoretical issues. *Work & Stress, 12*(3), 202-216.

Pomfret, G. (2006). Mountaineering adventure tourists: A conceptual framework for research. *Tourism Management, 27*(113-123).

Rayner, S. (1992). Cultural theory and risk analysis. In S. Krimsky, & D. Golding (Eds.), *Social theories of risk* (pp. 83-115). Westport, CT: Praeger Publishers.

Rayner, S. (1986). Management of radiation hazards in hospitals: Plural rationalities in a single institution. *Social Studies of Science, 16*(4), 573-591.

Rayner, S. (1993). Risk perception, technology acceptance, and institutional culture: Case studies of some new definitions. In B. Ruck (Ed.), *Risk is a construct: Perceptions of risk perception* (pp. 197-220). Munich: Knesebeck.

Rayner, S., & Cantor, R. (1987). How fair is safe enough? The cultural approach to societal technology choice. *Risk Analysis, 7*(1), 3-9.

Relph, E. (1976). *Place and placelessness*. London: Pion Limited.

Rennie, L., & Stocklmayer, S. (2003). The communication of science and technology: Past, present, and future agendas. *International Journal of Science Communication, 25*(6),759-

773.

Rickard, L. N. (2011). In backyards, on front lawns: Examining informal risk communication and communicators. *Public Understanding of Science, 20*(5), 642-657.

Rickard, L. N., McComas, K. A., & Newman, S. B. (2011). Visitor proficiency profiling and risk communication at a national park. *Environmental Communication: A Journal of Nature and Culture*, *5*(1), 62-82.

Rickard, L. N., Scherer, C. W., & Newman, S. B. (2011). Exploring attribution of responsibility for visitor safety in a U.S. national park. *Health, Risk & Society, 13*(6), 527-545.

Roberts, H., Smith, S. J., & Bryce, C. (1995). *Children at risk? Safety as a social value*. Philadelphia, PA: Open University Press.

Roberts, H., Smith, S., & Bryce, C. (1993). Prevention is better... *Sociology of Health & Illness, 15*(4), 447-463.

Rogers, R. A. (1998). Overcoming the objectification of nature in constitutive theories: Toward a transhuman materialist theory of communication. *Western Journal of Communication, 62*(3), 244-272.

Ross-Bryant, L. (2010). Ken Burns and American mythology in *The National Parks: America's Best Idea. Environmental Communication: A Journal of Nature and Culture, 4*(4), 475-483.

Rubin, H. J., & Rubin, I. S. (1995). *Qualitative interviewing*. Thousand Oaks, CA: Sage.

Saferparks. (2009). *Saferparks: Sharing information for safer amusement ride thrills*. **Retrieved June 22, 2010, from,** http://www.saferparks.org

Salminen, S. (1992). Defensive attribution hypothesis and serious occupational accidents. *Psychological Reports, 70*, 1195-1199.

Sarkisian, C. A., Prohaska, T. R., Davis, C., & Weiner, B. (2007). Pilot test of an attribution retraining intervention to raise walking levels in sedentary older adults. *Journal of the American Geriatrics Society, 55*(11), 1842-1846.

Sax, J. L. (1980). *Mountains without handrails: Reflections on the National P*arks. Ann Arbor: The University of Michigan Press.

Sexton, N. R., Miller, H. M., & Dietsch, A. M. (2011). Appropriate uses and considerations for online surveying in human dimensions research. *Human Dimensions of Wildlife, 16*(3), 154-163.

Shaver, K. G. (1970). Defensive attribution: Effects of severity and relevance on the responsibility assigned for an accident. *Journal of Personality and Social Psychology, 14*(2), 101-113.

Shaver, K. G. (1985). *The attribution of blame: Causality, responsibility, and blameworthiness*. New York: Springer-Verlag.

Shields, R. (1991). *Places on the margin: Alternative geographies of modernity*. London: Routledge.

Sieber, J. E. (1997). Planning ethically responsible research. In L. Bickman & D. J. Bog (Eds.), *Handbook of applied social research methods* (pp. 127-156). Thousand Oaks, CA: Sage.

Sieber, S. D. (1973). The integration of fieldwork and survey methods. *The American Journal of Sociology, 78*(6), 1335-1359.

Simcox, D. E., & Hodgson, R. W. (1993). Strategies in intercultural communication for natural resource agences. In A. W. Ewert, D. J. Chavez, & A. W. Magill (Eds.), *Culture, conflict, and communication in the wildland-urban interface* (pp. 123-134). Boulder, CO: Westview Press.

Silbey, S. S. (2009). Taming Prometheus: Talk about safety and culture. *Annual Review of Sociology, 35*, 341-369.

