

# Modeling the trust-risk relationship in a wildland recreation setting: A social exchange perspective



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## ABSTRACT

We empirically tested relationships among the characteristics of trustworthiness, trust instilled in river guides, and risks perceived by whitewater recreationists that rafted a Wild and Scenic River in the Southern Sierra Nevada, CA. Drawing on a social exchange framework, we used survey data to address the following objectives: 1) investigate three dimensions of trustworthiness, including ability, integrity, and benevolence; 2) examine trust in decisions and trust in values that recreationists associated with their river guides; and 3) determine the effects of trustworthiness and trust on recreationists' beliefs that river guides minimized psychological and social risks from rafting the Kern River. Results from a latent variable path model revealed that the ability and integrity of river guides played important roles in explaining why they were trusted by recreationists, which in turn positively influenced the extent to which guides were believed to minimize risk. Contrary to previous research, we found that trust in values did not play a substantive role in predicting risk perception. A greater understanding of the trust-risk relationship will shed light on how public land management agencies can effectively navigate risk in dangerous wildland environments and provide access to otherwise inaccessible resources owned and valued by the public.

## MANAGEMENT IMPLICATIONS

Our results offer insight on how public land management agencies can negotiate risk and maintain high quality recreational opportunities afforded by wildland environments. Specifically, our study findings suggest:

- Whitewater recreationists may not be able to access and/or enjoy wildland environments without trust and trustworthiness garnered from the assistance of guides.
- The trust-risk relationship can be understood from a social exchange perspective.
- Trustworthiness is an important mechanism for explaining trust in decisions and trust in values.
- The extent to which river guides are thought to minimize risks can be predicted by the ability and integrity of a river guide and trust placed on their decisions.
- The benevolence of river guides does not factor into the formation of trust or the risk perceptions of whitewater recreationists.

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## 1. Introduction

Public land management agencies are responsible for providing an array of opportunities for the public to engage in outdoor

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recreation activities, many of which are inherently dangerous, uncertain, and risky. Guides and outfitting concessions are instrumental in facilitating these opportunities, particularly in wildland settings. To effectively balance perceived and actual risks experienced by recreationists, commercial operators are advantaged if they foster trust and maintain cooperation among their clientele (Davenport, Leahy, Anderson, & Jakes, 2007; Stern, & Baird, 2015; Winter, Palucki, & Burkhardt, 1999). Trust research in natural resource management contexts has indicated that shared goals, values, and opinions are predictors of risk perception (Liljeblad, Borrie, & Watson, 2009; Siegrist, Cvetkovich, & Roth, 2000; Winter & Cvetkovich, 2010) and can help decision makers anticipate public acceptance of agency action (Absher & Vaske, 2011; Needham & Vaske, 2008; Sponarski, Vaske, Bath, & Musiani, 2014). Trustworthiness also plays an important role in explaining the trust-risk relationship (Emerson, 1976; Molm, Takahashi, & Peterson, 2000). However, few studies have incorporated the traits of trustworthiness – including ability, benevolence, and integrity – in models of the factors that influence the perceived risks of outdoor activities (Shooter, Paisley, & Sibthorp, 2010). Further inclusion of the trustworthiness concept in outdoor recreation research will provide insight on how agencies can optimize public enjoyment and management of natural resources, as well as stimulate discussions on the antecedent processes of risk perception.

Risk is at the heart of the wildland environment. In the United States (U.S.) for example, the preservation and conservation movements are rooted in nature's uncertainty and inherent variation across space and time. From the pioneers and early American settlers who aimed to conquer nature and expand westward across the continent to romanticists who glorified the rugged and sublime features of the outdoors, wildlands have been framed as places to be revered and respected (Nash, 2015). Western thinking has further situated these environments in a space of alterity, defined by nature-culture dualisms that consider people to be 'visitors' who remain fundamentally separated from the dangers of the outdoors (Braun, 2009; Cronon, 1995; Plumwood, 1998). This dichotomy of human-nature relationships has placed public land management agencies in positions of power and responsibility where they act as environmental stewards (Sellars, 1997) and facilitate social interactions that lead to an exchange of resources between recreationists and agencies. The socially valued outcomes that emerge from these interactions are reciprocally beneficial, and many become more noticeable when risk is brought to the fore (Molm et al., 2000). That is, recreation activities such as whitewater rafting are replete with uncertainty, dangers, and risks that are desirable yet simultaneously difficult to manage (Bricker & Kerstetter, 2000; Dickson & Hall, 2006; Stewart et al., 2000). The ability of an agency to adequately maintain trust while ensuring safety under potentially dangerous circumstances, thus, becomes paramount (Lynch, Jonson, & Dibben, 2007).

To better understand the trust-risk relationship, we looked to a social exchange framework (Emerson, 1976; Homans, 1961) for guidance on how to explain social structures such as those formed between recreationists and river guides. This framework provided a useful lens for viewing social phenomena in an outdoor recreation context given that the exchange of valued benefits can take multiple forms (direct versus indirect, negotiated versus reciprocal) and apply to various networks of people (Molm et al., 2000). At its core, the social exchange model presumes that people and organizations aim to maximize intended rewards and minimize unknown costs (Bagozzi, 1975). It also posits that an interdependency is formed when recreationists interact with other individuals, groups, or entities such as public land management agencies that make decisions or take actions on their behalf (Whitener, Brodt, Korsgaard, & Werner, 1998). The success of this relationship depends in part on the trust conferred on entities that

lie in positions of power and the perceptions of risk that emerge when one person relies on another (Blau, 1964). In other words, the development of trust in a social exchange provides opportunity for people to demonstrate their trustworthiness, especially in light of risk and uncertainty (Kollock, 1994; Molm et al., 2000).

