8-2013

LIONS ON THE BEACH, WHALES IN THE JUNGLE: A STUDY OF SOCIAL SEGMENTATION AND SOCIALIZATION IN ROCK CLIMBERS

Christopher Starker
Clemson University, cbstarker@hotmail.com

LIONS ON THE BEACH, WHALES IN THE JUNGLE:
A STUDY OF SOCIAL SEGMENTATION AND
SOCIALIZATION IN ROCK CLIMBERS

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Parks, Recreation, and Tourism Management

by
Christopher Britton Starker
August 2013

Accepted by:
Dr. Robert D. Bixler, Committee Chair
Dr. Elizabeth D. Baldwin
Dr. William C. Bridges, Jr.

ABSTRACT

Rock climbing, as a sport, began as a definitive style in the pursuit of attaining mountain peaks. However, over time, it has evolved into several different styles with varying rules and different goals, and can be experienced in a variety of settings. The growing popularity of the indoor gym climbing as both a practice space for more serious climbers and as an introductory venue for beginning climbers may have changed the way climbers develop attitudes, skills, and ethics that influence the role of managers of climbing areas. Information on how climbers may or may not be similar in terms of their preferences for different climbing styles and settings will aid managers of climbing areas with decisions that affect climbing opportunities and experiences. This study explores how climbing subgroups are different based on their preferences for wilderness settings, their support for Leave No Trace principles and management decisions, and attitudes toward the natural environment. In addition, this study explores whether socialization may play a role in these preferences.

504 climbers were approached at climbing gyms and outdoor recreation areas in the southeastern U.S. during the summer of 2007 and asked to complete an online survey consisting of items from the Wilderness Purism Scale, Leave No Trace principles, specific management decisions, and the Survey of Environmental Quality: Universal Orientations and Individual Attitudes. 409 surveys were usable for this study. Respondents were categorized by self-reporting climbing styles and one-way analysis of variance used to test the climbing subgroups for differences. Rock climbing subgroups differed on factors related to self-sufficiency, preferences for wilderness settings,

proximity to modern conveniences, closures to climbing areas, and impacts to climbing resources. In addition, differences based on socialization elements were primarily limited to preferences for wilderness settings and sensitivity to variations in the quality of a wilderness experience. The implications of this study and future research needs for climbing area managers are discussed.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

Table of Contents (Continued)

LIST OF TABLES

List of Tables (Continued)

CHAPTER ONE

INTRODUCTION

The overall quality of any given recreation experience is a personal measure of satisfaction that results from a variety of social dimensions (Manning, 2010). The interactions between these dimensions can be complex and deserve special attention, especially if conflicting pursuits produce diminished satisfaction among recreation participants. Climbing is a recreation activity that is characterized by a history of conflict over technological innovations and ethical refinements (Perkins, 2005; Bogardus, 2012). Such conflict has led to the creation of an array of climbing styles and the development of unique climbing areas. Furthermore, these segmenting dynamics will continue to be important in shaping the future of climbing. In general, climbers are a fairly well-organized and socially interdependent group of people capable of regulating themselves; but for land managers of climbing areas, continuing to provide quality recreation experiences becomes increasingly difficult as the climbing community continues to segment into new technical arenas and grows. The three-year average increase in participation in climbing is currently 2.8% for boulderers, sport climbers, and gym climbers, and 9.7% for traditional climbers, ice climbers, and mountaineering [Outdoor Industry Foundation, 2013].

The origin of climbing as a pursuit of leisure is generally attributed to the first ascent of Mont Blanc in 1786 (Mazel, 1991). Prior to that, climbing endeavors supported more functional motives for early explorers, natural scientists, surveyors, traders, and the military – as well as inspiration for writers and poets (Mazel, 1991; Selters, 2004).

Additionally, Native Americans may have scaled mountains for hunting, trade, or religious reasons, but insufficient evidence exists to understand the motives for their climbs (Selters, 2004). Regardless, from that historical ascent of Mont Blanc evolved a climbing tradition that formed the ethical groundwork for a variety of current climbing styles, including (but not limited to) traditional climbing, sport climbing, bouldering, and gym climbing.

Two hundred years after the inception of climbing, the first indoor climbing gym opened in Seattle in 1987 (Perkins, 2005). Originally intended as a training facility for climbers during the off-season, indoor climbing gyms have become a popular year-round venue for many climbers as well as a standard method of introduction to climbing for beginners. Because most gyms are easily accessed near densely populated urban areas, climbing participation at climbing gyms now rivals that of climbing in natural areas.

In its most recent detailed report on climbing, the Outdoor Industry Foundation (2006) reports that of the 9.2 million climbers that responded to their study, the majority of climbers use indoor gym facilities as their primary recreation setting. Five million people (54.3%) participated in natural rock climbing and took 15 million outings while 6.7 million (44.7%) people participated in artificial wall climbing and took 34 million outings. The crossover of climbing participation in both artificial wall climbing and natural rock climbing was 2.5 million people (27.2%). Interestingly, about half (52%) of natural rock climbers also went artificial wall climbing while only 39% of artificial wall climbers went natural rock climbing. Even more intriguing is that a greater number of people participated in artificial wall climbing and took more outings to artificial walls as

opposed to natural rock climbing (1.7 million more people went artificial wall climbing and the number of outings are over double the number of natural rock climbing outings).

While several studies have explored climbing's impact on the natural resources (Camp & Knight, 1998; McMillan, Nekola, & Larson, 2003; Wood, Lawson, & Marion, 2006; Vogler & Reisch, 2011), there has been no research on the influence that the indoor climbing gym has had on the development of attitudes of climbers toward climbing areas and climbing area management. There has been considerable research showing a relationship between outdoor recreation participation and environmental attitudes (Dunlap & Heffernan, 1975; Nord, Luloff, & Bridger, 1998; Sherburn & Devlin, 2004; Thapa, 2010) and that these attitudes differ between particular recreation activities (Bright & Porter, 2001; Teisl & O'Brien, 2003; Barker & Dawson, 2010). More specifically, Borrie and Harding (2002) found that the way climbers are introduced to an activity affects their attitudes toward low-impact practices. Similarly, Schuster, Thompson, and Hammitt (2001) identified a relationship between climbing style and attitudes towards management of climbing areas.

Visitor preferences for specific activity settings are based largely on the type of areas and facilities available. More importantly, these preferences are influenced by previous experiences. Recreationists tended to view the recreation resource in terms of the activity involved regardless of management objectives (Manning, 2010). Since most first-time visitors to backcountry areas have yet to establish values and preferences, they tended to support the conditions as they experience them; meanwhile, the values and preferences of returning visitors are determined largely by their activity style, skill level,

3

and mode of travel (Manning, 2010). Thus, visitors to climbing areas evaluate recreation experiences based upon prior knowledge, while social group norms have an important influence on the interpretation of the resource. Further insight into the role of the climbing gym on the socialization of climbers would assist the climbing community and the managers of climbing resources (both natural and artificial), and especially the climbers themselves.

Purpose

The increase of indoor climbing gyms in urban and suburban areas has altered the socialization process of the climbing activity. As more people are introduced to the activity of climbing through a broader range of settings, styles, and social groups, the development of attitudes toward the outdoor recreation resource setting and the accompanying management of these sites might also vary. More research is needed that describes the values held by various segments of the climbing community.

This study explored the relationships between socialization processes of climbers, climbing style preferences, climbing setting preferences, attitudes toward the natural resources used by climbers, and management of these resources. Of particular interest was the influence of the indoor climbing gym on the social development of climbers with respect to these dimensions. Therefore, the following research questions guided this study:

Research Question 1: Do rock climbing sub-groups in general differ in their preferences for wilderness settings, support for Leave No Trace and rock climbing management decisions, or attitudes toward the environment?

Research Question 2: Do rock climbers who differ in the way they were introduced to climbing also differ in their preferences for wilderness settings, support for Leave No Trace and rock climbing management decisions, or attitudes toward the environment?

Definition of Terms

Climbing – A recreation activity in which participants climb on natural rock formations or artificial walls according to "a hierarchy of games, each defined by a set of rules and an appropriate field of play" (Tejada-Flores, 1978);

Climbing style – Refers to the conscious choice of a set of rules for a given climbing game (Tejada-Flores, 1978);

Indoor Gym Climbing – A climbing style that predominantly takes place indoors on artificial climbing surfaces. For this study, indoor gym climbing includes all artificial wall climbing, such as climbing on outdoor climbing towers with artificial surfaces.

Natural Rock Climbing – A climbing style that predominantly takes place outdoors on natural rock surfaces. For this study, it encompasses all climbing styles regardless of difficulty so long as the activity occurs on natural rock formations.

Bouldering – A climbing style in which the climber ascends short vertical distances without ropes, harnesses or other forms of protection.

Top-rope Climbing – A climbing style in which the climber ascends longer vertical distances using a rope that is secured from above to protect the climber from the hazards of a fall. For this study, top-rope climbing is a natural rock climbing activity unless specifically stated otherwise.

Sport Climbing – A climbing style in which the climber ascends longer vertical distances and protects him or herself from the hazards of a fall using "bolts" or other protection permanently placed in the rock as well as a rope and harness. For this study, sport climbing is a natural rock climbing activity unless specifically stated otherwise.

Traditional Climbing, or Trad Climbing – A climbing style in which the climber must place temporary and removable gear in natural rock features while ascending longer vertical distances in order to protect him or herself from the hazards of a fall. For this study, traditional climbing is a natural rock climbing activity unless specifically stated otherwise.

Via Ferrata, or Klettersteig – An outdoor climbing style in which the climber ascends longer vertical distances while connected to ladders, cables or bridges to protect the climber from the hazards of a fall.

Aid Climbing – An outdoor climbing style in which the climber ascends longer vertical distances predominantly aided by climbing on gear that is placed in natural rock features rather than on the rock itself.

Ice Climbing – A climbing style in which the climber ascends vertical distances that are partially or entirely covered with ice and using specialized tools and footwear different from typical rock climbing hardware.

Mountaineering – A climbing style in which the climber ascends extended vertical distances that usually involves traditional climbing, aid climbing and/or ice climbing and which can often require extended periods of time involvement.

Rappelling – While not a climbing style in and of itself, this is an ancillary skill required for descending from the top of a climbing route to the bottom using ropes.

CHAPTER TWO

LITERATURE REVIEW

The purpose of this study is to explore the relationships between climbers, their preferred recreation environments, and the management of various climbing areas. In addition, this research investigated the role that socialization plays in the development of attitudes and preferences of climbers toward climbing areas and managers. This chapter traces the history of climbing and reviews the relevant literature associated with recreation substitutability, socialization, specialization, and conflict.

A Brief History of Climbing

While the history of climbing may have begun with the conquest of major mountain peaks, it has since evolved into a complex variety of climbing styles. Each version is based on individual limitations that mediate the intrusion of technology on the skill and risk inherent in earlier forms of rock climbing. These limitations also serve to provide some significance to an otherwise unnecessary recreation activity (Tejada-Flores, 1978).

References to climbing as a "game" are not uncommon. "It is precisely because there is no necessity to climb that we can describe climbing as a *game* activity" (Tejada-Flores, 1978, p. 19). In a seminal description of climbing, Tejada-Flores (1978) describes it as a "hierarchy of climbing games, each defined by a set of rules and an appropriate field of play" (p. 19), which also illustrates the inherent relationship between climbing styles and climbing areas. He further defines climbing style as "the conscious choice of a

set of rules for a given climbing-game" (Tejada-Flores, 1978, p. 25). Thus, various climbing styles invoke specific rules of engagement, which depend on the physical setting, the level of climbing experience, and the social and historical context of the climb.

Hamilton (1979) described climbing as "a game focused on a very definite achievement: the ascent, in a specified style, of specific routes on a cliff" (p. 285). Thus, style can be defined as the personal limitations placed on the technology used to execute a particular climb, which often vary depending on the climber(s) and the setting. Because these rules are actually limitations in the form of negatives (e.g., don't use fixed ropes, don't use protection), more difficult climbing styles incorporate more rules. "The purpose of these negative rules is essentially … to conserve the climber's feeling of personal (moral) accomplishment against the meaninglessness of success, which represents merely technological victory" (Tejada-Flores, 1978, p. 20).

Initially, the sole purpose of climbing was to reach the summit by any means possible and by any route available. However, once the majority of climbable peaks had been climbed, mountaineers began searching for more difficult routes to the summit as an alternative; and if alternative routes did not provide sufficient challenge, additional rules were implemented to make the climbing style more difficult. However, not all climbers embraced this approach to climbing.

In 1885, Albert Mummery introduced the idea of "fair means," suggesting that the technology used to attempt a climb should not detract from the worthiness of the ascent (Perkins, 2005) and, for the first time, placed emphasis on the ethical value of the rules of

climbing engagement. Thus, "fair means" insisted on a responsible balance between the technology used to climb a mountain and the boldness required to do so. Climbing, then, can be more than just another physical and technical activity since it often incorporates qualities of moral character as well (Heywood, 1994).

Throughout climbing history, the rules of climbing have constantly evolved and Mummery's ethic of "fair means" has been frequently challenged. The use of equipment to aid in the ascent of a mountain was considered cheating well into the twentieth century even though many climbs were being conducted this way (Perkins, 2005). For example, the use of bolts and pitons to successfully ascend mountains was being used by unskilled climbers "who desire to overcome every new difficulty with some kind of technological means rather than at the expense of personal effort under pressure" (Tejada-Flores, 1978, p. 24). Alternatively, as accomplished climbers sought other more difficult routes, they were concerned "not merely with ethical climbing but with minimizing the role of technology and increasing that of individual effort in order to do climbs with better style" (p. 24). The introduction and improvement of technology reduced the number of previously impossible climbs by creating more possibilities; however, it also decreased the level of satisfaction of some climbs by making them easier to complete (Hamilton, 1979). "Yet, though these technological innovations have at times replaced our boldness, they have opened up a whole new realm of possibilities" (Mellor, 1995, p. 411).

In the 1970's, French climbers challenged the notion of fair means by developing climbing areas protected entirely by bolts. Such climbing style emphasized the physical strength and endurance of the climber and the difficulty of the climb rather than the

experience with the natural setting. In addition, it transferred the goal of climbing to a fixed point on a cliff wall rather than to the top of a mountain, and it expanded the range of climbing to include all vertical rock faces (Rapelje, 2004). Furthermore, it allowed climbers to exert more control over the uncertainty and danger inherent in more traditional climbing. Although the majority of American climbers at the time disapproved of this approach to climbing, sport climbing, as it became known, grew in popularity in the 1980's to the extent that the traditional style of climbing became less popular (Perkins, 2005).

A more recent advance in climbing evolution is the introduction of indoor climbing gyms. The first indoor climbing gym opened in 1987 in Seattle (Perkins, 2005) as a place to train during the long, cold Pacific Northwest winters. Many climbers today learn to climb in this artificial environment where the risks have been minimized, amenities are maximized, and the climbing routes color coded. Bringing a safe and comfortable climbing environment closer to urban areas has increased access to climbing opportunities by reducing constraints that often make it difficult to commit to a typical climbing outing: time, partners, access, range of difficulty, and weather to name a few. Because gyms often provide separate areas for bouldering and technical climbing, climbers can focus on skills development and personal challenges that are most important to them while networking and socializing with other climbers.