Slovic, P. (1987). Perception of risk. *Science, 236*(4799), 280-285.

Slovic, P., Fischhoff, B., & Lichtenstein, S. (1981). Perceived risk: Psychological factors and social implications. *Proceedings of the Royal Society of London, A376*, 17-34.

Small, M. S. (2011). How to conduct a mixed method study: Recent trends in a rapidly growing literature. *Annual Review of Sociology, 37*, 57-86.

Smith, E., & Espiner, S. (2007). *The role of risk and safety in shaping the experiences of guided adventure tourists: A case study of sea-kayak and multi-day walking participants*. Canterbury, New Zealand: Lincoln University.

Smyth, J. D., Dillman, D. A., Christian, L. M., & O'Neill, A. C. (2010). Using the Internet to survey small towns and communities: Limitations and possibilities in the early 21st century. *American Behavioral Scientist, 53,* 1423–1448.

Solop, F. I., Hagen, K. K., & Ostergren, D. (2003). National Park Service comprehensive survey of the American public, 2000: Racial and ethnic diversity of National Park System visitors and non-visitors. National Park Service, Fort Collins, Colorado.

Sosis, R. L. (1974). Internal-external control and the perception of responsibility of another for an accident. *Journal of Personality and Social Psychology, 30*(3), 393-399.

Stedman, R.C. (2002). Toward a social psychology of place: Predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior, 34*(5), 561–581.

Stedman, R. (2003a). Is it really just a social construction? The contribution of the physical environment to sense of place. *Society and Natural Resources, 16*, 671–685.

Stedman, R. (2003b). Sense of place and forest science: Toward a program of quantitative research. *Forest Science, 49*(6): 822–829.

Stedman, R., Beckley, T., Wallace, S., & Ambard, M. (2004). A picture and 1,000 words: Using resident-employed photography to understand attachment to high amenity places. *Journal of Leisure Research, 36*(4), 580-607.

Steensma, H., den Hartigh, E., & Lucardie, E. (1994). Social categories, just world belief, locus of control, and causal attributions of occupational accidents. *Social Justice Research, 7*(3), 281-299.

Suchman, E. A. (1961). A conceptual analysis of the accident phenomenon. *Social Problems, 8*(3), 241-253.

Swearingen, T. C., & Johnson, D. (1988). *An analysis of off-trail hiking in response to selected social control techniques at Paradise Meadows, Mount Rainier National Park*. Seattle, WA: College of Forest Resources, University of Washington, Cooperative Park Studies Unit, National Park Service.

Tansey, J., & O'Riordan, T. (1999). Cultural theory and risk: A review. *Health, Risk, & Society, 1*(1), 71-90.

Tarlow, P. E. (2006). Crime and tourism. In J. Wilks, D. Pendergast, & P. Leggat (Eds.), Tourism in turbulent times: Towards safe experiences for visitors (pp. 93-106). London: Elsevier.

Tarlow, P., & Muehsam, M. (1996). Theoretical aspects of crime as they impact the tourism industry. In A. Pizam & Y. Manfeld (Eds.), *Tourism, crime and international security issues* (pp. 11-22). London: John Wiley & Sons.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches*. Thousand Oaks, CA: Sage.

Taylor, A., Grandjean, B. D., & Gramann, J. H. (2011). National Park Service comprehensive survey of the American public, 2008–2009: Racial and ethnic diversity of National Park System visitors and non-visitors. Natural Resource Report NPS/NRSS/SSD/NRR—2011432. National Park Service, Fort Collins, Colorado.

Theodori, G., & Luloff, A. E. (2000). Urbanization and community attachment in rural areas. *Society and Natural Resources, 13*(5), 399-420.

Tichenor, P. J., & Wackman, D. B. (1973). Mass media and community public opinion. *The American Behavioral Scientist, 16*(4), 593-606.

Torell, U., & Bremberg, S. (1995). Unintentional injuries: Attribution, perceived preventability, and social norms. *Journal of Safety Research, 26*(2), 63-73.

Trochim, W.M.K. (2006) *Research methods knowledge base 2nd Ed.* Cornell University. **Retrieved March 4, 2009, from**, http://www.socialresearchmethods.net/kb/qualval.php

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review, 117*(2), 440-463.

Tuan, Y. F. (1977). *Space and place: The perspective of experience*. Minneapolis, MN: University of Minnesota Press.

Tuler, S., & Golding, D. (2002). *A comprehensive study of visitor safety in the National Park System: Final Report*. Worcester, MA: The George Perkins Marsh Institute, Clark University.

Tuler, S., Golding, D., & Krueger, R. J. (2002). *A review of the literature for a comprehensive study of visitor safety in the National Park System*. Worcester, MA: The George Perkins Marsh Institute, Clark University.