We used a social exchange framework to better understand a suite of factors that affected the perceived risks of whitewater rafting, including the trustworthiness of river guides, alignment of values between recreationists and their guides, and resulting forms of trust that emerged from the association between recreationists-guide interactions. Whitewater rafting on a Wild and Scenic River in the western U.S. provided an ideal context for exploring the effects of trustworthiness and trust on risk perception, given that river guides were responsible for minimizing risk and providing access to areas that were otherwise inaccessible. A greater understanding of the trust-risk relationship will shed light on how agencies can effectively navigate risk in dangerous wildland environments and provide access to resources owned and valued by the public.

## 2. Review of literature

### 2.1. Trustworthiness

Over half a century of research has refined and focused scholars' conceptions of trust and trustworthiness (Becerra, Lunnan, & Huemer, 2008; Colquitt, Scott, & LePine, 2007; Mayer, Davis, & Schoorman, 1995; Schoorman, Mayer, & Davis, 2007), leading to the understanding that these are two distinct, yet interrelated, constructs (Sharp, Thwaites, Curtis, & Millar, 2013; Stern & Coleman, 2015). According to Mayer et al. (1995), trust is "the willingness of a party to be vulnerable to another party based on the expectation that another will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (p. 712). Trustworthiness, on the other hand, denotes the characteristics of the trustee, which impart perceptions of trust in the trustor (Mayer & Davis, 1999). Thus, trust should be distinguished from its antecedent processes (i.e., trustworthiness) (Liljeblad et al., 2009) to better understand the multiple factors that influence public attitudes towards natural resource management decisions (Sharp et al., 2013; Stern & Baird, 2015).

Trustworthiness has been shown to develop from a collage of dispositional (Hardin, 2002), behavioral (Whitener et al., 1998), cognitive (Becerra et al., 2008), social (Colquitt & Rodell, 2011), and symbolic factors (Bandura, 1986; Cvetkovich & Winter, 2003). This is, in part, because trustworthiness occurs between and within individuals and organizations across a diversity of social spheres and settings (Ashleigh & Prichard, 2012; Caldwell & Clapham, 2003; Davis, Schoorman, Mayer, & Tan, 2000; Hardin, 2002). And by extension, the strength, duration, and objects of trustworthiness have been shown to fluctuate according to various context-specific factors such as the: (a) type and length of relationships among people (Cheshire, Gerbasi, & Cook, 2010; Levin, Whitener, & Cross, 2006); (b) ways in which information is presented (Cvetkovich & Winter, 2003); (c) type of knowledge being communicated (Becerra et al., 2008); and (d) personal meanings and definitions individuals attach to trust and use to evaluate others' trustworthiness (Sharp et al., 2013).

Similar to the increasing outgrowth of interdisciplinary scholarship on trust (see Stern & Coleman, 2015), trustworthiness is viewed through a variety of disciplinary lenses and underpinned by a corpus of theoretical perspectives about how and why these traits develop. Previous research has refined understanding of trustworthiness as representative of the "...characteristics of the trusted that make them worthy of trust..." (Hamm, 2014, p. 45). Of

particular interest in the present study is the social exchange framework (Emerson, 1976) that complements Mayer et al.'s (1995) description of three trustworthiness characteristics that have developed across the past four decades: 1) *Ability*, 2) *Benevolence*, and 3) *Integrity*. According to Mayer et al., *Ability* is the “group of skills, competencies, and characteristics that enable a party to have influence within some specific domain” (p. 717). This describes the trustor's confidence that a public land management agency (i.e., trustee) has the capacity to effectively carry out an action to provide the desired result for an individual (i.e., trustor) (Stern & Coleman, 2015). *Benevolence* is considered the trustor's positive personal orientation towards the trustee, inferring a level of attachment based on the belief that the trustee wants to help and support the trustor. The last dimension, *Integrity*, is the trustor's perception that the trustee's values, principles, and actions align with his or her norms and value systems.

An interdisciplinary body of work has rigorously tested these three dimensions, demonstrating their core roles in reflecting trustworthiness. Although much of this literature emerged and continues to progress from organizational, sociological, political science, and psychological studies (Colquitt et al., 2007; Levin et al., 2006; Rousseau, Sitkin, Burt, & Camerer, 1998; Schoorman et al., 2007; Whitener et al., 1998), there has recently been a surge in interest towards the application and relevance of these concepts to natural resource use and management (Liljeblad et al., 2009; Sharp et al., 2013; Shooter, Paisley, & Sibthorp, 2012). For example, Liljeblad et al. (2009) found that all three dimensions of trustworthiness significantly influenced public trust in Bitterroot National Forest's fire and fuel management strategies. Similar results were found by Hamm (2014), who demonstrated that these variables were strongly correlated with landowners' trust, and likely to conflict with natural resource management institutions across three Midwestern states. In addition, Shooter et al. (2010); Shooter, Gookin and Sibthorp (2010) showed trustworthiness variables were more robust predictors of trust between participants and leaders in outdoor adventure education programs than the gender of leaders, optimism of participants, and changes in situational contexts.

Interestingly, Lynch et al. (2007) noted there was a lack of trust research to better understand outdoor recreation experiences. Given the theoretical connection between trust and trustworthiness (Sharp et al., 2013), it can be assumed that Lynch et al.'s (2007) observation equally applies to trustworthiness research. The brief review of literature presented in this paper supports this assertion. For example, four previous studies have investigated tenets of trustworthiness in a recreation context (Lynch et al., 2007; Shooter et al., 2012; Shooter et al., 2010; Shooter, Sibthorp et al., 2010), three of which explored participants' evaluations of the trustworthiness of their guides from the National Outdoor Leadership School, Outward Bound, Wilderness Education Association, and other outdoor education courses. This suggests that trustworthiness can contribute to an understanding of how trust is formed in outdoor recreation activities, and that there is opportunity to operationalize trustworthiness in terms of *Ability*, *Benevolence*, and *Integrity*, which aligns with previous research adopting a social exchange framework.