Because the element of risk is only a single motive for climbing, the activity of climbing can be viewed as moving away from the traditional sense of adventure that originally characterized it (Heywood, 1994). As a result, the emphasis on boldness that

characterized climbing tradition in the past is being replaced by a more rational style that relies on predictable outcomes and redundant protection in both the gym environment and the sport climbing area (Bogardus, 2012). Still, the increased variety of climbing styles and settings allows individuals to match personal skill levels with particular challenges and constraints, allowing more people to experiment with an otherwise elite recreation activity.

Alternatively, since interaction with the natural environment does not exist in the gym setting, many new climbers may never learn behaviors that are normally connected with the outdoor environment, such as ancillary skills that support outdoor activities, safe and appropriate behavior, Leave No Trace ethics, and the ecological impacts of climbing on natural resources. Ewert and Hollenhorst (1997) have argued that while the indoor gym provides a suitable training facility and may lead to increased participation in other wilderness activities, the lack of natural features and the controlled risk environment prevent gym climbing from being a genuine substitute for traditional rock climbing. Likewise, climbing gyms encourage the development of technical proficiency before ethical behavior, environmental etiquette, and safety practices are assimilated (Stuessy, 2009).

To date, a sizable portion of the national population continues to participate in climbing as a recreational activity. In fact, the activity has enjoyed a steady rise in popularity over the past three decades (Rapelje, 2004). The most recent detailed report on rock climbing participation from the Outdoor Industry Foundation (2006) reports that of the 9.2 million climbers who responded to the study, the majority of them use indoor gym

facilities as their primary recreation setting. Five million people participated in natural rock climbing and took 15 million outings while 6.7 million people participated in artificial wall climbing and took 34 million outings. The crossover of climbers in both settings comes to only 2.5 million people. Interestingly, about half (52%) of natural rock climbers also went artificial wall climbing while only 39% of artificial wall climbers went natural rock climbing. Even more informative is that a greater number of people participated in artificial wall climbing and took more outings to artificial walls as opposed to natural rock climbing (1.7 million more people went artificial wall climbing and the number of outings to artificial climbing destinations were more than double the number of natural rock climbing outings).

Substitutability

Substitutability has been defined as the interchangeability of recreation activities in satisfying participants' motives, needs, and preferences (or wishes and desires) (Hendee and Burdge, 1974) and includes qualities of spatial, temporal, and activity dimensions (Manning, 2010). Often, recreationists consider more than one of these dimensions when considering acceptable substitutes. Data from the Outdoor Industry Foundation (2006) suggest the possible substitutability of one climbing activity for another activity style, but fail to indicate which dimension is salient to climbers.

An early study by Hendee and Burdge (1974) explored the relationships between 69 leisure activities and their respective settings by grouping them into five categories. At that time, recreation managers expressed some concern that "over excessive crowding,

13

disregard for environmental values, and preference for inappropriate facilities and activities" were indicators of activities chosen by recreationists "whose leisure interests might reflect other priorities" (p. 160). While the study was inconclusive, it did suggest a relationship between activities and settings and the need for more research to appreciate the nature of this association, especially with regard to activities like climbing that utilize wilderness, natural or historical areas.

Iso-Ahola (1986) later expanded on the theory of substitutability, redefining it as a psychological process that occurs when "the originally intended activity is no longer possible and therefore must be replaced by another behavior if leisure involvement is to be initiated or continued" (p. 369). His theoretical framework states that substitutability is based on the reasons why a substitution is needed and the individual's perceptions of the substituted activity, setting, or time. The theory affirms that the substitution process is inevitable due to limited recreational resources and that climbers seek to preserve the general qualities of the original climbing activity as much as possible in the substitution. Furthermore, these requirements can be fulfilled more easily through alternative behaviors if a wider variety of acceptable climbing substitutes is available, such as climbing gyms.

These early studies in substitutability only focused on the replacement of recreation activities, ignoring the importance of possible replacement settings and times. Later studies focused on particular activities and the recreationist's way of coping for alternative leisure experiences, particularly in hunting (Baumgartner & Heberlein, 1981), boating (McCool & Utter, 1982), fishing (Manfredo & Anderson, 1987), and

backpacking (Shelby, Goodwin, Brunson & Anderson, 1989). These studies showed that in order to achieve the desired outcomes, recreationists preferred to make substitutions within an activity rather than by substituting the actual activity. Thus, Brunson and Shelby (1993) offered a more holistic definition, which refers to "the interchangeability of recreation experiences such that acceptably equivalent outcomes can be achieved by varying the following: the timing of the experience, the means of gaining access, the setting, and the activity" (p. 69).

Because the very nature of a substitute implies an inferior or unintended quality, some recreation experiences can be compromised by a substitution. For example, experienced whitewater paddlers might not enjoy paddling on a slow, flat river because they prefer settings that challenge their higher level of expertise. Similarly, climbing is an activity with a wide variety of environments and difficulty levels, which provides climbers with opportunities to match their skill level to a desired level of challenge. Likewise, Shelby and Vaske (1991) reported an "asymmetric substitutability" effect in their study of salmon anglers in New Zealand where anglers judged the quality of substitute rivers in terms of their fishing success. As such, some nearby rivers were considered acceptable substitutes while others were less so. However, another study by Shelby, Goodwin, Brunson and Anderson (1989) looked at the substitutions that backpackers made who were denied wilderness permits to the Alpine Lakes wilderness. A significant number reported having satisfactory experiences regardless of seemingly substandard settings. Surprisingly, this finding is contrary to the theory of recreation specialization proposed by Bryan (1977), in which more specialized recreation activities

would require more particular experiences and settings, thus limiting the range of acceptable substitutes for any given experience. Climbers may find alternative settings less acceptable than others depending on their level of specialization, depending on the qualities desired in the climbing experience.

In addition to issues of access, other situational constraints may play a role in the substitution process, such as limitations due to obtainable finances, available time, reasonable driving distances, perceived crowding, and deficient scenery. Furthermore, the dynamics of the social group can limit the range of options available for acceptable substitutes. As mentioned earlier, Ewert and Hollenhorst (1997) have argued that while the indoor gym provides a suitable training facility and may lead to increased participation in other wilderness climbing activities, the lack of natural features and the controlled risk environment would prevent gym climbing from being a genuine substitute for traditional rock climbing.

Specialization

By knowing the experience levels of climbers, managers of climbing areas make assumptions regarding environmental and social setting preferences, frequency of participation, sensitivity to crowding, and participation in other risk-related activities (Hollenhorst, 1990). Through the socialization process, as climbers develop from beginners to more advanced levels, they obtain specialized knowledge and skills while learning the attitudes and norms associated with the activity. To explain some of the diversity among recreationists within an activity style, Bryan (1977) proposed that

individuals could be defined along "a continuum of behavior from the general to the particular reflected by equipment and skills used in the sport and activity setting preferences." Based on the concept of leisure social worlds (Shibutani, 1955), he applied his theory to anglers and classified them according to technique, setting, experience, and lifestyle centrality and grouped them into four categories: occasional recreationists, general recreationists, technique specialists, and technique and setting specialists.

Ditton, Loomis, and Choi (1992) linked the recreation specialization theory of Bryan (1977) to the social subworlds literature (Shibutani, 1955; Strauss, 1978; Unruh, 1979, 1980) through eight postulations. The re-conceptualized recreation specialization framework proposed that a person's level of specialization increases over time and that there is a direct relationship between specialization level and the value of sidebets, the centrality of the activity to that person's lifestyle, acceptance and support of rules and norms, the importance attached to equipment and its use, resource dependency, and the level of mediated interaction related to the activity. Also, they proposed an increase in the importance of non-activity specific elements and a decrease in the importance of activity specific elements with regard to recreation experiences.

Because the study conducted by Ditton and others used a uni-dimensional scale, Salz, Loomis and Finn (2001) created a multi-dimensional measure based exclusively from the social worlds concepts of Unruh (1979, 1980). Unruh defined social worlds as "amorphous and diffuse constellations of actors, organizations, events and practices, which have coalesced into spheres of interest and involvement for participants" (1980, p. 277). He suggested that members of the same social world often maintain similar

attitudes, beliefs and motivations, which creates a feeling of group identity, and that each member can be described by four core characteristics: orientation, experiences, relationships, and commitment. He also suggested that each characteristic can be categorized according to the person's level of involvement – strangers, tourists, regulars, and insiders – creating a matrix of social subworlds.

Strauss (1984) described three ways in which an activity group becomes segmented from other sub-groups in the social world: new technologies can influence one group to "bud off" from the parent group, ideological differences can force a "splitting off" from the parent group, and sub-worlds can "intersect" due to common settings and techniques. Climbing's history of technological influence, multiple and contested settings, and opposing ethical orientations toward climbing and climbing resources exemplifies such a theory. "Where once there was only one type of climber, there are now devotees of sport climbing, gym climbing, competition climbing, waterfall ice climbing, big wall climbing, alpine climbing, and high altitude climbing" (Scott, 2000, p. 391).

Conflict

The concern for conflict among outdoor recreationists has grown along with a rise in the number of visitors to areas and the new technologies that allow them to participate in more diverse activities. Advances in sports equipment have led to more specialized activities while modern lifestyles have increased diversity among recreationists (Manning, 2010; Cordell & Tarrant, 2002). One would expect that as peoples' lives

become more sensitive to temporal and economic constraints, expectations from recreation areas will become more stringent. It has been argued that an increase in improved technology has also amplified the rift in the relationship between mankind and the land (Shultis, 2001). As a result, the type and degree of conflict has paralleled the growth in different types of recreation uses and evolving values. A history of climbing based on the evolution of technology and disparate climbing styles alludes to such connotations of conflict.

A model put forth by Jacob and Schreyer in 1980 presents conflict as "goal interference attributed to another's behavior" (p. 369) and provides a sound basis for examining experienced conflict. This theory describes factors that can potentially lead to conflict: activity style, resource specificity, mode of experience, and lifestyle tolerance. Activity style refers to the various personal meanings assigned to an activity by the participant and includes intensity, status from equipment and experience, and the influence of experience on evaluations of quality. Resource specificity refers to the significance attached to using a specific recreation resource for a given recreation experience and varies with the range of activity experiences and the possessive attitudes and relationship levels regarding a specific recreation resource. Mode of experience refers to the level at which the participant engages with the environment and ranges from focused – high interaction with the environment – to unfocused – little interaction with the environment. Finally, lifestyle tolerance refers to the tendency to accept or reject lifestyles different from one's own and includes racial, ethnic, and cultural prejudice, technological biases, and perceived normative and social values.

Manning (2010) expanded on Jacob and Schreyer's theory by including other dimensions that resulted in a more comprehensive model that differentiates perceived conflict from experienced conflict. It analyzes in more detail the specific dimensions leading to conflict and the various coping mechanisms used to deal with stressful situations. While the original four factors leading to conflict are still important in the expanded model, these variables describe sensitivity to conflict rather than perceived conflict. Thus, studies can distinguish actual goal interference attributed to others from a sensitivity to conflict situations: The former approach is retrospective while the latter is prospective. The expanded model also adds that conflict can occur not only between groups (inter-group conflict) but also within a group (intra-group conflict) and with managers or other uses of the resources and that different methods of coping with conflict have evolved according to the degree and type of conflict.

Although the idea of conflict has a negative connotation, recreation conflict can lead to positive outcomes in overall management (Deutsch, 1994; Hammittt & Schneider, 2000). The presence of conflict in climbing areas indicates where in the management plan managers should direct additional attention. As new technologies and increasing numbers of visitors create new issues, conflict scenarios force managers to respond accordingly and thereby update management plans to operate efficiently.

The majority of studies of conflict in recreation have focused on the role of motivations in goal interference between activity groups; however, researchers have recently recognized that social values have an influence on conflict potential (Watson, 2001). Several studies found significant relationships between motivations or social

values and perceived conflict involving recreation groups using the same resources: skiers and snowboarders (Vaske, Dyar & Timmons, 2004), hikers and mountain bikers (Carothers, Vaske & Donnelly, 2001), hikers and equestrians (Blahna, Smith & Anderson, 1995), canoeists and motor boaters (Adelman, Heberlein, & Bonnicksen, 1982), cross-country skiers and snowmobilers (Vitterso, Chipeniuk, Skar & Vistad, 2004), and water skiers and fisherman (Gramann & Burdge, 1981).

More recently, research in recreation conflict has evolved to explore the relationship of particular variables that lead to conflict sensitivity, such as the role of tolerance in similar activities that use the same resource (Ivy, Stewart, & Lue, 1992; Thapa & Graefe, 2003), social values versus interpersonal relationships (Carothers, Vaske & Donnelly, 2001), and conflict management strategies (Row & Benson, 2001; Stewart & Cole, 2001). Furthermore, conflict can be asymmetrical, where conflict is not mutual between climbing groups or climbing styles but unique to one and not the other. Asymmetrical conflict occurs when one group attributes goal interference to another group but the other group experiences no conflict at all. This is typical among activity groups such as water skiers and fishermen (Gramann and Burdge, 1981), motor-boaters and canoeists (Ivy, Stewart, and Lue, 1992), and mountain-bikers and hikers (Ramthun, 1995) in which non-mechanized activity groups often perceive conflict with mechanized activity groups while the latter seldom if ever experience conflict with the former.

In order to understand conflict appropriately, researchers need to understand the various orientations that people have regarding the values, meanings, expectations, and importance of a resource while examining the effect that the commingling of these

orientations have on each other. Two studies involving rock climbers (Borrie & Harding, 2002; Schuster, Thomson & Hammittt, 2001) have shown that the method of introduction to a sport has an influence on the development of attitudes toward the activity and the resource. To expand on this, research should evaluate the socialization processes of activities that occur both indoors and outdoors, such as indoor gym climbing and natural rock climbing, or in urban and rural areas, such as road biking versus mountain biking and trail running versus street running.

Conflict can also occur between recreationists and non-recreation groups when place identity has a strong influence on the way a place should be interpreted and managed. The Kiowa Americans at Devils Tower National Park have expressed conflict with rock climbers and hikers in the area, especially during meditations (Dustin, Schneider, McAvoy & Frakt, 2002). Businesses rely on the peak summer season for tourist-based guided climbing trips, which coincide with a Kiowa religious holiday. A collaborative effort in which both groups met with managers resulted in a voluntary ban during the month of June.

Socialization and Environmental Values

Socialization into leisure activities is a process by which one "acquires the motives, attitudes, values, and skills that affect their leisure choices, behavior and experiences throughout their lives" (Mannell & Kleiber, 2011). Early childhood experiences have shown to play a significant role in preferences for recreation activities and the attitudes and behaviors toward the environment in later years (Tanner, 1980;

Bixler & Floyd, 1997; Bixler, Floyd & Hammittt, 2002). Many recreational activities are learned during childhood (Bixler & Morris, 1998) and the most important influences come from family members (Corcoran, 1999) and peers (Harris, 1995). Other variables that influence environmental attitudes include formal education, the media, negative environmental experiences, and involvement in outdoor organizations (Tanner, 1980; Palmer, 1993; Corcoran, 1999).