Tulloch, J., & Lupton, D. (2002). *Risk and everyday life.* Thousand Oaks, CA: Sage.

U.S. Department of Labor, Bureau of Labor Statistics. (2010). *Census of fatal occupational injuries*. **Retrieved June 22, 2010, from,** http://www.bls.gov/iif/#tables

Turner, V. (1974). *Dramas, fields, and metaphors*. Ithaca, NY: Cornell University Press.

U.S. Department of the Interior. (2010). *National Park Service Director's order #50C: Public risk management program.*

Van Gennep, A. (1960). *The rites of passage.* Chicago: University of Chicago Press.

Van Maanen, J., & Barley, S. R. (1984). Occupational communities: Culture and control in organizations. *Research in Organizational Behavior, 6*, 287-365.

Vaske, J. J. (2011). Advantages and disadvantages of Internet surveys: Introduction to the special issue. *Human Dimensions of Wildlife, 16*(3), 149-153.

Vaske, J. J., Jacobs, M. H., Sijtsma, M. T., & Beaman, J. (2011). Can weighting compensate for sampling issues in Internet surveys? *Human Dimensions of Wildlife, 16*(3), 200-215.

Viswanath, K., & Finnegan, Jr., J. R. (1996). The knowledge gap hypothesis: Twenty-five years later. In B. R. Burleson (Ed.), *Communication Yearbook 19* (pp. 187–227). Thousand Oaks, CA: Sage.

Walster, E. (1966). Assignment of responsibility for an accident. *Journal of Personality and Social Psychology, 3*(1), 73-79.

Wang, C. (1992). Culture, meaning, and disability: Injury prevention campaigns and the production of stigma. *Social Science & Medicine, 35*(9), 1093-1102.

Weiner, B. (2008). Reflections on the history of attribution theory and research: People, personalities, publications, problems. *Social Psychology, 39*(3), 151-156.

Weiner, B. (1996). Searching for order in social motivation. *Psychological Inquiry, 7*(3), 199-216.

Weiner, B. (2006). *Social motivation, justice and the moral emotions: An attributional approach*. Mahwah, NJ: Lawrence Erlbaum.

Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology, 39*, 806-820.

Weinstein, N. D. (1987). Unrealistic optimism about susceptibility to health problems: Conclusions from a community-wide sample. *Journal of Behavioral Medicine, 10,* 481-500.

Weiss, R. S. (1994). *Learning from strangers: The art of qualitative interview studies*. New York: The Free Press.

White, D. F. (2006). A political sociology of socionatures: Revisionist maneuvers in environmental sociology. *Environmental Politics, 15*(1), 59-77.

Whittlesey, L. H. (1995). *Death in Yellowstone: Accidents and foolhardiness in the first national park*. Boulder, CO: Roberts Rinehart Publishers.

Wildavsky, A., & Dake, K. (1993). Theories of risk perception: Who fears what and why. *Daedalus, 119*(4), 41-60.

Williams, C. W., & Lees-Haley, P. R. (1996). The role of counterfactual thinking and causal attribution in accident-related judgments. *Journal of Applied Social Psychology, 26*(23), 2100-2112.

Williams-Piehota, P., Cox, A., Navarro Silvera, L., Mowad, S., Garcia, N., Katulak, N., & Salovey, P. (2004). Casting health messages in terms of responsibility for dietary change: Increasing fruit and vegetable consumption. *Journal of Nutrition Education and Behavior, 36*(3), 114-120.

Wilson-Donnelly, K. A., Priest, H. A., Salas, E., & Burke, C. S. (2005). The impact of organizational practices on safety in manufacturing: A review and reappraisal. *Human Factors and Ergonomics in Manufacturing, 15*(2), 135-176.

Winter, G., & Fried, J. (2000). Homeowner perspectives on fire hazard, responsibility, and management strategies at the wildland-urban interface. *Society & Natural Resources, 13*(1), 33-49.

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior, 27*, 591- 615.

Wynne, B. (1993). Public uptake of science: A case for institutional reflexivity. *Public Understanding of Science, 2*, 321 337.

Yee, K., & Iserson K. V. (2008). The epidemiology of search and rescue incidents in the Grand Canyon National Park: Are preventive measures making a difference? *Western Journal of Emergency Medicine, 9*(1), 64-65.

Yin, R. K. (1994). *Case study research: Design and methods*. Thousand Oaks, CA: Sage.

Zuckerman, M. (1979). *Sensation-seeking: Beyond the optimal level of arousal.* Hillsdale, NJ: Lawrence Erlbaum Associates.