## 2.2. Trust

In a social exchange, trust can be defined as the belief that a trustee will not exploit the interests of a trustor (Molm et al., 2000). This definition complements previous studies that have considered trust to be a reflection of a trustor's belief that a trustee can competently carry out actions that minimize risk. We refer to this construct as *Trust in Decisions* but acknowledge that previous studies have used the term “social trust” (e.g., Absher & Vaske,

2011; Earle & Cvetkovich, 1995; Vaske, Absher, & Bright, 2008). This conceptualization of the generalized trust concept is based on the assumption that the trustor has a basic understanding or established relationship with the trustee (Levin et al., 2006; Stern & Baird, 2015; Winter et al., 1999) and emphasizes the need for a trustor to build and actively reinforce their confidence in the expertise of another individual, group, or agency acting on their behalf (Earle & Cvetkovich, 1995; Hamm, 2014). In this vein, research has provided insight on trust in public land management agency decisions about global climate change (Wynveen & Sutton, 2015), wildland fire (Borrie & Liljeblad, 2006), wildlife management (Needham & Vaske, 2008), and endangered species protection (Cvetkovich & Winter, 2003).

Previous research has suggested that *Trust in Decisions* is a complex idea preceded by an array of variables including perceived value similarity (Poortinga & Pidgeon, 2006; Siegrist et al., 2000; Vaske et al., 2008). Consequently, the second trust construct examined in this study was labeled *Trust in Values* and defined as the values, goals, and beliefs that were shared between the trustor and the trustee. Drawing on the tenets of the social exchange framework (Emerson, 1976), the present study did not consider what recreationists valued per se. Rather, the values that were shared and created during social interactions were of primary concern. On this basis, *Trust in Values* reflected both value similarity and also the relations in an exchange structure between mutually dependent individuals and/or groups (Earle & Cvetkovich, 1995; Kelley & Thibaut, 1978). This construct can be distinguished from *Trustworthiness* in light of work by Siegrist et al. (2000) that has showed *Trust in Values* are in part “...a conclusion about the values that are salient for the person whose trustworthiness is being judged” (p. 355).

The effects of *Trust in Values* and *Trust in Decisions* on risk perceptions have been examined to better understand the challenges associated with managing natural resources and outdoor recreation. Siegrist et al. (2000), for instance, examined the role of *Trust in Values* and *Trust in Decisions* as predictors of the risks posed by a variety of environmental and human health issues including nuclear power, agricultural pesticides, and artificial sweetener. These authors argued that *Trust in Decisions* was negatively correlated with risk perceptions. That is, the lower the levels of trust that individuals placed on governing institutions to competently regulate environmental and human health issues, the greater the risks they perceived from those sources. However, other authors have posited that weaker relationships between trust and risk may exist. For example, Needham & Vaske (2008) found that *Trust in Decisions* was not a strong predictor of the risks posed by chronic wasting disease among hunters in the western U. S. Other scholars have also questioned the empirical linkages between trust concepts as part of first or second order structural equation models (Absher & Vaske, 2011; Liljeblad et al., 2009). This body of work verifies the trust-risk relationship, albeit a linkage that varies across different contexts. These findings are important because they suggest that different institutional contexts may make a large difference in the establishment of trust and reinforce the notion of trust as the reliance of a trustor on a trustee who carries formal responsibilities (Cvetkovich & Winter, 2002).

## 2.3. Risk

Risk has been conceptualized in numerous ways (Slovic, 1987) and its influence on human decision-making and behavior substantiated by past research (Fischhoff, Slovic, Lichtenstein, Read, & Combs 1978; Siegrist, Gutscher, & Earle, 2005). Risk is defined as the potential to lose something of value (Bauer, 1960) and/or the extent to which the outcome of a decision is uncertain (Creyer, Ross, & Evers, 2003). Following these definitions, various

approaches and measures of risk and risk perception have been developed. For example, past research has examined the probability or likely consequences of harmful events (McCaffrey 2004; Thompson & Dean, 1996) and risk characteristics of environmental hazards (Riley & Decker, 2000; Sjöberg 2000; Slovic, 1987). Risk perception is defined as the extent to which an individual believes s/he will be exposed to a hazard or an uncertain situation (Sjöberg, 2000; Thompson & Dean, 1996). These lines of research focused on risk and risk perception have provided a foundation for past work to assess a host of explanatory variables including trust (Colquitt et al., 2007), similarity (Needham & Vaske, 2008), involvement (Havitz & Dimanche, 1997; Laurent & Kapferer, 1985), engagement (McIntyre, 1992), knowledge and skill (Ewert & Hollenhorst, 1994), and competence (Priest & Bunting, 1993).

Various dimensions of the risk construct have been proposed in past research. For example, Brannan, Condello, Stuckum, Vissers, and Priest, (1992) found that physical and psychological risks of recreation activities were the strongest predictors of perceived risks among the general public, while five other dimensions – financial, functional, satisfaction, time, and social – played less prominent roles. Another study identified six dimensions of perceived risks among backpackers that visited Ghana, including expectation, physical, health, financial, political, and socio-psychological (Adam, 2015). Results indicated that physical risks were not of great concern owing to the use of risk reduction strategies and individual interests and desires for adventure. Social risks reflect the probability that an activity can alter others' perceptions of the individual, whereas psychological risks reflect the probability that an activity alters perceptions of the self (Cheron & Ritchie, 1982). Although the salience of these risk dimensions varies by context, social and psychological risks were deemed most pertinent to the present study.

Several studies have investigated the role of risk from the perspective of its social and psychological dimensions in a wildland recreation context, and called for clarification on its measurement properties (Kyle, Absher, Norman, Hammitt, & Jodice, 2007; Kyle, Kerstetter, & Guadagnolo, 2002). For example, the

Adventure Model was proposed in an early study that incorporated type of risk, level of risk, decision making ability, level of experience, and environmental setting to better understand the recreation experience (Ewert & Hollenhorst, 1994). This model suggested introductory participants with lower skill levels were more likely to prefer low-risk experiences in relatively developed or well-traveled settings. By contrast, more advanced recreationists tended to pursue higher levels of risk in more natural settings (either in small groups or alone) rather than relinquish responsibility to others. These findings support the notion that risk should be considered in light of competence to ensure a high quality recreation experience (Csikszentmihalyi & Csikszentmihalyi, 1999; Hollenhorst, 1989; Lynch et al., 2007). Given the importance of risk management for many agencies, and recreationists' desires to engage in activities that test their abilities in wildland environments, risk research warrants continued attention.