In a study of anglers in New York, Kuehn, Dawson and Hoffman (2006) identified a three-stage process of socialization: initial involvement, attachment, and commitment. Their study found that those who began fishing during childhood were more likely to progress to more involved stages. Furthermore, the activity and social bonds that developed during the attachment stage continued into the commitment stage, with social attachments being the most influential.

Research over the past several decades has consistently reinforced the relationship between social groups and recreation activities. Early on, Burch (1969) proposed a "personal community hypothesis" of recreation in which recreation participation was influenced largely by family, friends, and coworkers. Similarly, a study in 1971 (Cheek) found that a majority of visitors to local parks came in groups rather than alone and a study by Buchanan, Christensen, and Burdge (1981) indicated that various social groups participated in particular recreation activities based on similar motives.

Stokowski (1990) and Stokowski and Lee (1991) used social network analysis to explore social groups and revealed that socialization in recreation activities comes from a variety of social worlds ranging from "personal communities" to extensive social

relationships reminiscent of the social worlds research of Unruh (1980) and others (see Salz, Loomis, and Finn, 2001; and Ditton, Loomis, & Choi, 2006). More recently, Schuett (1995) found a relationship between social group affiliation and motivation that included personal characteristics such as skill level and centrality to lifestyle. Finally, an individual's socialization process into a recreation activity can include a range of childhood experiences, influences from the community, and status group dynamics (Manning, 2010).

There has been considerable research showing a direct relationship between outdoor recreation participation and environmental attitudes (Dunlap & Heffernan, 1975; Nord, Luloff, & Bridger, 1998; Cordell, Betz & Green, 2002; Sherburn & Devlin, 2004) and that these attitudes differ between particular recreation activities and the level of involvement (Bright & Porter, 2001; Teisl & O'Brien, 2003). More specifically, Borrie and Harding (2002) found that the way climbers are introduced to an activity affects their attitudes toward low-impact practices and Schuster, Thompson, and Hammitt (2001) found a relationship between climbing style and attitudes towards management of climbing areas. However, recreationists who are quickly immersed into a sport may develop skill and expertise more rapidly than they develop ethical standards and attitudes (Bryan, 2000).

Visitors tended to view the recreation resource in terms of the activity involved regardless of management objectives. Visitor preferences for specific activity settings are based largely on the type of areas and the facilities available. More importantly, these preferences are influenced by previous experiences (Manning, 2010). Stankey and

Schreyer (1987) identified several commonalities among visitors to backcountry areas and concluded that most visitors to wilderness areas held more stringent attitudes toward wilderness values and they tendered to endorse restrictions enforced by management. Additionally, they determined that since most visitors to backcountry areas do not have established values and preferences, they tended to support the conditions as they experience them while others' values and preferences are determined largely by the activity style, skill level, and mode of travel (Manning, 2010).

Similarly, in a study of visitors to the Deschutes River in Oregon, Brunson and Shelby (1990) revealed that visitors resort to a hierarchy of campsite attributes to determine the quality of the experience. These attributes range fall into three categories: "necessary" attributes (considered very important to the overall recreation experience), "experience" attributes (considered somewhat important to the overall recreational experience), and "amenity" attributes (less important but useful for choosing between multiple and acceptable campsites). Both studies show that visitors evaluate recreation experiences on prior knowledge and that social group norms have an important influence on the interpretation of the resource. Understanding the various attributes of climbing resources and their respective levels of importance would help managers provide the right environment for optimal recreation experiences. Because users of recreation areas have different expectations, understanding the attitudes of recreationists allows managers to provide quality recreation opportunities.

Summary

This chapter provides a brief history of climbing and its inherent qualities of segmentation, community, and dispute that have guided the climbing community to its present state of diverse styles, settings, and ethics. A brief review of pertinent areas of recreation studies included socialization, specialization, and recreation conflict. However, the effect of the indoor climbing gym on the climbing experience, while the dominant influence in climbing socialization, is largely absent from the canon of climbing research and should be investigated.

CHAPTER 3

METHODS

Introduction

This study explored the relationships between climbers, their preferred recreation environments, and the management of various climbing areas, including the role of socialization in the development of attitudes and preferences toward climbing areas and managers. Furthermore, socio-demographic and psychographic characteristics are sought to describe segments of the climbing community. This chapter will describe the study population and sample, instrument development, data collection and response rates.

Study Population

The study population could be described as the global entity of climbers, whether in Europe, Asia, the United States, or anywhere. However, this particular study acknowledges the cultural differences between international groups of climbers, as well as the nuances between regional communities in the United States. Thus, this study primarily focused on climbers on the East Coast of the U.S., predominantly the Southeast.

Study Sample

The study sample consisted of climbers at various events and venues predominantly in the southeastern U.S. Climbing areas were targeted according to the variety of climbing styles and difficulty ranges typical of that area. In addition, some

27

venues were chosen according to the social atmosphere being promoted. Indoor climbing gyms were included in both cases, as were competitions, festivals, and stewardship events hosted by climbing clubs. Finally, a segment of the climbing community was targeted via the internet by appealing to blogs and discussion groups on several climbing websites. In all, three websites and one retail space were used and four climbing gyms and four climbing areas were visited that included a trail clean up, two festivals, two competitions, and a climber appreciation day.

Table 3.1

Sampling sites, type of event, and sampling dates for data collection

Location	Event Type	Dates
Seneca Rocks, WV	Cinco de Mayo	5 – 6 May 2007
Wall Crawler Rock Club, Atlanta, GA	SCS Regional Championship	12 May 2007
Foster Falls, TN	SCC Trail Day	12 May 2007
New River Gorge, WV	New River Rendezvous	18 – 20 May
Rocks and Ropes, Greenville, SC	Climbing Gym	22 May 2007
Crowder's Mountain State Park, NC	Holiday Weekend	26 May (Memorial Day Weekend)
ClimbMax, Asheville, NC	Climbing Gym	5 June 2007
Stronghold Athletic Club, Columbia, SC	Climbing Appreciation Night	6 June 2007
Sunrift Adventures, Travelers Rest, SC	Retail Store	16, 23 and 30 June 2007
Carolina Climbers Coalition	Climbing Club	1 – 31 July 2007
Southeastern Climbers Coalition	Climbing Club	1 – 31 July 2007
NEIce website	Online Climbing Forum	1 – 31 July 2007

- Cinco de Mayo, Seneca Rocks, WV, 5 – 6 May 2007 – "Official" opening day of climbing with a climbing shoe demo and Cinco de Mayo party afterwards hosted by the Gendarme, a climbing gear retail store and guide center. The Seneca Rocks climbing area offers traditional and sport climbing routes in a variety of difficulty levels.

- SCS Regional Championship, Wall Crawler Rock Club, Atlanta, GA, 12 May 2007 – USA Climbing organizes climbing competitions in climbing gyms across the nation in either of two series, the American Bouldering Series and the Sport Climbing Series. The Wall Crawler Rock Club is situated near downtown Atlanta and hosted the Southeastern regional championship for the Sport Climbing Series.

- SCC Trail Day, Foster Falls, Tennessee, 12 May 2007 – Foster Falls is located west of Chattanooga and consists almost entirely of sport climbing routes. The Southeastern Climbers Coalition, a membership-based regional climbing club, sponsors several trail maintenance days annually to help rehabilitate and improve climbing areas from the impacts of use.

- New River Rendezvous, New River Gorge, West Virginia, 18 – 20 May 2007 – The New River Rendezvous is an annual climbing festival hosted by the Access Fund, Water Stone Outdoors, and the National Park Service. The area boasts a variety of climbing for all levels for bouldering, sport and traditional climbing, includes a climbing competition by each style, and attracts thousands of participants.

- Rocks and Ropes, Greenville, SC, 22 May 2007 – Rocks and Ropes is a climbing gym located in downtown Greenville, SC, less than two hours away from several climbing destinations in the Blue Ridge Mountains.

- Memorial Day Weekend, Crowder's Mountain State Park, 26 May 2007 – Crowder's Mountain State Park is located just west of Charlotte, NC and is the closest climbing destination from Columbia, SC. The area supports a variety of traditional and sport climbing routes and is developing a management plan for a bouldering area. Memorial Day weekend typically draws large numbers of recreationists.

- ClimbMax, Asheville, NC, 5 June 2007 – ClimbMax is a climbing gym located in downtown Asheville, NC, less than an hour away from several climbing destinations in the Blue Ridge Mountains.

- Climbing Appreciation Night, Stronghold Athletic Club, Columbia, SC, 6 June 2007 – Stronghold Athletic Club is the only climbing gym in Columbia, SC and regularly hosts competitions for bouldering and vertical climbing. Free climbing and free pizza were offered to attract climbers of all skill levels.

- Sunrift Adventures, Travelers Rest, SC – Sunrift Adventures is an outdoor gear retailer in Travelers Rest, SC, less than two hours away from many climbing destinations in the Blue Ridge Mountains. The store attracts climbers in all styles and skill levels and is often a stopping point on the way to or from climbing destinations.

- Carolina Climbers Coalition (CCC) – The CCC is a non-profit corporation

  dedicated to preserving the natural environment, promoting safe climbing

  practices, and protecting and expanding climbing opportunities in both North and

  South Carolina (www.carolinaclimbers.org). Their website includes a message

  board where a link to the survey was posted.

- Southeastern Climbers Coalition (SCC) – The SCC is a non-profit corporation

  dedicated to preserving climbing areas in the southeast. The group sponsors

  climbing area cleanups and trail maintenance days, raises money to purchase land

  and to keep climbing areas open for future generations, and includes volunteers

  from Tennessee, Alabama, Georgia, North and South Carolina and the Ozarks.

  The SCC provides an ongoing means for climbers throughout the area to come

  together and respond effectively to access threats to climbing areas and the

  impacts of increasing use. Their website includes a message board where a link

  to the survey was posted.

- NEIce website – www.NEIce.com is an online forum for ice climbers that centers

  on climbing in the northeastern U.S. Like the CCC and the SCC, the site hosts a

  message board where a link to the survey was posted.

Question Development

The survey instrument was developed by reviewing research on environmental

attitudes and preferences including literature pertaining to market segmentation and

preferences for urban amenities. Additionally, literature related to management of

natural resources, particularly climbing areas, as well as psychographic scales related to values and attitudes toward the natural environment were utilized to develop the questionnaire.

The independent variables for this study are climbing subgroups (gym climbing, bouldering, sport climbing, and traditional climbing) and socialization parameters (climbing style, climbing resource, and climbing party). Because climbers often engage in several types of climbing, the variable climbing subgroups was defined by asking participants which style of climbing best describes them as a climber. The dependent variables for this study included the respondents' preferences for wilderness settings, their attitudes toward minimum impact ethics and management decisions, their environmental orientations and attitudes, and socio-demographic characteristics..

Climbing Education and Training: Socialization

Part one of the survey instrument consisted of twelve nominal items to learn more about the respondent's socialization into climbing activities as well as current social dimensions. Parameters regarding the method of introduction and current climbing environment included climbing style, climbing setting, members of the climbing party, and the occasion. Additional questions were asked to gauge the level of outdoor education associated with climbing, including involvement with Scouts groups and outdoor leadership schools.

Climbing History and Experience: Skill Level and Experience-Use History

Studies in specialization have indicated a positive relationship between skill level and level of involvement to protective attitudes towards the recreation resource. As such, part two of the survey instrument (fifteen items) was designed to ascertain the skill level and the years of experience of the respondent. Because many climbers regularly engage in several styles of climbing, the questions were posed for all climbing styles. Furthermore, respondents were asked to rank their preferences for climbing activities and to describe the social parameters of the group. Finally, questions regarding each respondent's level of involvement included total years of experience in each of the climbing styles, farthest distance traveled to a climbing destination, frequency of climbing, commitment level, and leadership qualities.

Climbing Values and Experiences: Wilderness Purism

Developed by Stankey in 1973, the Wilderness Purism scale differentiates wilderness users by their preferences for wilderness attributes. Purism is described as those attitudes associated with high levels of expectations of and sensitivity to variations in the quality of a wilderness experience. For this study, the scale consisted of 17 items based on the dimensions of wilderness as defined by the U.S. Wilderness Act of 1964. Using a five-point Likert scale, it measures the degree of purism in the attitudes of wilderness users toward wilderness and ranks their involvement, concern, and knowledge about wilderness. In his study, Stankey found that there was a direct relationship between an individual's wilderness orientation ("purism") and sensitivity to encounters

with other recreationists and alternative management plans. Items from the Wilderness

Purism scale were adapted for use in this study to measure the respondents' affinity for

wilderness settings.

Management of Climbing Areas: Leave No Trace

Leave No Trace is a program that has developed a set of ethical principles

designed to educate the public on the impacts of recreation on the natural resources. It

also provides minimum impact techniques to recreation resource visitors to prevent and

minimize such impacts. Leave No Trace principles are often incorporated into recreation

resource management plans in order to provide quality recreation opportunities for all

visitors. Because recreation activities can occur in a wide variety of settings and not all

recreation activities create the same impacts, there are additional recommendations

specifically designed to reduce the impacts from rock climbing. For the purpose of this

study, items from the Social Science Research on Recreational Use and Users of

Shenandoah National Park's Rock Outcrops and Cliffs (Lawson, Wood, Hockett,

Bullock, Kiser and Moldovanyi, 2006) were used to ask respondents for their level of

perceived social, resource or management problems based on Leave No Trace principles

(19 items) as well as the extent of support or opposition for alternative management

strategies regarding the social or resource impacts from rock climbing activities (17

items) using a five-point Likert scale.

Climbing Association: Centrality to Lifestyle

Items for this section explored the level of involvement for each respondent in the climbing community. Most questions were nominal and asked about magazine subscriptions, membership to climbing groups, and volunteer work. This section also included five items arranged in a Likert scale to explore the central life interests of climbing to the respondent.

Living, Learning, and Playing: Survey of Environmental Quality: Universal Orientations and Individual Attitudes (SEQUOIA)

The SEQUOIA scale was developed by Colorado State University in conjunction with the United States Department of Agriculture's Natural Resource Conservation Service in order to understand a group's attitude toward the environment (Bell & Clarke, personal communication, 12 July 2007). Unlike other scales, however, SEQUOIA includes a factor for urban preferences, thus providing a balance in the scale for this study to measure urban-rural preferences. Other factors included modern sensation-seeking, independence self-sufficiency, and environmental concern. Arranged in a five-point Likert scale, the 40 items from the original scale were pre-tested by a small group of climbers and reduced to 20 items for this study. This section of the survey also included eight items to learn more about childhood play environments.

A final section asked about respondents' childhood play experiences in particular environments: in the woods; on a playground; around a lake, pond, or stream; in their yard; in a field, barn, or pasture; in an alley, cul-de-sac, or street near their home; in their

neighbor's yard, and in a vacant or undeveloped lot. Eight items each asked how much

the respondent played in that particular environment throughout childhood. Responses

included never, maybe once, a few times, a lot, and almost always.