2.4. Hypotheses

Building from our review of past work, we hypothesized that three trustworthiness dimensions (Ability, Benevolence, and Integrity) would predict Trust in Decisions and Trust in Values, which would in turn predict Psychological Risk and Social Risk (see Fig. 1). Specifically, the following hypotheses were tested:

- H<sub>1</sub>: As the perceived ability of a river guide increases, so too will levels of trust in the guide's decisions and the alignment of values between the guide and the recreationist.
- H<sub>2</sub>: As the perceived level of a guide's benevolence increases, trust in their decisions and trust in values shared by guides and recreationists will increase.
- H<sub>3</sub>: As the perceived level of a guide's integrity increases, trust that recreationists place on their decisions and the alignment of values between guides and recreationists will increase.
- H<sub>4</sub>: As trust in a guide's decisions increases, the degree to which he or she is believed to minimize psychological and social risks

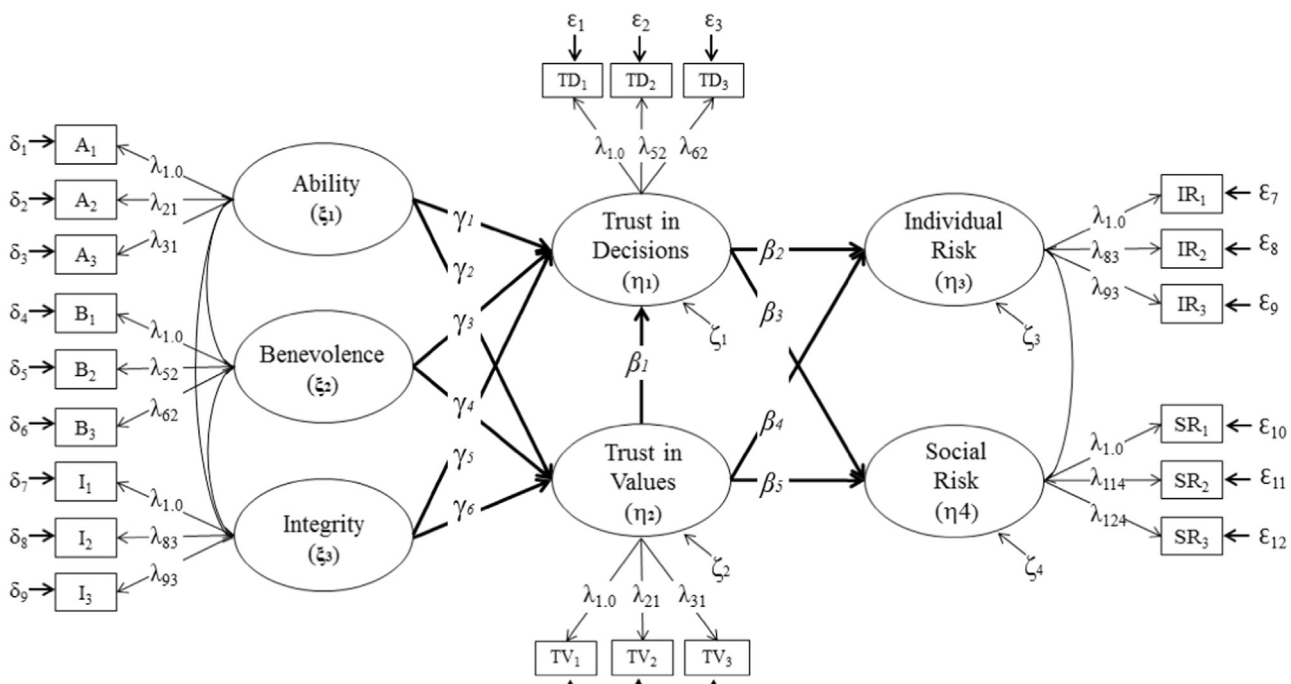


Fig. 1. Hypothesized model.

will increase.

H<sub>5</sub>: As trust in a guide's values increases, the degree to which he or she is believed to minimize psychological and social risks will increase.

### 3. Methods

#### 3.1. Study context

We explored recreational use on the Kern River located in the southern Sierra Nevada of California (see Fig. 2). The river was designated by the United States Congress as a National Wild and Scenic River in 1987 and includes 123.1 miles of Wild, 7.0 miles of Scenic, and 20.9 miles of Recreational River. The Kern is managed in cooperation by multiple agencies including Sequoia and Kings Canyon National Park and Sequoia National Forest. Snowpack in the Sierra Nevada range near Mount Whitney is the major source of streamflow for the Kern. Conditions on the river create notoriously dangerous rapids ranging from class I–class VI, earning the river the moniker of “The Killer Kern.” Although a popular destination for whitewater rafters and kayakers, much of the water in

the Kern has been diverted for agricultural purposes and positions the Kern as a critical resource for many communities in the southern part of California's Central Valley and Sierra Nevada.

Recreational boating operations are permitted in accordance with the mandates of the Wild and Scenic Rivers Act and require a USDA Forest Service Special Use Permit. Commercial river guides and whitewater operators facilitate recreational, scenic, scientific, educational, conservation, and historical experiences for users (Wallen, Kyle, Absher, & van Riper, 2014). The majority of the river guides and whitewater companies who operate on the Kern River are located in Kernville, which is located at an elevation of 813 m, approximately 68 km northeast of Bakersfield and 264 km north of Los Angeles, CA. Individuals and groups typically hire whitewater operators to provide guided recreational experiences on the Upper and Lower Kern. The Upper Kern provided the majority of runs during the peak season of March through July in 2014, while the Lower Kern was used later in the season. Less often, and depending on a company's permit status with the Forest Service, recreationists venture north of the Upper Kern to the Wild and Scenic section of the river called the Forks of the Kern (north and south forks), which starts just south of the Golden Trout Wilderness.