Recreation Activities

Much can be learned about the respondents by learning about other recreation

activity preferences – what a person does when they are not climbing. This section of the

survey included 26 items asking respondents whether they liked or disliked other

recreation activities. The various activities represent qualities such as nature

appreciation, risk-taking, consumptive use, and technology.

Socio-demographics

Socio-demographic variables for this study included gender, age, education,

residence, employment type, marital status, and income. For the age variable,

respondents were asked to give the year of their birth. For the education variable,

respondents were asked for the highest level of education completed so far, which

included six options including: some high school; high school graduate or GED; some

college, business, or trade school; college, business or trade school graduate; some

graduate school; and master's, doctoral or professional degree. For the residence

variable, respondents were asked to give their zip code or if they did not live in the U. S.

their country of residence. The variable for employment included six options: employed

full-time, employed part-time or temporary, self-employed, unemployed or homemaker,

student, and retired. Marital status included single, divorced or separated, married (no children), and married (with children). Income was measure with two questions: yearly individual income before taxes and total household income before taxes, which had the following options: less than $20,000; $20,000 to $39,999; $40,000 to $59,999; $60,000 to $79,999, $80,000 to $89,999 and $100,000 or more.

Data Collection

Respondents for this study participated through an online survey provided through emails obtained at onsite climbing areas or through online climbing websites. As much as possible, all climbers aged eighteen and over that were encountered at all sites were asked to participate in the study. A total of 504 potential participants were approached at all of the sampling sites. 31 of those approached expressed an unwillingness to participate. Of the 473 people who agreed to participate, 8 respondents requested hard-copies by mail, all of which were returned completed. Emails were sent with a link to the online survey to 465 persons and 36 of those emails were undeliverable. Of the 429 respondents whose emails were deliverable, 409 completed the survey in usable form.

Response rates (RR), cooperation rates (COOP), and refusal rates (REF) were calculated according to the methods outlined by the American Association for Public Opinion Research (2011). Because the outcome rates from final disposition distributions included partial surveys as usable data, response rate type 2, cooperation rate type 2, and refusal rate type 2 calculations were used. Additional response rates for each sampling

site are presented in Table 3.2 and Table 3.3 presents response rates based on the event or

targeted characteristic of the climbing venue.

$$RR= \frac{\text{number of usable surveys}}{\text{number of usable surveys + number of refusals and non-contacts}} = 90.1\%$$

$$COOP = \frac{\text{number of usable surveys}}{\text{number of usable surveys + number of refusals}} = 93.0\%$$

$$REF = \frac{\text{number of refusals}}{\text{number of usable surveys + number of refusals and non-contacts}} = 0.07\%$$

Table 3.2

Individual response rates for each sampling site

	Approached	Refusals	Surveys sent	Deliverable surveys	Surveys returned	Usable surveys
Seneca Rocks	96	1	95 [a]	94	92	87
Wall Crawler Rock Club	22	4	18	18	7	7
Foster Falls	19	0	19	19	12	10
New River Gorge	256	9	247 [b]	235	136	133
Rocks and Ropes	18	2	16 [c]	16	10	10
Crowder's Mountain State Park	13	2	11	11	9	9
ClimbMax	14	1	13 [d]	13	6	6
Stronghold Athletic Club	26	0	26	26	18	18
Sunrift Adventures	40	12	28	27	23	23
Carolina Climbers Coalition	-	-	-	-	25	24
Southeastern Climbers Coalition	-	-	-	-	61	56
NEIce website	-	-	-	-	30	26
Total	504	31	473 [e]	459	429	409

[a] Two respondents requested a hard copy of the survey, both of which were sent and returned completed.
[b] Three respondents requested a hard copy of the survey, all of which were sent and returned completed.
[c] One respondent requested a hard copy of the survey, which was sent and returned completed.
[d] Two respondents requested a hard copy of the survey, both of which were sent and returned completed.
[e] A total of eight respondents were mailed hard copies of the survey, all of which were returned completed.

Table 3.3

Response rates by categorical sampling characteristics.

	Number approached	Number of refusals	Number of surveys sent	Number of deliverable surveys	Number of surveys returned	Usable surveys
Outdoor Climbing	384	12	372	359	249	239
Indoor Climbing	80	7	73	73	41	41
Climbing Festival	352	10	342	329	228	220
Climbing Competition	22	4	18	18	7	7
Trail Cleanup	19	0	19	19	12	10
Retail	40	12	28	27	23	23
Club	19	0	19	19	98	90
Online	-	-	-	-	116	106

Analysis

All statistical procedures were performed using SPSS version 17. Because a limited number of respondents labeled themselves as ice climbers, mountaineers, or rappellers, these variables were deleted from analysis and only the independent variables gym climbers, boulderers, sport climbers, and traditional climbers were used. Principle component analysis with varimax rotation was used to group dependent variables into factor groupings for the Wilderness Purism and SEQUOIA scales and exploratory factor analysis (Fabrigar, Wegener, MacCallum, and Strahan, 1999) with varimax rotation was used to group dependent variables into factor groupings for the Leave No Trace and

Management Decisions factors. Factors were calculated using the regression method for each respondent for each subscale, which were then used for the remaining analyses.

The Wilderness Purism scale was analyzed using principal component analysis and varimax rotation and resulted in six factors: proximity, solitude, noise, natural environment, remoteness, and management. Maximum Likelihood analysis with promax rotation was used to analyze factors for the Leave No Trace items of the questionnaire. Items related to management issues and perceived problems at climbing areas resulted in three factors: resource impacts, crowding, and disturbances. Items related to support for management decisions resulted in four factors: closures, crowding, impacts, and use of bolts. Finally, principal component analysis with varimax rotation was used to reaffirm the four components of the SEQUOIA scale: environmental concern, urban dweller, independent/self-sufficient, and sensation seeking.

CHAPTER 4

RESULTS

The objectives of this study are to explore the relationships between climbing styles, climbing socialization, and attitudes and preferences for climbing settings, management, and amenities. This chapter presents the results of the quantitative analyses used to meet these objectives. Before the research questions are addressed, the socio-demographic characteristics of the respondents are described. Then the results of data analysis are presented as they related to each research question. First, do rock climbers who differ in the way they were introduced to climbing also differ in their preferences for wilderness settings, Leave No Trace principles and rock climbing management decisions, or attitudes toward the environment? Second, do rock climbing sub-groups in general differ in their preferences for wilderness settings, agreement on Leave No Trace principles and rock climbing management decisions, or attitudes toward the environment?

Respondent Characteristics and Independent Variables

This study produced 409 usable surveys. The respondents can be described as mostly single (n = 204, 58.1%), male (n = 250, 70.8%) college graduates (n = 145, 41.1%) with a mean age of 32.24 years old (SD = 10.21), working full-time (n = 206, 58.4%), with a minority making less than $20,000 per year (n = 85, 37.8%). Tables 4.1 and 4.2 show the distribution of socio-demographic characteristics of the study sample.

Table 4.1

Socio-demographic characteristics of respondents

	Items	N	%
Gender	Female	103	29.2
	Male	250	70.8
Age	Under 21	25	7.1
	21 to 30	162	46.0
	31 to 40	90	25.6
	41 to 50	49	13.9
	51 and over	26	7.4
Education	Some high school	5	1.4
	High school graduate or GED	11	3.1
	Some college, business or trade school	72	20.4
	College, business, or trade school	145	41.1
	graduate	30	8.5
	Some graduate school	90	25.5
	Master's, doctoral or professional degree		
Employment	Employed full-time	206	58.4
	Employed part-time or temporary	26	7.4
	Self-employed	29	8.2
	Unemployed or homemaker	5	1.4
	Student	82	23.2
	Retired	5	1.4
Marital status	Single	204	58.1
	Divorced or separated	24	6.8
	Married w/o children	71	20.2
	Married with children	52	14.8
Income, individual before taxes	Less than $20,000	85	37.8
	$20,000 to $39,999	52	23.1
	$40,000 to $59,999	47	20.9
	$60,000 to $79,999	23	10.2
	$80,000 to $99,999	7	3.1
	$100,000 or more	11	4.9
Income, household before taxes	Less than $20,000	49	14.5
	$20,000 to $39,999	53	15.6
	$40,000 to $59,999	63	18.6
	$60,000 to $79,999	60	17.7
	$80,000 to $99,999	41	12.1
	$100,000 or more	73	21.5

Table 4.2

Age distribution of study sample

	N	Min	Max	Mean	SD
Age	352	18	67	32.24	10.21
Valid N	352				

Several questions were included in the instrument to understand the dynamics of the respondents' socialization into climbing as well as what type of climber each respondent chose to describe her or himself. The socialization parameters tested included the style of climbing, the climbing environment and location, and the relationship of the respondent to the other members of the climbing party. The complete response frequencies for socialization parameters are listed in Table 4.3. Because response frequencies for some items (location, style, and climbing group) were too low to include in the analysis they were either deleted from analysis or recoded (Table 4.4).

Most initial climbing experiences occurred either indoors at a climbing gym (n = 142, 34.7%) or outdoors on a natural rock face (n = 218, 53.3%) (Tables 4.3 and 4.4). Respondents reported that most initial climbing experiences involved top rope climbing (n = 282, 69.1%) with friends (n= 188, 46.0%). Respondents also reported that when they started to climb regularly they generally continued to engage in top rope climbing (n = 199, 49.5%) with friends (n = 283, 70.8%) either indoors at climbing gyms (n = 171, 42.6%) or outdoors on a natural rock face (n = 220, 54.7%). No respondents reported sport climbing outdoors for first climbing experience. Similarly, no respondents reported climbing with family or outdoors on an artificial wall when climbing regularly.

44

Table 4.3

Responses to parameters of socialization

Item	Response	First climbing experience		When started climbing regularly	
		n	%	n	%
Location	Indoors at a climbing gym	142	34.7	171	42.6
	Outdoors on an artificial wall or tower	45	11.0	6	1.5
	Outdoors on a natural rock face	218	53.3	220	54.7
	Outdoors on a frozen ice structure [a]	2	0.5	3	0.7
	Other [a]	2	0.5	2	0.5
	Total	409	100.0	402	100.0
Style	Bouldering	57	14.0	76	18.9
	Abseiling/ rappelling for sport [a]	17	4.2	4	1.0
	Top rope climbing	282	69.1	199	49.5
	Sport climbing outdoors	9	2.2	46	11.4
	Traditional climbing outdoors	25	6.1	70	17.4
	Ice climbing indoors [a]	1	0.2	3	0.7
	Alpine mountaineering [a]	8	2.0	4	1.0
	other	9	2.2	-	-
	Total	408	100.0	402	100.0
Climbing Group	No one/myself [b]	26	6.4	22	5.5
	Friends	188	46.0	283	70.8
	Family	62	15.2	23	5.8
	Spouse/significant other [b]	18	4.4	30	7.5
	Classmates/coworkers [b]	34	8.3	16	4.0
	Members of my church [b]	8	2.0	4	1.0
	Members of a club [b]	22	5.4	18	4.5
	My scout group [b]	25	6.1	-	-
	A guide/personal trainer [b]	26	6.4	4	1.0
	Total	409	100.0	400	100.0

Note: [a] Due to low response rates, these items were deleted from the analysis (see Table 4.4)
[b] Due to low response rates, these items were recoded as "other" (see Table 4.4)

Table 4.4

Recoded responses to parameters of socialization

Item	Response	First climbing experience		When started climbing regularly	
		n	%	n	%
Location	Indoors at a climbing gym	142	35.1	171	43.7
	Outdoors on an artificial wall or tower	45	11.1	-	-
	Outdoors on a natural rock face	218	53.8	220	56.3
	Total	405	100.0	391	100.0
Style	Bouldering	57	15.6	76	19.4
	Top rope climbing	282	77.5	199	50.9
	Sport climbing outdoors	-	-	46	11.8
	Traditional climbing outdoors	25	6.9	70	17.9
	Total	364	100.0	391	100.0
Climbing Group	Friends	188	46.0	283	70.7
	Family	62	15.1	-	-
	Other	159	38.9	117	29.3
	Total	409	100.0	400	100.0

Because climbers engage in more than one style of climbing, respondents were also asked which type of climbing best described them (Table 4.5). The majority of respondents chose to describe themselves as traditional climbers (43.0%) while the rest described themselves as gym climbers (10.0%), boulderers (15.7%), or sport climbers (22.3%). Because frequencies were too low for statistical analysis, abseiling/rappelling for sport, ice climbing, and alpine mountaineering participants were deleted from analysis. The study sample ranged from 5.4 to 7.6 years of experience for each climbing style (Table 4.6) with most respondents having had some formal instruction in climbing safety (n = 243, 60.4%) or skills/technique (n = 229, 57.0%). Considerably fewer

respondents had formal instruction in minimum-impact climbing (n = 113, 28.1%) or

climbing etiquette (n = 120, 29.9%) (Table 4.7). Furthermore, respondents typically

climbed in groups of two to four people (Table 4.8) with 44.4% (n = 166) reporting that

they were usually the party leader when climbing with others.

Table 4.5

Reported frequencies for respondents' self-described climbing style [a]

	n	%
Gym climbing	38	10.0
Bouldering	60	15.7
Sport climbing	85	22.3
Traditional climbing	164	43.0

Note: [a] Due to low response rates, the items abseiling/rappelling for sport (n=2, 0.5%), ice climbing (n=15, 3.9%), and alpine mountaineering (n=17, 4.5%) were not included for analysis.

Table 4.6

Years of climbing experience reported by respondents for each climbing style

	n	Min	Max	Mean	SD
Bouldering	380	0	33	5.4	6.3
Top Rope Climbing	381	0	35	7.6	7.2
Sport Climbing	381	0	23	5.4	5.4
Traditional Climbing	381	0	35	6.2	7.6

Table 4.7

Number of respondents reporting having received formal instruction

	n	*%*
… in minimum-impact climbing	113	28.1
… in climbing etiquette	120	29.9
… in climbing safety	243	60.4
… in climbing skills/techniques	229	57.0
Note: Multiple responses were possible		

Table 4.8

Number of people in a typical climbing party as reported by respondents

	n	*%*
1 person/solo climbing	18	4.8
2 people	147	39.2
3 people	62	16.5
4 people	110	29.3
5 people or more	38	10.2

Dependent Variables

This study seeks to explore the relationships between climbing styles, climbing socialization, and attitudes and preferences for climbing settings, management, and amenities by making comparisons between climbing socialization and climbing subgroups in terms of preferences for wilderness settings, Leave No Trace principles and rock climbing management decisions, and attitudes toward the environment.

Seventeen items were used to measure preferences for wilderness settings. The items were compiled from Stankey's (1973) Wilderness Purism scale and adapted to be more specific to climbing areas. Each item used a five-point Likert scale to measure the respondent's degree of purism toward wilderness settings in the climbing environment. Principal component analysis with varimax rotation was used, which produced a six-factor solution (Table 4.9). The first factor included four items pertaining to proximity to amenities, including home, showers, toilets, parking lots, and civilization. The second factor included three items related to solitude in terms of encounters with other climbers and natural resource users. The third factor included two items associated with disturbances from noise. The fourth factor included three items pertaining to the natural environment and the absence of human-made features. The fifth factor included two items related to remote settings with access or climbing areas far from non-wilderness settings. The final factor included three items associated with management of the climbing area. Combined, the six factors explained 62.95% of the variance. Typically, a Cronbach's alpha greater than or equal to .65 is sufficient to ensure inter-correlation between items (Mueller, 1986). For this scale, alpha values ranged from .47 to .68 with

the strongest alphas coinciding with the factor groupings proximity (α=.68), solitude (α=.64), and noise (α=.62). The other three factor items produced low Cronbach alpha scores (natural environment, α=.51; remoteness, α=.52; and management, α=.47) indicating these items are only moderately correlated. However, they were still used in this study.

Using a five-point Likert scale, 19 items were used to measure perceived problems based on Leave No Trace principles relating to social, resource, or management issues. An additional 17 items were used to measure support or opposition for alternative management strategies regarding the social or resource impacts from rock climbing activities based on the study completed by Lawson and others (2006) on the Shenandoah National Park. Factor analysis (Maximum Likelihood with promax rotation) was used to produce a three-factor solution (Table 4.10). The first factor included eight items pertaining to resource impacts resulting from rock climbing activities. The second factor included five items related to issues of crowding at climbing areas. The final factor included three items associated with perceived problems related to management of the climbing area. The three factors explained 58.97% of the variance and had alphas of .89 (resource impacts), .87 (crowding), and .81 (disturbances).

Factor analysis (Maximum Likelihood with promax rotation) was also used to identify the underlying dimensions of the 19 items used to measure support or opposition for alternative management strategies and resulted in a four-factor solution (Table 4.11). The first factor included five items pertaining to closures to climbing areas or other broad-based prohibitive measures aimed at eliminating damaging impacts to natural

resources. The second factor included only two items related to restricting climbing

access by designating dates or places for large groups as a means of reducing crowding at

climbing areas. The third factor included six items associated with requirements that

address or minimize impacts to natural resources. The final factor included four items

specifically associated with placement and regulation of bolts. All four factors explained

54.35% of the variance with alpha values ranging from .68 to .86 (Closures, α=.81;

Crowds, α=.86; Impacts, α=.75; and Bolts, α=.68).

Table 4.9

Factor analysis of Climbing Values and Experiences: Six factor solution for Wilderness Purism

Items	Item Mean [a]	Load-ing	Eigen-values	% Vari-ance	Cron-bach Alpha
Proximity			**3.24**	**20.27**	**.68**
A short driving distance from the climbing area to the nearest town	3.51	.75			
A short drive from home	4.01	.74			
Nearby showers and flushing toilets	3.35	.68			
A short walking distance from the climbing site to the parking lot	3.41	.56			
Solitude			**2.20**	**13.75**	**.64**
Other climbers being close to your party	2.55	− .78			
Not seeing many people other than those in your climbing party	4.05	.76			
Little evidence of other visitors	4.20	.60			
Noise			**1.48**	**9.24**	**.62**
Motorized travel in the climbing area	1.72	.80			
Human-made noise present	1.73	.69			
Natural Environment			**1.09**	**6.83**	**.51**
Being in a completely natural environment	4.82	.75			
Being exposed to the elements of nature	4.35	.70			
The absence of human-made features except trails	4.26	.57			
Remoteness			**1.06**	**6.60**	**.52**
Trail access far from heavily traveled roads	3.69	.82			
The climbing site is set in an area that covers a large area (at least 25 sq. miles)	3.77	.74			
Management			**1.00**	**6.26**	**.47**
A short walking distance from the climbing site to the campsite	3.54	.77			
Overnight camping available	4.30	.73			
Managers contacting climbers at the site	2.65	-			

Note. [a] 1 = "strongly decreases" enjoyment of climbing; 3 = "neutral;" 5 = "strongly increases" enjoyment of climbing

Table 4.10

Factor analysis for Perceived Problems: Three factor solution for Leave No Trace

Items	Item Mean [a]	Loading	Eigen-values	Percent Variance	Cronbach Alpha
Resource Impacts			**7.97**	**41.95**	**.89**
Damage to fragile vegetation due to climbers using brushes to clean routes	1.95	.883			
Tree damage caused by climbers using trees as anchors	2.21	.807			
Erosion and/or trampling impacts caused by rock climbing use	2.47	.791			
Removal or pruning of trees to make climbs safer	1.74	.686			
Large numbers of bolts on climbing routes	1.54	.626			
Disturbances to wildlife caused by rock climbing use	1.96	.561			
Excessive use of chalk on climbing routes	1.83	.505			
Too many visitor-created trails to climbing areas	2.21	.484			
Crowding			**1.98**	**10.43**	**.87**
Too many large climbing groups	2.68	.969			
Crowding at climbing areas	2.75	.825			
Too many organized climbing groups	2.13	.738			
Long wait-time for preferred climbing routes	2.20	.504			
Other groups leaving ropes/equipment on routes that are not being used	2.09	.480			
Disturbances			**1.25**	**6.59**	**.81**
Human waste near and around the boulders and cliff faces	2.09	.859			
Litter near and around the boulders and cliff faces	2.41	.759			
Disturbances due to climbers bringing their dogs to the climbing sites	2.16	.758			
Damage to historical and/or archaeological sites caused by rock climbing use	1.65	.680			
Disturbances due to climbers playing loud music	1.71	-			
Lack of overnight camping near the climbing areas	1.78	-			

Note. [a] 1 = "not a problem;" 2 = "small problem;" 3 = "moderate problem;" 4 = "big problem"

Table 4.11

Factor analysis for Management Decisions: Three factor solution for Leave No Trace

Items	Item Mean [a]	Loading	Eigen-values	Percent Variance	Cronbach Alpha
Closures			**4.01**	**23.60**	**.81**
Close climbing routes in areas containing sensitive rare plant species	3.66	.904			
Close climbing routes in areas where climbing use is causing impacts to cultural/archaeological resources	3.66	.817			
Temporarily close areas to climbing use during critical wildlife seasons	4.29	.570			
Prohibit the chipping or gluing of holds	4.66	-			
Provide fixed anchors at the top of climbs to minimize resource impacts	4.40	-			
Crowds			**2.08**	**12.25**	**.86**
Require organized groups to climb only during specially designated dates and times	2.80	.913			
Require organized groups to climb in specially designated climbing areas	2.60	.865			
Impacts			**1.73**	**10.17**	**.75**
Limit the number of permits issued to organized groups	3.55	.625			
Limit the size of climbing groups	3.51	.622			
Require climbers to use designated trails to access climbing areas	4.38	.583			
Require leaders of organized groups to attended a program on minimum impact climbing as part of the permit process	3.79	.549			
Require new fixed anchors and bolts to be camouflaged to blend with the rock	3.59	.487			
Provide more information regarding minimum-impact climbing practices	4.49	.401			
Bolts			**1.42**	**8.33**	**.68**
Require a permit to place bolts on climbing routes	3.66	.763			
Limit the placement of bolts to specified areas	3.58	.697			
Allow unregulated bolting of climbing routes	1.93	.516			
Prohibit the placement of bolts on routes anywhere in the climbing area	2.02	-			

Note. [a] 1 = "strongly oppose;" 3 = "neither oppose nor support;" 5 = "strongly support"

Finally, 20 items were used to measure attitudes about preserving and using different environments. The items were compiled from SEQUOIA, which includes four factors corresponding to a measure of concern for natural environments, a measure of enjoyment of thrill-seeking environments, a measure of self-reliance, and a measure of preferences for urban amenities. Each item used a five-point Likert scale to measure the respondent's agreement with statements from each factor. Principal component analysis with varimax rotation was used to produce a six-factor solution (Table 4.12). The first factor included six items pertaining to concern for the environment. The second factor included five items related to an inclination to urban amenities. The third factor included four items associated with independence and self-sufficiency. The final factor included five items associated with thrill-seeking activities. Combined, the six factors explained 53.24% of the variance with alpha values ranging from .63 to .86 (Environmental Concern, α=.86; Urban Dweller, α= .75; Independent/ Self-Sufficient, α= .63; and Sensation Seeking, α=.63).

Table 4.12

Factor analysis for SEQUOIA: Four factor solution

Items	Item Mean [a]	Loading	Eigen-values	Percent Variance	Cron-bach Alpha
Environmental Concern			**3.29**	**16.43**	**.86**
Unique environments should be protected at all costs	3.95	.860			
Endangered wildlife should be protected at any cost	3.91	.858			
Natural ecosystems have a right to exist for their own sake, regardless of human concerns and uses	3.90	.830			
Wild plants and animals have a right to live unaffected by the actions of humans	4.02	.798			
I would be willing to make sacrifices to slow down pollution even though the immediate results may not seem significant	4.39	.618			
The idea of walking into a forest and "living off the land" for a week is appealing to me [b]	3.98	-			
Urban Dweller			**2.72**	**13.59**	**.75**
I like the variety of stimulation one finds in the city	3.41	.848			
The cultural life of a big city is very important to me	2.85	.826			
Cities are too noisy and crowded for me	2.78	.646			
It is exciting to go shopping in a big city	2.50	.576			
I would like to live in a modern planned community	2.37	.538			
Independent/Self-Sufficient			**2.64**	**13.20**	**.80**
I can repair just about anything around the house	3.46	.841			
I would enjoy working with precision power tools	3.47	.758			
I enjoy tinkering with mechanical things	3.59	.755			
I am quite skillful with my hands	4.12	.742			
Sensation Seeking			**2.00**	**10.02**	**.63**
I would enjoy driving a racing car	3.49	.826			
I would enjoy riding a motorcycle	3.52	.723			
I would like to take flying lessons	3.50	.508			
I am afraid of driving in the city [c]	4.36	.382			
If I had the money, I would enjoy owning an expensive stereo	2.72	.357			

Notes. [a] 1 = "strongly disagree;" 3 = "neutral;" 5 = "strongly agree"
[b] This item was expected to load under the factor Independent/Self-Sufficient.
[c] The item "I am afraid of driving in the city" was deleted from this component to obtain a Cronbach alpha of .63. Including this item resulted in a Cronbach alpha of .58.

Data Analysis

One-way Analysis of Variance (ANOVA) was used to determine whether climbing subgroups differ in terms of preferences for wilderness settings, Leave No Trace principles and management decisions, and attitudes toward the environment by testing for statistically significant differences in the means. Post hoc tests using the Least Significant Difference (LSD) test were performed to provide additional detail on differences between groups when means are statistically different from each other. There was a significant difference between certain climbing subgroups for five subscale items: Proximity [$F(3, 299) = 3.2$, $p < .05$], Natural Environment [$F(3, 299) = 4.0$, $p < .01$], Resource Impacts [$F(3, 256) = 3.7$, $p < .05$], Closures [$F(3, 283) = 2.7$, $p < .05$], and Independent/Self-Sufficient [$F(3, 289) = 3.1$, $p < .05$] (Table 4.13). All other scale factors were not significant at the p<.05 level.

Wilderness Purism

Post hoc comparisons for the factor item Proximity (Table 4.14) using the Least Significant Difference (LSD) test indicated that the mean score for traditional climbers ($M = -.14$, $SD = .91$) was significantly different from gym climbers ($M = .26$, $SD = 1.06$), boulderers ($M = .23$, $SD = 1.05$), and sport climbers ($M = .16$, $SD = 1.0$). However, gym climbers, boulders, and sport climbers did not differ significantly, indicating that gym climbers tended to prefer shorter driving distances and climbing centers closer to home.

Post hoc comparisons for the factor item Natural Environment (Table 4.15) using the Least Significant Difference (LSD) test indicated that the mean score for gym

climbers (M = -.51, SD = 1.10) was significantly different from boulderers (M = .02, SD = 1.05), sport climbers (M = -.05, SD = .97), and traditional climbers (M = .15, SD = .87). However, boulders, sport climbers, and traditional climbers did not differ significantly, indicating that gym climbers tended to place less importance on being in a natural environment when climbing.

Leave No Trace and Management Decisions

Post hoc comparisons for the factor item Resource Impacts (Table 4.16) using the Least Significant Difference (LSD) test indicated that the mean score for traditional climbers (M = .13, SD = 1.01) was significantly different from both gym climbers (M = -.47, SD = .64) and sport climbers (M = -.23, SD = .90), but was not significantly different from boulderers (M = -.11, SD = .92). However, gym climbers, boulders, and sport climbers did not differ significantly, indicating that traditional climbers tended to be more concerned about impacts to climbing resources than gym climbers and sport climbers. Meanwhile, boulderers share some of those concerns with traditional climbers, but they also tended to be somewhat less concerned, similar to gym climbers and sport climbers.

Table 4.13

One-way Analysis of Variance for subscale items with significant differences between climbing subgroups

Dependent Variable		Sum of Squares	df	Mean Square	F	Sig
Wilderness Purism: Proximity	Between groups	9.1	3	3.0	3.2	.023
	Within groups	280.6	299	.94		
	Total	289.6	302			
Wilderness Purism: Natural Environment	Between groups	10.82	3	3.6	4.0	.008
	Within groups	268.4	299	.90		
	Total	279.2	302			
Leave No Trace: Resource Impacts	Between groups	10.07	3	3.36	3.7	.012
	Within groups	230.3	256	.90		
	Total	240.4	259			
Management Decisions: Closures	Between groups	6.60	3	2.20	2.7	.048
	Within groups	233.3	283	.82		
	Total	240.0	286			
SEQUOIA: Independent/ Self-Sufficient	Between groups	9.21	3	3.07	3.1	.028
	Within groups	287.6	289	1.0		
	Total	296.8	292			

Table 4.14

Results for the factor Proximity by climbing subgroups

	N	Mean	SD	SE	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Gym Climber	29	.26 [a]	1.06	.20	-.14	.67	-1.0	2.6
Boulderer	50	.23 [a]	1.05	.15	-.07	.53	-1.6	2.8
Sport Climber	76	.16 [a]	1.00	.11	-.07	.39	-2.8	2.3
Trad Climber	148	-.14 [b]	.91	.07	-.28	.01	-2.6	2.7
Total	303	.036	.98	.06	-.07	.15	-2.8	2.8

Notes. Means with differing subscripts within rows are significantly different at the p<.05 based on Fisher's LSD post hoc paired comparisons.

Table 4.15

Results for the factor Natural Environment by climbing subgroups

	N	Mean	SD	SE	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Gym Climber	29	-.51 [a]	1.10	.20	-.93	-.09	-3.6	1.4
Boulderer	50	.02 [b]	1.05	.15	-.27	.32	-3.2	1.4
Sport Climber	76	-.05 [b]	.97	.11	-.27	.17	-3.2	1.3
Trad Climber	148	.15 [b]	.87	.07	.005	.29	-3.0	1.7
Total	303	.01	.96	.05	-.09	.12	-3.6	1.7

Notes. Means with differing subscripts within rows are significantly different at the p<.01 based on Fisher's LSD post hoc paired comparisons.