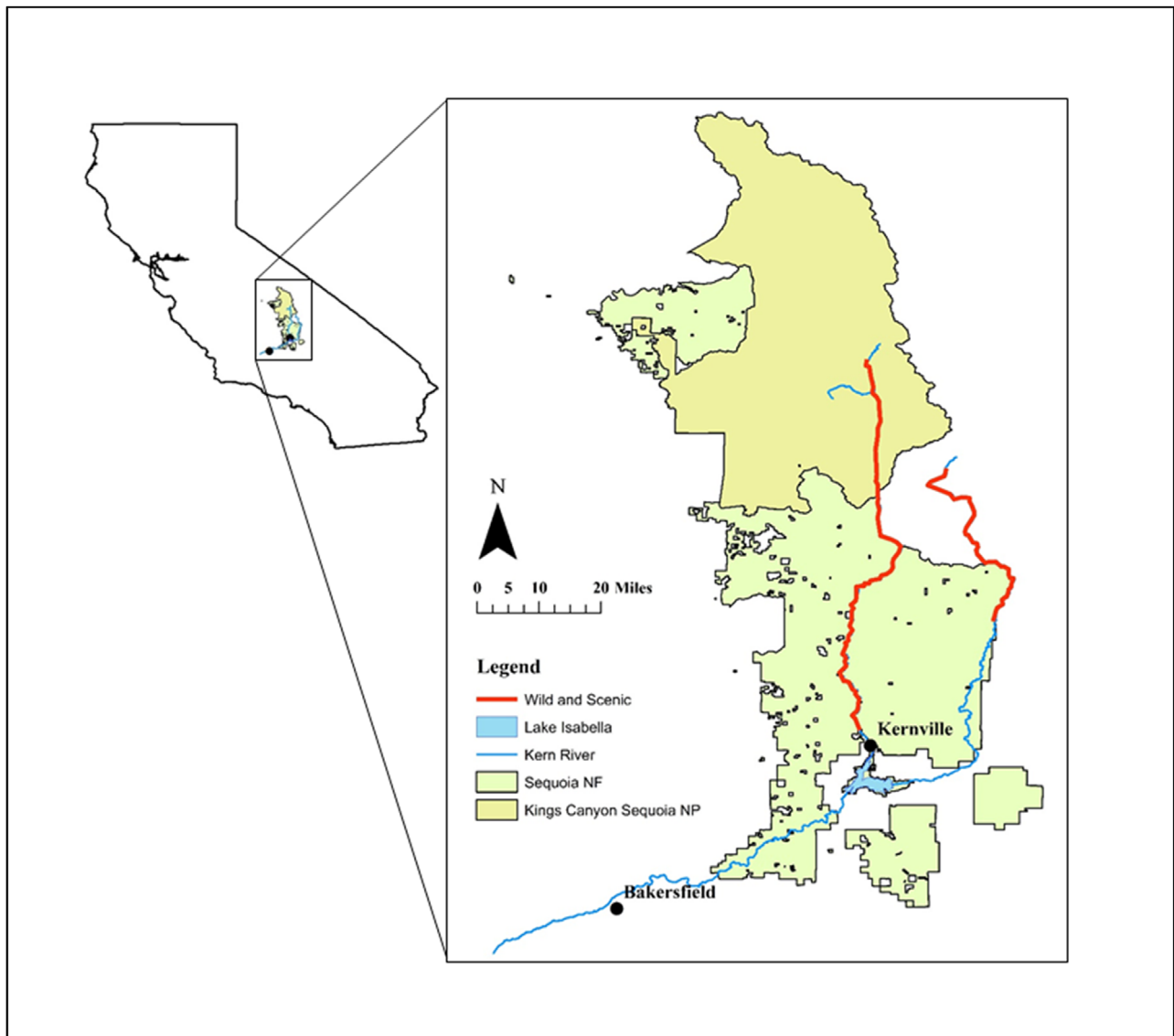


Fig. 2. Study Context.

Three whitewater companies permitted through the US Forest Service facilitated whitewater experiences for visitors to the Kern during the 2014 rafting season. These three companies agreed to provide access to their clientele: 1) White Water Voyages, 2) Mountain River Adventures, and 3) Sierra South. A variety of activities (e.g., tubing, rafting, kayaking) were provided by these organizations on sections of the Lower and Upper Kern, though we selected only whitewater recreationists for potential inclusion in the study sample. Multiple other companies have established a presence in the Kern River Valley; however, water levels were at historic lows in 2014 and limited the number of operations that could provide guiding services.

### 3.2. Survey administration

We administered on-site surveys during the rafting season from April to July 2014. A total of 584 people were contacted on-site and asked to complete a short one-page survey. Five hundred and twenty people agreed, which resulted in an on-site response rate of 89%. All on-site encounters and observational data were collected using contact logs, which allowed us to calculate non-response bias. Using the Dillman (2007) total design method, we sent all respondents follow-up survey questionnaires by mail and/or email. A total of 242 people completed the follow-up survey yielding an overall response rate of 48%. No differences were found between respondents and non-respondents on the basis of gender ( $\chi^2=0.308$ ) and group size ( $t=0.487$ ,  $df=295$ ).

### 3.3. Measurement and analysis

Drawing from past research, we examined three dimensions of the trustworthiness of river guides (Colquitt et al., 2007; Mayer & Davis, 1999). Specifically, the following three dimensions were tailored to the rafting context: 1) *Ability*, 2) *Benevolence*, and 3) *Integrity*. Each was measured using three survey items. The reliability estimates (Cronbach's alpha) of scaled items ranged from .689–.951 (Aiken, 1997), and all factor loading scores were above .40 (Hair, Anderson, Tatham, & Black, 1998).