Table 4.16

Results for the factor Resource Impacts by climbing subgroups

| | N | Mean | SD | SE | 95% Confidence Interval for Mean | | Min | Max |
					Lower Bound	Upper Bound		
Gym Climber	19	-.47 [a]	.64	.15	-.78	-.16	-1.3	1.2
Boulderer	43	-.11 [ab]	.92	.14	-.40	.17	-1.4	2.0
Sport Climber	62	-.23 [a]	.90	.11	-.46	-.005	-1.3	2.3
Trad Climber	136	.13 [b]	1.01	.09	-.04	.30	-1.3	2.6
Total	260	-.04	.96	.06	-.16	.08	-1.4	2.6

Notes. Means with differing subscripts within rows are significantly different at the p<.05 based on Fisher's LSD post hoc paired comparisons.

Post hoc comparisons for the factor item Closures (Table 4.17) using the Least Significant Difference (LSD) test indicated that the mean score for boulderers (M = -.28, SD = .90) was significantly different from both sport climbers (M = .17, SD = .93) and traditional climbers (M = .04, SD = .90), but was not significantly different from gym climbers (M = -.12, SD = .91). In addition, gym climbers did not differ significantly from any group, indicating that sport climbers and traditional climbers tended to be more concerned about temporary or permanent closures to climbing areas than boulderers.

Table 4.17

Results for the factor Closures by climbing subgroups

	N	Mean	SD	SE	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Gym Climber	23	-.12 [ab]	.91	.19	-.51	.27	-2.3	1.2
Boulderer	48	-.28 [a]	.90	.13	-.54	-.02	-2.6	1.2
Sport Climber	75	.17 [b]	.93	.11	-.04	.38	-2.7	1.2
Trad Climber	141	.04 [b]	.90	.08	-.11	.19	-2.7	1.2
Total	287	.01	.92	.05	-.10	.12	-2.7	1.2

Notes. Means with differing subscripts within rows are significantly different at the p<.05 based on Fisher's LSD post hoc paired comparisons.

SEQUOIA

Post hoc comparisons for the factor item Independent/Self-sufficient (Table 4.18) using the Least Significant Difference (LSD) test indicated that the mean score for gym climbers (M = -.52, SD = 1.0) was significantly different from boulderers (M = .07, SD = .78), sport climbers (M = .06, SD = .98) and traditional climbers (M = .05, SD = 1.0). However, boulderers, sport climbers, and traditional climbers did not differ significantly from each other indicating that gym climbers tended to be less self-reliant than the other climbing sub-groups.

Table 4.18

Results for the factor Independent/Self-Sufficient by climbing subgroups

	N	Mean	SD	SE	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Gym Climber	31	-.52 [a]	1.0	.19	-.90	-.13	-2.9	1.5
Boulderer	47	.07 [b]	.78	.11	-.15	.30	-1.4	1.5
Sport Climber	72	.06 [b]	.98	.12	-.17	.29	-2.0	1.7
Trad Climber	143	.05 [b]	1.0	.09	-.12	.22	-2.7	1.6
Total	293	-.004	1.0	.06	-.12	.11	-2.9	1.7

Notes. Means with differing subscripts within rows are significantly different at the p<.05 based on Fisher's LSD post hoc paired comparisons.

Socialization

One-way Analysis of Variance (ANOVA) was used to determine whether there was a difference in the socialization parameters during the introduction to climbing in terms of wilderness settings, Leave No Trace principles and rock climbing management decisions, or attitudes toward the environment. Socialization parameters included the location of the climbing setting (indoors at a climbing gym, outdoors on an artificial wall or tower, and outdoors on a natural rock face), the style of climbing (bouldering, top rope climbing, and "other," which includes sport climbing and traditional climbing), and the people with whom the respondent first climbed (family, friends, or other).

Table 4.19 shows the subscale items with significant differences using ANOVA to compare means for socialization parameters during the first climbing experiences. There was a significant difference in three scale factors when comparing locations and settings for the first climbing experience: Proximity [$F(2, 323) = 3.3$, p<.05], Natural

Environment [$F_{(2,323)} = 5.5$, $p<.01$], and Independent/Self-sufficient [$F_{(2, 314)} = 3.1$, $p<.05$]. There was only one scale factor with a significant difference when comparing climbing styles for first climbing experience: Natural Environment [$F_{(2, 319)} = 3.4$, $p<.05$]. Finally, there were no significant differences based on with whom the respondents first climbed. Even when responses were recoded and t-tests performed for only two items there was still no significant differences for any scale factors with regard to whom the respondent climbed with during the first climbing experience.

Table 4.19

One-way Analysis of Variance for subscale items with significant differences for the climbing location during first climbing experiences

Dependent Variable		Sum of Squares	df	Mean Square	F	Sig
Locations and Settings						
Wilderness	Between groups	9.1	2	3.1	3.3	.039
Purism:	Within groups	309.7	323	.96		
Proximity	Total	316.0	325			
Wilderness	Between groups	9.9	2	5.0	5.5	.005
Purism:	Within groups	292.2	323	.90		
Natural	Total	302.1	325			
Environment						
SEQUOIA:	Between groups	6.0	2	3.0	3.1	.047
Independent/	Within groups	306.6	314	1.0		
Self-Sufficient	Total	312.7	316			
Climbing Styles						
Wilderness	Between groups	6.3	2	3.2	3.4	.033
Purism:	Within groups	293.8	319	.92		
Natural	Total	300.1	321			
Environment						

Post hoc tests using the Least Significant Difference (LSD) test were performed to

provide additional detail on differences between the climbing locations and settings for

items with means statistically different from each other. Post hoc comparisons for

Proximity using the Least Significant Difference (LSD) test indicated that the mean score

for indoor gym climbing (M = .19, SD = .89) was significantly different from climbing

outdoors on a natural rock face (M = -1.0, SD = 1.03) but neither setting was significantly

different from climbing outdoors on an artificial wall or tower (M = -.07, SD = 1.01)

(Table 4.20). These data indicate that respondents whose first climbing experiences

occurred at an indoor gym tended to prefer the conveniences that a close proximity to the

climbing area provides, including amenities.

Table 4.20

Results for the subscale Proximity by climbing locations and settings

	N	Mean	SD	SE	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Indoors at climbing gym	120	.19 [a]	.89	.08	.03	.35	-2.4	2.6
Outdoors on an artificial wall or tower	33	-.07 [ab]	1.01	.18	-.43	.29	-1.6	2.2
Outdoors on a natural rock face	173	-.10 [b]	1.03	.08	-.26	.05	-2.8	2.8
Total	326	.01	.99	.05	-.10	.12	-2.8	2.8

Notes. Means with differing subscripts within rows are significantly different at the p<.05
based on Fisher's LSD post hoc paired comparisons.

Post hoc comparisons for Natural Environment indicated that climbing outdoors on a natural rock face (M = .18, SD = .90) was significantly different from both climbing indoors at a climbing gym (M = -.10, SD = .99) and climbing outdoors on an artificial surface (M = -.32, SD = 1.08) (Table 4.21). These data indicate that respondents whose first climbing experiences occurred outdoors on natural rock face tended to prefer being in a completely natural environment free of human-made features and being exposed to the elements of nature.

Table 4.21

Results for the subscale Natural Environment by climbing locations and settings

| | N | Mean | SD | SE | 95% Confidence Interval for Mean | | Min | Max |
					Lower Bound	Upper Bound		
Indoors at climbing gym	120	-.10 [a]	.99	.09	-.28	.08	-3.6	1.6
Outdoors on an artificial wall or tower	33	-.32 [a]	1.08	.19	-.70	.06	-2.8	1.4
Outdoors on a natural rock face	173	.18 [b]	.90	.07	.04	.31	-3.2	1.7
Total	326	.02	.96	.05	-.08	.13	-3.6	1.7

Notes. Means with differing subscripts within rows are significantly different at the p<.01 based on Fisher's LSD post hoc paired comparisons.

Post hoc comparisons for Independent/Self-sufficient using the Least Significant

Difference (LSD) test indicated that the mean score for indoor gym climbing (M = -.15,

SD = 1.03) was significantly different from climbing outdoors on a natural rock face (M

= .14, SD = .98) but neither setting was significantly different from climbing outdoors on

an artificial wall or tower (M = -.06, SD = .87) (Table 4.22). These data indicate that

respondents whose first climbing experiences occurred outdoors on natural rock face

tended to be more autonomous with a do-it-yourself attitude and an appreciation for

minimalism and living off the land.

Table 4.22

Results for the subscale Independent/Self-sufficient by climbing locations and settings

| | N | Mean | SD | SE | 95% Confidence Interval for Mean | | Min | Max |
					Lower Bound	Upper Bound		
Indoors at climbing gym	114	-.15 [a]	1.03	.10	.-.34	.04	-2.9	1.6
Outdoors on an artificial wall or tower	36	-.06 [ab]	.87	.14	-.35	.24	-2.3	1.1
Outdoors on a natural rock face	167	.14 [b]	.98	.08	-.01	.29	-2.4	1.7
Total	317	.014	.99	.06	-.10	.12	-2.9	1.7

Notes. Means with differing subscripts within rows are significantly different at the p<.05 based on Fisher's LSD post hoc paired comparisons.

Finally, post hoc comparisons for Natural Environment with regard to introductory climbing styles indicated that top rope climbing (M = .002, SD = .95) was significantly different from other climbing styles (M = .19, SD = 1.19) but that bouldering was not significantly different from either top rope climbing or other styles of climbing (M = .06, 1.11) (Table 4.23). These data indicate that respondents whose first climbing experiences involved the safety of top rope climbing, which reduces the threat of physical harm to the self, tended to be less interested in being in a completely natural environment or being exposed to the elements of nature.

Table 4.23

Results for the subscale Natural Environment by climbing style

	N	Mean	SD	SE	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Bouldering	44	.06 [ab]	1.11	.17	-.28	.40	-.32	1.2
Top rope climbing	232	-.05 [a]	.97	.06	-.18	.07	-.36	1.6
Other	46	.35 [b]	.73	.11	.13	.56	-.21	1.7
Total	322	.02	.97	.05	-.09	.12	-.36	1.7

Notes. Means with differing subscripts within rows are significantly different at the p<.05 based on Fisher's LSD post hoc paired comparisons.

Summary

This chapter described the results of the data analysis first by describing respondent characteristics and the independent variables, then by reporting response

frequencies, and followed by the results of factor analysis. Finally, the results of ANOVA tests for both climbing subgroups and socialization parameters were presented.

Of the seventeen factors produced by factor analyses, three were consistently significantly different when looking at climbing subgroups as well as socialization factors: two from the Wilderness Purism scale (Proximity and Natural Environment) and one from the SEQUOIA scale (Independent/Self-Sufficient). When comparing climbing subgroups, only one factor from Leave No Trace was significant (Resource Impacts) and only one factor from Management Decisions was significant (Closures). However, when looking at socialization factors, none of the factors from Leave No Trace or Management Decisions were significant.

In general, the results of the analysis show that in terms of attitudes and preferences for climbing settings, management, and amenities, there are some differences between climbing subgroups and that these differences extended to the way climbers are introduced to the sport.

- Gym climbers tended to prefer shorter driving distances and climbing centers closer to home;

- Gym climbers tended to place less importance on being in a natural environment when climbing;

- Traditional climbers tended to be more concerned about impacts to climbing resources than gym climbers and sport climbers;

- Sport climbers and traditional climbers tended to be more concerned about temporary or permanent closures to climbing areas than boulderers;

- Gym climbers tended to be less self-reliant than the other climbing sub-groups.

- Respondents whose first climbing experiences occurred at an indoor gym tended to prefer the conveniences that a close proximity to the climbing area provides, including amenities.

- Respondents whose first climbing experiences occurred outdoors on natural rock face tended to prefer being in a completely natural environment free of human-made features and being exposed to the elements of nature;

- Respondents whose first climbing experiences occurred outdoors on natural rock face tended to be more autonomous with a do-it-yourself attitude and an appreciation for minimalism and living off the land;

- Respondents whose first climbing experiences involved the safety of top rope climbing, which reduces the threat of physical harm, tended to be less interested in being in a completely natural environment or being exposed to the elements of nature; and

- There were no significant differences between respondents based on with whom the respondents first climbed.

CHAPTER 5

DISCUSSION AND CONCLUSION

This chapter includes a discussion of the results presented in Chapter 4, the contributions and limitations of the study, and suggestions for future research. The purpose of this study was to explore the relationships between socialization processes, climbing style preferences, climbing setting preferences, and attitudes toward the natural resources and management of these resources. Of particular interest was the influence of the indoor climbing gym on the social development of climbers with respect to these dimensions. A stratified convenient sampling method was used to gather data through responses to a survey instrument that was made available through the world-wide-web, however eight respondents required paper copies. The survey instrument consisted of items from the Wilderness Purism scale, the SEQUOIA scale, Leave No Trace ethics, and management decisions. The research questions were formulated to test for differences between climbing subgroups and socialization into climbing but are unique in that they include indoor gym climbing as both a subgroup and a socialization parameter.

Summary and Discussion of the Results

The first research question asked if rock climbing subgroups in general differ in their preferences for wilderness settings, support for Leave No Trace and rock climbing management decisions, or attitudes toward the environment. Results showed that climbing subgroups differed on five of the seventeen factors, indicating that climbing tends to provide similar outcomes regardless of style.

71

Gym climbers tend to be less self-reliant than all of the other climbing sub-groups and place less importance on being in a natural environment when climbing. They also tended to prefer shorter driving distances from home or to the nearest town, short walking distances between the climbing site and the parking lot, and nearby showers and flushing toilets. This finding is consistent with findings of Bixler & Floyd (1997) that teenagers with limited exposure to nature play were more likely to want easy access to modern conveniences.

Sport climbers and traditional climbers tend to be more concerned about temporary or permanent closures to climbing areas than boulderers. Closures to climbing areas are usually an effort to provide sufficient space for birds nesting on cliffs, to allow for re-vegetation of highly impacted areas, or as a result of vandalism or graffiti to rock faces. Because sport climbing and traditional climbing are more specialized forms of climbing, being forced to substitute the climbing experience with one of an "inferior" style may be harder to do for sport climbers and traditional climbers, supporting Bryan's theory of recreation specialization (1977). These concerns do not affect indoor climbing gyms.

In particular, traditional climbers tend to be more concerned about impacts to climbing resources than either gym climbers or sport climbers. This supports the findings of Schuster, Thompson, and Hammitt (2001), which identified a relationship between climbing style and management of climbing areas. It is further supported by the specialization theory of Bryan (1977), which proposed that more specialized

recreationists will have more particular expectations of the climbing experience and setting.

The second research question asked if climbers who differ in the way they are socialized into climbing also differ in their preferences for wilderness settings, support for Leave No Trace and rock climbing management decisions, or attitudes toward the environment. Results showed that two of the three socialization parameters affected four of the seventeen factors. However, the results of this study are not consistent with the study conducted by Borrie and Harding (2002), which found that the way climbers are introduced to an activity, affects their attitudes towards low-impact practices. There were no significant differences between socialization parameters for any of the factors involving Leave No Trace ethics or management decisions. Instead, differences were primarily limited to preferences for wilderness attributes and sensitivity to variations in the quality of a wilderness experience.