We hypothesized that the three dimensions of trustworthiness would predict two trust-related constructs. First, *Trust in Decisions* was assessed using a modified scale developed by Earle & Cvetkovich (1995) and applied by Winter et al. (1999). Three survey items were created to reflect the primary responsibilities of river guides, including safety, injury prevention, and education. These key responsibilities were identified in a review of literature and in consultation with a guide company. We believed that *Trust in Decisions* would be predicted by *Trust in Values*, which was measured in terms of value congruence (Borrie, Freimund, & Davenport, 2002; Kyle, Absher, Hammitt, & Cavin, 2006). This construct was comprised of three survey items drawn from past work that indicated whether respondents believed their values, goals, and views were consistent with the guide who facilitated their experiences on the Kern River.

We examined respondents' risk perceptions using two dimensions established in past research (Havitz & Dimanche, 1997) and tested by scholars in the field of outdoor recreation (Kyle et al., 2007; Kyle, Graefe, Manning, & Bacon, 2003). The first, *Psychological Risk*, reflected the stresses that could be experienced if a guide were to put a rafter in danger, and was made operational using scale items that assessed the perceived consequences and perceived probability of risks in a whitewater rafting context (Laurent & Kapferer, 1985). The second, *Social Risk*, reflected potential harm or impact that could be inflicted on a respondent's social group. Agreement with the survey items assessing *Psychological Risk* and *Social Risk* indicated the respondent believed that river guides minimized risks from whitewater rafting for the

individual and his or her social group.

We employed two-step structural regression modeling (Anderson & Gerbing, 1988) to assess the measurement properties and hypothesized structural relations examined in this study using Mplus version 7.2 (Muthén & Muthén, 2012). Data were analyzed using a maximum likelihood estimation procedure and missing data were accounted for using the full information maximum likelihood method. A chi-square test of significance assessed model re-specification, although it did not evaluate model fit given this statistic's sensitivity to sample size (Byrne, 1998). Thus, we used three fit indices to determine the fit of the model to the sample data (Kline, 2011). Root Mean Square Error of Approximation (RMSEA) values less than .08 indicated acceptable fit (Steiger 2007), though RMSEA values less than .10 were considered the upper limit (Browne & Cudeck, 1992), Comparative Fit Index (CFI) values over .90 were accepted (Bentler, 1990), and Standardized Root Mean Square Residual (SRMR) values less than .08 were considered acceptable (Hu & Bentler, 1999).

## 4. Results

### 4.1. Descriptives

The majority of respondents (61.6%) was male and the average age was 43 years old ( $SD=10.66$ ) (see Table 1). Respondents were highly educated, in that most possessed either a four year college degree (37.1%) or a graduate degree (37.5%). Most (79.1%) identified as White, while Asian was the second most commonly reported race (14.7%). A substantive minority (13%) reported being of Hispanic descent. Respondents spanned all income brackets but most fell within \$50,000–99,999 (31.9%) or \$100,000–149,999 (28.2%) (Tables 2 and 3).

**Table 1**  
Socio-demographic characteristics.

Variable	Valid percent
<i>Gender distribution</i>	
Male	61.6
Female	38.4
<i>Ethnicity</i>	
Hispanic, Latino/a	13.0
<i>Race</i>	
American Indian/Native	3.5
Asian	14.7
White	79.1
Black/African American	3.1
Native Hawaiian/Pacific Islander	2.2
Other	6.2
<i>Educational attainment</i>	
Less than high school	0.4
High school graduate	6.5
Vocation/trade school certificate	7.3
Two year college degree	11.2
Four year college degree	37.1
Graduate degree	37.5
<i>Annual income</i>	
Less than \$20,000	2.3
\$20,000–\$49,999	14.4
\$50,000–\$99,999	31.9
\$100,000–\$149,999	28.2
\$150,000–\$199,999	8.8
Greater than \$200,000	14.4
Age (M, SD)	43 (10.6)
Number of times rafting Kern in previous year (M, SD)	1.1 (1.3)
Number of times rafting Kern in lifetime (M, SD)	6.7 (8.0)
Number of rafting trips on any river (M, SD)	1.4 (1.2)

**Table 2**  
Construct reliability, mean values, and factor loadings for perceived risk consequences and social risk variables.

Scale items	$\lambda$	t-value	Mean (S.D.)
<b>Risk</b>			
<i>Individual Risk</i> ( $\alpha=.788$ )			
IR1 It was a big deal that my guide never put me in harm's way when passing through rapids	.689	17.77	4.11 (1.00)
IR2 It really mattered that my guide created a fun and exciting atmosphere	.713	19.14	4.45 (0.81)
IR3 Injury prevention was always a priority for my guide	.831	31.68	4.47 (0.81)
<i>Social Risk</i> ( $\alpha=.689$ )			
SR1 My guide taught everyone in my raft how to properly use their equipment	.773	24.49	4.50 (0.80)
SR2 I would have been concerned if my guide had not actively ensured the safety of my group	.405	6.81	4.26 (0.89)
SR3 My guide made sure my group had minimal impact on the river	.720	19.82	4.02 (1.01)
<b>Trust</b>			
<i>Trust in Decisions<sup>a</sup></i> ( $\alpha=.911$ )			
TD1 Communicating about how to prevent injuries (e.g., sunburn, drowning)	.861	41.30	6.13 (1.27)
TD2 Ensuring everyone's safety on the trip	.896	46.16	6.31 (1.18)
TD3 Educating you and others in your raft how to properly use equipment	.809	29.83	6.36 (1.10)
<i>Trust in Values<sup>b</sup></i> ( $\alpha=.931$ )			
TV1 The guide shared my same values	.946	78.88	3.56 (0.79)
TV2 The guide's views were similar to my own	.924	68.30	3.49 (0.79)
TV3 The guide's goals were consistent with my own	.850	40.60	3.65 (0.83)
<i>Trustworthiness<sup>b</sup></i>			
<i>Ability</i> ( $\alpha=.951$ )			
A1 My guide was well equipped to improve my experience on the river	.924	66.13	3.56 (0.76)
A2 My guide was very skillful	.919	62.68	3.49 (0.80)
A3 I trusted my guide's knowledge of rafting	.905	55.42	3.65 (0.79)
<i>Benevolence</i> ( $\alpha=.907$ )			
B1 My guide was very concerned about my welfare	.893	46.41	4.46 (0.81)
B2 My needs and desires were very important to my guide	.871	40.74	4.26 (0.91)
B3 My guide would not have knowingly exposed me to a dangerous situation on the river	.817	32.60	4.52 (0.76)
<i>Integrity</i> ( $\alpha=.888$ )			
I1 My guide had a strong environmental ethic	.786	28.17	4.06 (0.92)
I2 My guide's intentions and actions were consistent with the company's principles	.893	53.49	4.40 (0.76)
I3 My guide was trustworthy	.877	48.64	4.55 (0.71)

Measurement model fit:  $\chi^2=418.52$ ,  $df=166$ ; RMSEA =.081; CFI =.947; SRMR =.038.

<sup>a</sup> Mean values were coded on a Likert scale where 1="I did not trust my guide at all" and 7="I trusted my guide completely".

<sup>b</sup> Mean values were coded on a Likert scale where 1="Strongly Disagree" and 5="Strongly Agree".

We examined trip characteristics to better understand respondents' skill levels and previous experience with rafting and the Kern River Valley. On average, respondents reported spending one day on the Kern River in the previous year and a maximum of six days. The number of rafting trips on any river in the previous year ranged from one to ten. Over the course of their lives, respondents averaged nearly seven days on the river and a maximum of fifty days. Half rated their rafting skills as "average." Nearly one third (32%) reported skill levels below average and less than a quarter (17%) reported above average rafting skills. Most participated in their trip as part of a group of family and/or friends (71.9%), while few (2.5%) traveled alone, in an organized group (2.0%), or in an "other" group type (1.7%). All respondents were "assigned" to a raft and therefore became part of an organized group when rafting the river irrespective of their self-identified group type.

In addition to the modeling results, we evaluated the overall trust of river guides using two separate items looking at safety and risk (Winter & Cvetkovich, 2010). Respondents trusted the extent to which their guides provided a safe rafting experience ( $M=6.23$ ,  $SD=1.24$ ) and the extent to which their guide minimized risk for the individual and members of their group ( $M=5.99$ ,  $SD=1.37$ ). These items were assessed on a Likert scale where 1="Not at all" and 7="Completely."

## 4.2. Modeling results

Results from our test of the measurement model revealed the data to be an adequate fit ( $\chi^2=418.52$ ,  $df=166$ ; RMSEA =.081 (90% C.I. is.071–.091); CFI =.947; SRMR =.038). Following an examination of modification indices, two sets of measurement error terms (A2 with A3 and B1 with B2) were allowed to covary. We made these adjustments to the model based on indices that showed significant improvements in model fit under the assumption that method-related effects may have caused common sources of error (Byrne, Shavelson, & Muthén, 1989). Next, we estimated a structural model to test the hypothesized relationships among model constructs. All non-significant paths were dropped from the analysis. The final modified structural model displayed adequate fit ( $\chi^2=561.286$ ,  $df=178$ ; RMSEA =.096 (90% C.I. is.087–.105); CFI =.920; SRMR =.059) and offered partial support for our study hypotheses.

In line with our first (H1) and third (H3) study hypotheses, *Ability* predicted *Trust in Decisions* ( $\beta=.396$ ; t-value =3.50), and *Integrity* predicted both *Trust in Decisions* ( $\beta=.535$ ; t-value =4.65) and *Trust in Values* ( $\beta=.682$ ; t-value =17.25). *Ability* did not predict *Trust in Values* to a statistically significant degree. The second study hypothesis (H2) was not supported, in that *Benevolence* of river rafting guides was not a significant predictor of either trust construct, indicating that this trait did not play a role in the formation of trust between guides and whitewater recreationists. In

support of H4, our modeling results showed that as *Trust in Decisions* increased, so too did the extent to which guides minimized *Individual Risk* ( $\beta=.922$ ;  $t\text{-value}=34.29$ ) and *Social Risk* ( $\beta=.963$ ;  $t\text{-value}=29.83$ ). Finally, H5 was not supported given the non-significant relationship between *Trust in Values* and both *Individual Risk* and *Social Risk*.

## 5. Discussion

We tested a structural equation model of the factors that shaped the risk perceptions of recreationists that rafted the Kern River located in California's Sierra Nevada mountain range. The social exchange framework (Emerson, 1976; Molm et al., 2000) provided a theoretical basis for forming our study hypotheses and arguing that the qualities of trustworthiness demonstrated by river guides predicted value congruence and trust in decisions, which in turn shaped the perceived risks inherent in wildland environments. Whitewater rafting and the deliberate risk taking pursuits of recreationists provided ideal circumstances for investigating how individuals attribute their own safety to the traits of others rather than the structures that were external to a social exchange.

The theoretical proposition that trustworthiness influenced trust and risk was partially supported by our study findings. The tripartite dimensionality of trustworthiness (*Ability*, *Benevolence*, *Integrity*) (Colquitt et al., 2007) fit within the measurement model that we tested for this research; however, contrary to our hypotheses, the formation of *Trust in Decisions* hinged on the characteristics of *Ability* and *Integrity* rather than *Benevolence*. Similarly, *Trust in Values* was only predicted by *Integrity*. Although past research has indicated that trust is anteceded by three primary mechanisms (Mayer & Davis, 1999), the goodwill of river guides was not instrumental to the formation of trust in the context of whitewater rafting on the Kern River. People involved with risky recreation may be more focused on a guide's ability to help them maneuver and navigate the dangers of a river, because abilities directly influence personal safety (Shooter et al., 2012). This finding aligns with past research that has suggested *Integrity* explains an individual's willingness to take risks when in a relational environment that is free of physical risk (Becerra et al., 2008). Thus, our study suggests the dimensions of trustworthiness vary in salience across different contexts and contribute to the development of trust research in outdoor recreation environments (Hamm, 2014; Shooter et al., 2012; Stern & Coleman, 2015).