Respondents whose first climbing experiences occurred at an indoor gym tended to prefer short drives from home or to the nearest town, a short walk from the parking lot to the climbing site, and nearby showers and flushing toilets. Conversely, respondents whose first climbing experiences occurred outdoors on natural rock face tended to prefer being in a completely natural environment free of human-made features and being exposed to the elements of nature.

Respondents whose first climbing experiences occurred outdoors on natural rock face also tended to be more autonomous with a do-it-yourself attitude and an appreciation for minimalism and living off the land. Respondents whose first climbing experiences

involved the safety of top rope climbing, which reduces the threat of physical harm, tended to be less interested in being in a completely natural environment or being exposed to the elements of nature. Finally, there were no significant differences between respondents based on with whom the respondents first climbed. Future research should explore the nuances in socialization among climbing partners to better understand the relationships between leaders and learners and to verify that this is not really an important socialization parameter. Perhaps, a broader measure of how climbers were introduced to outdoor recreation, if at all for indoor climbers, would have had greater predictive power. Being introduced to rock climbing through traditional outdoor routes, may be an indirect measure of greater overall exposure to nature play and wildland recreation. In the end, this may be what would have shaped at least some of the observed differences between outdoor and indoor rock climbers.

Implications of the Study

Information regarding the expectations and concerns of visitors to recreation areas that provide climbing opportunities may be valuable to managers of areas allowing rock climbing. These managers are not always rock climbers and may not understand the expectations of diverse climbing groups or the experiences they seek in their visitation. The findings of this study provides additional insights into the differences and similarities among rock climbing subgroups and how to appeal to targeted groups while managing for potential conflicts. This in turn helps managers provide the highest potential for

positive recreation experiences, including the provision or elimination of amenities, solitude, and safety.

Seeking to fulfill their goals, recreationists tend to view the recreation resource in terms of a particular chosen activity instead of specific management objectives (Manning, 2010). Because only a few of the factors explored in this study showed significant differences between climbing subgroups or socialization, managers should understand that similar outcomes are provided through most climbing opportunities; however, the results of this study suggest that visitors engaging in more specialized climbing styles may be more sensitive to management decisions such as closures and may be more sensitive to degradation of the natural environment inherent in outdoor rock climbing areas.

The Wilderness Purism scale informed this study by indicating that setting preferences are important for traditional climbers, who evaluate their climbing experiences based on style and skill level as mentioned by Manning (2010). Beginning climbers will want amenities such as flushing toilets, which may be in direct contrast to the expectations of more specialized climbing groups and limit choices for climbing destinations that provide more solitude. Managing climbing areas to provide a balance for climbing groups will appeal to a wider variety of climbers and ensure visitation to climbing areas while minimizing conflict due to diverse expectations.

Providing different climbing opportunities based on climbing style would be the easiest way to reduce potential conflict among climbers; but, as this study suggests, there are a limited number of differences among climbing subgroups. Managers should instead

focus on coordinating with other climbing areas and gyms so that climbers are introduced to specific climbing experiences that are compatible with their management guidelines.

Limitations of the Study

There are apparent methodological (and other) limitations to this study. First, the study was predominantly conducted with climbers in the southeastern US and, therefore, may not necessarily be generalized to climbing communities as a whole. Similarly, the data were collected over the summer and, therefore, may not be representative of climbers who climb during the fall, winter or spring seasons.

The survey instrument attempted to capture more information than was necessary to answer the research questions posed in this study. Because of the additional questions, the survey took respondents about 20 minutes on average rather than 10-15 minutes as anticipated, which may have resulted in respondent fatigue and non-completion. In addition, respondents who completed the survey may not accurately represent all climbers due to the stratified convenience sample approach. More specifically, the ratings used for ice climbing were from the New England scale and specific to that region; since many of the respondents were not from the New England area, a more general Waterfall Ice rating may have provided different responses. Similarly, the SEQUOIA scale was reduced from 40 items to 20 items, which did affect the factor analysis. Moreover, because the survey was available on several climbing websites, and due to the nature of the study, it is possible for climbers to submit multiple responses to "weigh" their opinions; however, due to the length of the survey, this is unlikely.

There are also limitations within the data analysis. For example, the sample sizes for each climbing subgroup were disproportionate, especially traditional climbers (n = 164, 43%) versus gym climbers (n = 38, 10%), which made some conclusions tenuous. Small subgroup samples may have resulted in a failure to find significant differences or relationships that would have been identified with a larger sample size. Also, some Cronbach's alpha scores from factor analysis of scale items were low. Since reliability is low, then validity is also low and therefore may fail to identify statistical differences or relationships. Even when responses to scales produce good reliability and validity, some abstract constructs are more accurately measured than others. Therefore, it is possible that some findings are a result of differences in the accuracy of the measurements.

Finally, this study used a structured questionnaire that was designed by the researcher, which may not have asked questions important to the respondent or asked questions that were not salient to respondents but they answered anyway (Bishop, 2005). For example, some items in the SEQUOIA scale, which was rigorously developed, may not have been salient to respondents.

There is a growing awareness among social scientists that humans are less aware of why they behaved in a certain way in the past, and an inability to accurately predict how they will behave in the future (Graves, 2010). This research project took a "rational person" approach by assuming that respondents can accurately report and interpret their own behavior. Additional research needs to be conducted with observation of rock climbing behaviors in situ (Graves, 2010) to help in confirming the results of this survey-based research.

Recommendations for Future Research

Based on the limitations of this study, several recommendations can be made for future research that would contribute to and expand on the information available to managers of recreation areas that provide climbing opportunities. Future research should study climbing during all four seasons of the year and all regions of the country. Regional variations in socialization and attitudes may vary as much as religious or political affiliation. Furthermore, future studies should attempt to study climbers in more defined styles such as ice climbers, mountaineers, and those who rappel for sport, to see if these styles differ from more popular styles.

Table 4.4 on page 46 shows that the respondents in this study tended to move away from top rope climbing and into traditional styles of climbing between the first climbing experience and the period when the respondents started climbing regularly. Future research could explore this period of transition through qualitative methods and include a longitudinal study that follows a group of climbers as they progress. This would provide substantial insights in how specialization manifests itself under various climbing scenarios and how this development is related to climbing experiences both indoors and outdoors as well as the development of climbing ethics and wilderness preferences. Documenting individual climbing experiences over time would provide insights into how climbers' experiences evolve within a specific climbing subgroup, and what encourages a climber to transition from one style to another as well as the specific

goals, environment, and social atmosphere that is sought throughout the development process.

In addition, future research should look deeper into the role of gender in climbing as well as the socialization process. The majority (70%) of the respondents in this study was male, which suggests there may be gender-based constraints both in the socialization process for climbing. Future research should explore why climbing is predominantly a male recreation activity and include what efforts can increase female participation in climbing and what constraints exists that alienate them. This research should also explore the role of relationships with others, and include what an analysis of constraints and what influences climbing decisions. This study found that who a climber climbs with is not as important as the environment in which the climbing activity occurs but future research with different methods should be conducted to confirm or disconfirm this finding.

Conclusion

This study examined the preferences and attitudes of climbing subgroups and the role that socialization has on the development of these preferences and attitudes in order to give managers of climbing areas information useful in providing positive recreation experiences. Climbing is a recreation activity that is characterized by a history of conflict over technological innovations and ethical refinements. The social worlds of rock climbing will probably continue to segment into additional subgroups based on technology and technique. Managers will encounter these innovations and refinements as

79

the sport develops new technologies and possibly even new settings. Climbing is not the only sport to embrace the human-made environment. Whitewater parks for paddlers and even indoor snow skiing facilities provide opportunities for other recreationists to hone their skills but also invite neophytes and casual recreationists to their facilities. These recreationists might inevitably end up in natural recreation areas. Consequently this study might inform a larger more generalized study on the role of the human-made environments on socialization or management of natural recreation areas.

SURVEY INSTRUMENT

Lions on the Beach, Whales in the Jungle:

A Social Segmentation Study of Climbers' Values Orientations

<u>Information Concerning Participation in a Research Study</u>

Lions on the Beach, Whales in the Jungle:
A Social Segmentation Study of Climbers' Values Orientations

I enjoyed meeting all of you and climbing with some of you over the past several months. You are invited to participate in a research study conducted by Robert Bixler and Chris Starker at Clemson University. The purpose of this research is to gain an understanding of our preferences as climbers and what we think of the management of climbing areas we use. Your participation is voluntary and will involve completing an online survey. The survey takes about 20 minutes.

There are no known risks associated with this research; however, you may experience brief periods of boredom and perhaps some impatience. We only ask you to hang in there – your input will be very useful. Your input will help us better understand the climbing community and educate land managers who are often not climbers. Your input will help them to make better decisions about climbing opportunities.

While we are not asking personal questions, we carefully protect your privacy. If you have any questions or concerns about this study, or if any problems arise, please contact Robert Bixler at Clemson University at 864-656-1647. If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at 864-656-6460.

Section 1: Climbing

In your lifetime, have you tried or participated in any climbing activities such as climbing in a gym, climbing on an artificial wall or tower, abseiling or rappelling for sport, bouldering, stegophily (buildering or urban climbing), via ferrata or Klettersteig, sport climbing, traditional climbing, aid climbing, ice climbing, alpine mountaineering, etc.?

□   Yes   **[Go to page 4]**

□   No   **[Go to page 16]**

Section 2: Climbing Education and Training

The questions on the next few pages ask about how you became involved in climbing. What we call "your first experience" might have sparked your interest in climbing while your "first meaningful experience" would be when you first started climbing regularly. They could be the same or different. For example, your first climbing experience might have been when you were ten at a birthday party at a gym. Then, you might have started climbing regularly with some friends at a climbing gym or local bouldering spot. Thinking back to your earliest climbing experiences, please answer the following questions to the best of your ability.

How old were you when you had your very first climbing experience?
      I was _____ years old when I had my first climbing experience.

Where did your first climbing experience take place? *(Please check ✓ only one.)*

☐ Indoors at a climbing gym

☐ Outdoors on an artificial wall or tower

☐ Outdoors on a natural rock face

☐ Outdoors on a frozen ice structure

☐ Other: _____

_____

What type/style of climbing did you do on your first climbing experience, regardless of whether it was indoors or outdoors? *(Please check ✓ only one.)*

☐ Bouldering

☐ Abseiling/rappelling for sport

☐ Top rope climbing

☐ Sport climbing outdoors

☐ Traditional climbing outdoors

☐ Ice climbing outdoors

☐ Alpine mountaineering

☐ Other: _____

What was the occasion for your first climbing experience? *(Please check ✓ only one.)*

☐ None

☐ Summer camp

☐ Birthday party

☐ Family vacation

☐ Personal vacation

☐ School or college club/class

☐ Special event/festival

Who were you with when you first started climbing? *(Please check ✓ only one.)*

☐ No one/myself

☐ Friends

☐ Family

☐ Spouse/significant other

☐ Classmates/coworkers

☐ Members of my church

☐ Members of a club

☐ My scout group

☐ A guide/personal trainer

At what age did you start climbing regularly?

I was _____ years old when I started climbing regularly.

Where did you start climbing regularly? *(Please check ✓ only one.)*

☐ Indoors at a climbing gym

☐ Outdoors on an artificial wall or tower

☐ Outdoors on a natural rock face

☐ Outdoors on a frozen ice structure

☐ Other: _____

What type/style of climbing did you do when you started climbing regularly, regardless of whether it was indoors or outdoors? *(Please check ✓ only one.)*

☐ Bouldering   ☐ Traditional climbing outdoors

☐ Abseiling/rappelling for sport   ☐ Ice climbing outdoors

☐ Top rope climbing   ☐ Alpine mountaineering

☐ Sport climbing outdoors   ☐ Other: _____

Who did you climb with regularly when you started climbing? *(Please check ✓ one.)*

☐ No one/myself   ☐ Members of my church

☐ Friends   ☐ Members of a club

☐ Family   ☐ My scout group

☐ Spouse/significant other   ☐ A guide/personal trainer

☐ Classmates/coworkers

Have you had formal instruction in any of the following?
(Check ✓ all that apply.)

☐ Minimum-impact climbing practices

☐ Climbing etiquette

☐ Climbing safety

☐ Climbing skills/techniques

Have you ever been actively involved with a Scout group such as Girl Scouts, Boy Scouts, Cub Scouts, Brownies, or another similar group?

☐ Yes   ☐ No

Have you taken any courses from an outdoor adventure school such as NOLS, Outward Bound, or Wilderness Ventures?

☐ Yes   ☐ No

Section 3: Climbing History and Experience

In this section I am seeking information about your climbing experience and background. Please answer the following questions **based on your own climbing experiences**.

Please circle the number that corresponds to your overall skill as a **boulderer**:

VB V0 V1 V2 V3 V4 V5 V6 V7 V8 V9 V10 V11 V12+

☐ I don't know   ☐ I have never tried bouldering

Please circle the number that corresponds to your overall skill as a **sport climber**:

5.4   5.5   5.6   5.7   5.8   5.9   5.10   5.11   5.12   5.13   5.14+

☐ I don't know   ☐ I have never tried sport climbing.

Please circle the number that corresponds to your overall skill as a **traditional style climber**:

5.4   5.5   5.6   5.7   5.8   5.9   5.10   5.11   5.12   5.13   5.14+

☐ I don't know   ☐ I have never tried traditional climbing.

Please circle the number that corresponds to your overall skill as an **aid climber**:

A0   A1   A2   A3   A4   A5

☐ I don't know   ☐ I have never tried aid climbing.

Please circle the number that corresponds to your overall skill as an **ice climber**:

NEI 1   NEI 2   NEI 3   NEI 4   NEI 5

☐ I don't know   ☐ I have never tried ice climbing.

Below is a list of various climbing styles. I would like to know how much you like or dislike each style. Please circle the best response for each item. **THEN, if you have participated in any of these climbing styles in the past 12 months, check ✓ that activity's box on the far right.**

	Dislike	Not Interested	Like a little	Like	Like a lot	Don't Know or Never heard of it	Participated in last 12 months
Gym climbing (all styles)	-1	0	+1	+2	+3	DK	
Bouldering outdoors	-1	0	+1	+2	+3	DK	
Buildering, urban climbing or stegophily	-1	0	+1	+2	+3	DK	
Via ferrata or Klettersteig	-1	0	+1	+2	+3	DK	
Abseiling or rappelling for sport	-1	0	+1	+2	+3	DK	
Top rope climbing outdoors	-1	0	+1	+2	+3	DK	
Sport climbing outdoors	-1	0	+1	+2	+3	DK	
Traditional climbing	-1	0	+1	+2	+3	DK	
Aid climbing	-1	0	+1	+2	+3	DK	
Ice climbing	-1	0	+1	+2	+3	DK	
Alpine mountaineering	-1	0	+1	+2	+3	DK	

How many total years of experience do you have in each of the following climbing styles? Write a zero (0) if you have never participated in it.