**Table 3**  
Regression results for final structural model.

Dependent variable	Predictor	$\beta$	$t\text{-value}$	SE	$R^2$
<i>Individual risk</i>	Trust in decisions	.922	34.29*	.03	.850
	Trust in values	–	–	–	–
<i>Social risk</i>	Trust in decisions	.963	29.83*	.03	.927
	Trust in values	–	–	–	–
<i>Trust in decisions</i>	Integrity	.535	4.65*	.11	.821
	Benevolence	–	–	–	–
	Ability	.396	3.50*	.11	–
<i>Trust in values</i>	Integrity	.682	17.25*	.04	.465
	Benevolence	–	–	–	–
	Ability	–	–	–	–

Final structural model fit:  $\chi^2=561.286$ ,  $df=178$ ; RMSEA = .096; CFI = .920; SRMR = .059.

\*  $p < .01$

Although *Trust in Decisions* positively influenced the degree to which respondents believed that their river guide minimized risks, *Trust in Values* did not predict the other endogenous constructs in our model, which lies contrary to some past research (Sponarski et al., 2014; Winter & Cvetkovich, 2010). We believe that value similarity was overlooked by respondents in light of the interdependence between whitewater recreationists and their guides (Kelley & Thibaut, 1978). Whitewater rafting was a highly controlled recreational activity in which guides instruct each paddler on how best to navigate rapids, and tend to their primary responsibilities of safety, injury prevention, and education. Value similarity may have been rendered less important than traits such as *Ability* and *Integrity*, because decisions rather than shared values maintained wellbeing in a situation where everyone was at equal risk. It could be that value congruence is more important for other whitewater enthusiasts such as kayakers who operate in an environment with less oversight where river guides do not mediate human-environment interactions. Future research should consider comparing subgroups of recreationists exposed to guiding operations that play more or less prominent roles in determining perceived levels of safety and comfort.

In response to previous studies that have called for clarification on the measurement properties of risk in outdoor recreation contexts (Havitz & Dimanche, 1997; Kyle et al., 2002), we confirmed that *Psychological Risk* and *Social Risk* (Cheron & Ritchie, 1982) were anteceded by a variety of psychological processes including trust and trustworthiness. We accounted for high degrees of variance in the study's endogenous constructs, indicating that trust was a strong driver of perceived risk. To ensure the safety of their clientele, public land management agencies and their concessionaires should take steps to build trust before rafting a river, because trust ameliorates perceived risk. Guide delivered safety instructions and other information about the role of guides in a whitewater context will likely be received well by paddlers on the Kern and encourage team building and compliance with regulations. It could be that a guide's *Ability* and *Integrity* work in tandem with how technical information is communicated to generate and maintain trust. Other factors also likely feed into an individual's assessment of risks experienced while rafting a river. For example, previous studies have indicated that variation in experience levels (Bricker & Kerstetter, 2000; Ewert & Hollenhorst, 1994) and expectations before and after river rafting trips (Dickson & Hall, 2006; Stewart et al., 2000) play important roles in the formation of risk perception. Future research should continue to consider the array of factors that shape how and why risks are viewed to be problematic, particularly trust instilled in a guide's decisions.

The multidimensional measures that we tested in this study helped us to identify the conditions that would minimize the unwanted dangers and uncertainties of wildland environments. Specifically, we reached beyond the use of unidimensional scales and summative scores and considered multiple aspects of the trust-risk relationship (Stern & Coleman, 2015). Our results showed that *Psychological Risk* and *Social Risk* (Laurent & Kapferer, 1985) were anteceded by *Trust in Decisions*, *Ability*, and *Integrity*, which yielded a model with high explanatory power. Future research should consider trust and risk as multifaceted phenomena that can be understood from a social exchange perspective. A better understanding of the major tenets of risk perception and clarity on the factors that shape these perceptions will advance theoretical understandings of the trust-risk relationship in wildland settings. These findings also carry implications for elevating perceived access of recreationists who are less experienced with high risk activities, and in turn, enabling public land management agencies to address the diverse needs and demands of their constituencies.



## 6. Conclusion

We drew on a social exchange framework to advance theoretical understanding of risk perception and its antecedents, as well as provide options for public land management agencies that run concessions in wildland environments. Our results illustrate that trustworthiness is an important mechanism for explaining trust in decisions and the shared values of river guides responsible for shaping the risk perceptions of whitewater recreationists. Without a social exchange between guides and rafters, attributions of trustworthiness would not have been possible. As such, the context of this research and variables modeled to test our study hypotheses were essential for exploring how river guides effectively negotiated risk and maintained high quality recreational opportunities afforded by the wildland settings in which they operated.

Mitigation of risk perception and the inherent dangers of wildland environments are salient resource management concerns. There have been vocal opponents to allowing concessions in wildlands such as federally designated Wilderness and on Wild and Scenic Rivers. Our data illustrate, that in some contexts, people may not be able to fully access and/or enjoy the outdoors without the trust and trustworthiness garnered from the assistance of guides. Public land management agencies will continue to face challenges insofar as their abilities to maintain desirable levels of uncertainty and gauge the extent to which unsafe conditions pose real versus perceived threats (Winter et al., 1999). The provision of opportunities for experiencing risk in a safe environment thus becomes fundamental for ensuring the continued interest and commitment of recreationists. Failure to engender trust in guiding operations may undermine the potential for these risk-prone activities to meet recreationists' needs and desires, which would lessen the capacity of agencies to generate environmental stewardship, manage natural resources, and improve human health and well-being.

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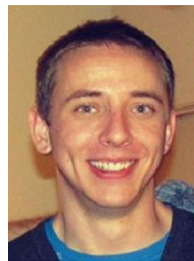
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