Climbing in a gym or on an outdoor climbing tower...... _____ years(s)

Abseiling or rappelling for sport………………………… _____ years(s)

Bouldering outdoors…………………………………………. _____ years(s)

Top roping climbing outdoors…………………………….. _____ years(s)

Sport climbing outdoors………………………………… _____ years(s)

Traditional climbing…………………………………….. _____ years(s)

Aid climbing ……………………………………………. _____ years(s)

Ice climbing………………………………………………….. _____ years(s)

Mountaineering…………………………………………… _____ years(s)

Please rank your top three favorite climbing styles by placing a one (1) by your first choice, a two (2) by your second choice, and a three (3) by your third choice:

_____ Gym climbing (all styles)

_____ Abseiling or rappelling for sport

_____ Bouldering

_____ Buildering, urban climbing or stegophily

_____ Via ferrata or Klettersteig

_____ Top rope climbing outdoors

_____ Sport climbing

_____ Traditional climbing

_____ Aid climbing

_____ Ice climbing

_____ Alpine Mountaineering

While you might regularly engage in several styles of climbing, which of the following best describes you as a rock climber? *(Please check ✓ only one.)*

☐ Gym climbing

☐ Bouldering

☐ Abseiling/rappelling for sport

☐ Sport climbing

☐ Traditional climbing

☐ Aid climbing

☐ Ice climbing

☐ Alpine mountaineering

To the best of your knowledge, what is the farthest you have traveled to go climbing in the past twelve months?

_____ miles

In what regions of the U.S. have you climbed? *(Check ✓ all that apply.)*

☐ East central and southeast

☐ Northeast

☐ Rocky mountains

☐ Southwest

☐ West Coast

☐ Alaska

☐ Other: _____

_____

Have you climbed anywhere outside the U.S.?

    ☐ No

    ☐ Yes   If you answered **yes**, please describe where:

_____

_____

In the past 12 months, on average, how many days per month have you gone climbing (any style including gym climbing, bouldering, sport climbing, traditional climbing, etc.)? *(Please check* ✓ *only one.)*

☐ less than 1 day per month	☐ 8 to 10 days per month
☐ 1 day per month	☐ 11 to 14 days per month
☐ 2 days per month	☐ 15 to 18 days per month
☐ 3 days per month	☐ 19 to 23 days per month
☐ 4 days per month	☐ 24 to 28 days per month
☐ 5 to 7 days per month	☐ More than 28 days per month

Have you ever taken any multi-day/overnight climbing trips?

    ☐ Yes   **[Continue to the next questions]**

    ☐ No   **[Skip the next two questions and go to page 10]**

What is the longest amount of time (most number of nights) you have spent away on a multi-day/overnight climbing trip?

            _____ day(s)

In the past twelve months, which of the following overnight accommodations have you used on an overnight climbing trip? *(Check* ✓ *all that apply.)*

    ☐ Car-access campground

    ☐ Lodge/cabin

    ☐ Backcountry campsite

    ☐ Hotel

    ☐ Stayed with friends/family

    ☐ Other: _____

Including yourself, how many people are usually in your climbing party?

_____ people

When climbing with others, are you normally the group leader?
- ☐ Yes
- ☐ No

Which of the following best describes the people with whom you climb? Place a one (1) next to your first choice and a two (2) next to your second choice.

_____ No one, I climb alone

_____ Friends

_____ Family

_____ Spouse or significant other

_____ Organized group

If you have climbed with an organized group, which of the following best describes your group? *(Please check ✓ only one.)*
- ☐ I have never climbed with an organized group
- ☐ Church group
- ☐ Youth camp
- ☐ Scout group
- ☐ School or university club
- ☐ Guided group or personal trainer

Have you ever climbed outdoors?
- ☐ Yes   **[Go to page 11]**
- ☐ No   **[Go to page 14]**

Section 4: Climbing Values and Experiences

Climbing areas are managed for characteristics that provide different types of experiences. Keeping in mind your own climbing experiences, **please rate how the following characteristics increase or decrease your enjoyment of climbing.**

	Strongly Decreases		Neutral		Strongly Increases	I don't know
Being in a completely natural environment	-2	-1	0	1	2	DK
A short drive from home	-2	-1	0	1	2	DK
A short driving distance from the climbing area to the nearest town	-2	-1	0	1	2	DK
Nearby showers and flushing toilets	-2	-1	0	1	2	DK
A short walking distance from the climbing site to the parking lot	-2	-1	0	1	2	DK
Being exposed to the elements of nature	-2	-1	0	1	2	DK
Human-made noise present	-2	-1	0	1	2	DK
A short walking distance from the climbing site to the campsite	-2	-1	0	1	2	DK
The absence of human-made features except trails	-2	-1	0	1	2	DK
Not seeing many people other than those in your climbing party	-2	-1	0	1	2	DK
Other climbers being close to your party	-2	-1	0	1	2	DK
Little evidence of other visitors	-2	-1	0	1	2	DK
Motorized travel in the climbing area	-2	-1	0	1	2	DK
The climbing site is set in an area that covers a large area (at least 25 sq. miles)	-2	-1	0	1	2	DK
Trail access far from heavily traveled roads	-2	-1	0	1	2	DK
Managers contacting climbers at the site	-2	-1	0	1	2	DK
Overnight camping available	-2	-1	0	1	2	DK

Section 5: Management of Climbing Areas

How much have each of the situations listed below been a problem for you where you climb? **Please circle a number that reflects how much of a problem each issue has been where you have climbed.**

	Not a problem	Small Problem	Moderate problem	Big problem	I don't know
Large numbers of bolts on climbing routes	0	1	2	3	DK
Excessive use of chalk on climbing routes	0	1	2	3	DK
Tree damage caused by climbers using trees as anchors	0	1	2	3	DK
Damage to fragile vegetation due to climbers using brushes to clean routes	0	1	2	3	DK
Erosion and/or trampling impacts caused by rock climbing use	0	1	2	3	DK
Removal or pruning of trees to make climbs safer	0	1	2	3	DK
Too many visitor-created trails to climbing areas	0	1	2	3	DK
Other groups leaving ropes/equipment on routes that are not being used	0	1	2	3	DK
Crowding at climbing areas	0	1	2	3	DK
Too many large climbing groups	0	1	2	3	DK
Too many organized climbing groups	0	1	2	3	DK
Long wait-time for preferred climbing routes	0	1	2	3	DK
Disturbances to wildlife caused by rock climbing use	0	1	2	3	DK
Damage to historical and/or archaeological sites caused by rock climbing use	0	1	2	3	DK
Human waste near and around the boulders and cliff faces	0	1	2	3	DK
Disturbances due to climbers bringing their dogs to the climbing sites	0	1	2	3	DK
Lack of overnight camping near the climbing areas	0	1	2	3	DK
Disturbances due to climbers playing loud music	0	1	2	3	DK
Litter near and around the boulders and cliff faces	0	1	2	3	DK

Land managers often rely on help from the climbing community when making decisions. Please indicate to what extent you support or oppose each of the following potential rock climbing management actions. *(Please circle __one__ number for each item.)*

	Strongly oppose		Neither oppose nor support		Strongly support	I don't know
Provide more information regarding minimum-impact climbing practices	-2	-1	0	1	2	DK
Provide fixed anchors at the top of climbs to minimize resource impacts	-2	-1	0	1	2	DK
Require new fixed anchors and bolts to be camouflaged to blend with the rock	-2	-1	0	1	2	DK
Require climbers to use designated trails to access climbing areas	-2	-1	0	1	2	DK
Limit the size of climbing groups	-2	-1	0	1	2	DK
Require leaders of organized groups to attend a program on minimum impact climbing as part of the permit process	-2	-1	0	1	2	DK
Limit the number of permits issued to organized groups	-2	-1	0	1	2	DK
Require organized groups to climb only during specially designated dates and times	-2	-1	0	1	2	DK
Require organized groups to climb in specially designated climbing areas	-2	-1	0	1	2	DK
Allow unregulated bolting of climbing routes	-2	-1	0	1	2	DK
Require a permit to place bolts on climbing routes	-2	-1	0	1	2	DK
Limit the placement of bolts to specified areas	-2	-1	0	1	2	DK
Prohibit the placement of bolts on routes anywhere in the climbing area	-2	-1	0	1	2	DK
Prohibit the chipping or gluing of holds	-2	-1	0	1	2	DK
Close climbing routes in areas where climbing use is causing impacts to cultural/archaeological resources	-2	-1	0	1	2	DK
Close climbing routes in areas containing sensitive rare plant species	-2	-1	0	1	2	DK
Temporarily close areas to climbing use during critical wildlife seasons (e.g., nesting, breeding)	-2	-1	0	1	2	DK

Section 6: Climbing Association

Are you a member of or do you regularly visit a local climbing gym?

☐ Yes   ☐ No

To the best of your knowledge, how far do you live from the nearest indoor climbing gym (whether you climb there or not)?

☐ Walking distance

☐ Biking distance

☐ Driving distance

In the past 12 months have you competed in a climbing competition?

☐ Yes   ☐ No

Have you ever received income from climbing or from anything related to climbing?

☐ Yes   ☐ No

Are you a member of a climbing organization such as the American Alpine Club, the Access Fund, or the Southeastern Climbers Coalition?

☐ Yes   ☐ No

In the past 12 months have you donated money other than membership dues to a climbing organization such as the American Alpine Club, the Access Fund, or the Southeastern Climbers Coalition?

☐ Yes   ☐ No

In the past 12 months have you participated in a volunteer service project such as a trail maintenance day at a rock climbing area?

☐ Yes   ☐ No

Do you have a subscription to or do you regularly purchase any of the following climbing magazines? *(Check ✓ all that apply.)*

☐ No, I don't read climbing magazines

☐ Climbing

☐ Rock & Ice

☐ Urban Climber

☐ Alpinist

☐ Vertical Jones

☐ Rock

☐ Gripped

☐ Other: _____

Which of the following resources do you use to obtain more information about a climbing area? *(Check ✓ all that apply.)*

- ☐ Friends/family
- ☐ Climbing club
- ☐ Outfitter/gear shop
- ☐ Internet

- ☐ Guidebook
- ☐ Magazine
- ☐ Guide service

If you could NOT climb outdoors (for example, if the weather turned bad), would you visit a climbing gym or cancel your climbing trip?

- ☐ Cancel the trip
- ☐ Go to a climbing gym

If you left your climbing helmet at home, would you cancel you climbing trip or climb without it?

- ☐ Cancel the trip
- ☐ Climb without one

How much do you agree or disagree with the following statements:

	Strongly Disagree		Neutral		Strongly Agree	I don't know
I would rather go climbing than most anything else	-2	-1	0	1	2	DK
Others would say that I spend too much time climbing	-2	-1	0	1	2	DK
If I stopped climbing I would probably lose touch with a lot of my friends	-2	-1	0	1	2	DK
If I couldn't go climbing, I am not sure what I would do	-2	-1	0	1	2	DK
Much of my life is organized around climbing	-2	-1	0	1	2	DK

Section 7: Living, Learning, and Playing

Below is a series of questions about living, learning and playing. **Please circle the number that best represents how much you agree or disagree with the following questions.**

	Strongly Disagree		Neutral		Strongly Agree	I Don't Know
The idea of walking into a forest and "living off the land" for a week is appealing to me	-2	-1	0	1	2	DK
I like the variety of stimulation one finds in the city	-2	-1	0	1	2	DK
Wild plants and animals have a right to live unaffected by the actions of humans	-2	-1	0	1	2	DK
I would like to live in a modern, planned community	-2	-1	0	1	2	DK
I can repair just about anything around the house	-2	-1	0	1	2	DK
I would enjoy riding a motorcycle	-2	-1	0	1	2	DK
The cultural life of a big city is very important to me	-2	-1	0	1	2	DK
If I had the money, I would enjoy owning an expensive stereo	-2	-1	0	1	2	DK
Endangered wildlife should be protected at any cost	-2	-1	0	1	2	DK
I am afraid of driving in the city	-2	-1	0	1	2	DK
I would like to take flying lessons	-2	-1	0	1	2	DK
I am quite skillful with my hands	-2	-1	0	1	2	DK
Cities are too noisy and crowded for me	-2	-1	0	1	2	DK
I would enjoy working with precision power tools	-2	-1	0	1	2	DK
Unique environments should be protected at all costs	-2	-1	0	1	2	DK
It is exciting to go shopping in a large city	-2	-1	0	1	2	DK
Natural ecosystems have a right to exist for their own sake, regardless of human concerns and uses	-2	-1	0	1	2	DK
I would enjoy driving a racing car	-2	-1	0	1	2	DK
I enjoy tinkering with mechanical things	-2	-1	0	1	2	DK
I would be willing to make sacrifices to slow down pollution even though the immediate results may not seem significant	-2	-1	0	1	2	DK

Throughout childhood, everyone has different places to play outside. Please circle how much you played in each of these places during your childhood.

	Never	Maybe once	A few times	A lot	Almost always
…in the woods	0	1	2	3	4
…on a playground	0	1	2	3	4
…around a lake, pond or stream	0	1	2	3	4
…in my yard	0	1	2	3	4
…in a field, barn, or pasture	0	1	2	3	4
…in an alley, cul-de-sac, or street near my home	0	1	2	3	4
…in my neighbor's yard	0	1	2	3	4
…in a vacant or undeveloped lot	0	1	2	3	4

Section 8: Recreation Activities

Below is a list of recreational activities that many people enjoy in addition to climbing. I would like to know how much you like or dislike each activity. Please circle the best response for each item.

	Dislike	Not Interested	Like a little	Like	Like a lot	Don't Know or Never heard of it
Surfing	-1	0	+1	+2	+3	DK
Skateboarding	-1	0	+1	+2	+3	DK
Golf	-1	0	+1	+2	+3	DK
Fishing	-1	0	+1	+2	+3	DK
Visiting museums	-1	0	+1	+2	+3	DK
Whitewater boating	-1	0	+1	+2	+3	DK
Backpacking	-1	0	+1	+2	+3	DK
Bike trials	-1	0	+1	+2	+3	DK
Bird watching with a book and binoculars	-1	0	+1	+2	+3	DK
Rodeo	-1	0	+1	+2	+3	DK
Mountain biking	-1	0	+1	+2	+3	DK
Surfing the internet	-1	0	+1	+2	+3	DK
Hiking to view wildflowers	-1	0	+1	+2	+3	DK
Disc golf	-1	0	+1	+2	+3	DK
Tennis	-1	0	+1	+2	+3	DK
Scuba diving	-1	0	+1	+2	+3	DK
Parkour or free-running	-1	0	+1	+2	+3	DK
Driving off-road vehicles such as ATV	-1	0	+1	+2	+3	DK
Visiting cultural or historic sites	-1	0	+1	+2	+3	DK
Hunting	-1	0	+1	+2	+3	DK
Horseback riding	-1	0	+1	+2	+3	DK
Hiking to look at rocks and minerals	-1	0	+1	+2	+3	DK
Playing video games	-1	0	+1	+2	+3	DK
Automobile racing	-1	0	+1	+2	+3	DK
Snowboarding	-1	0	+1	+2	+3	DK
Jet skiing	-1	0	+1	+2	+3	DK

Section 9: Closing Questions

Please help me describe the group that participated in this study by answering the following questions about yourself. This information will be kept confidential and used for statistical purposes only.

I am: ☐ Female ☐ Male

What is your year of birth? _____

What is the highest level of education you have completed so far?
(Please check ✓ only one.)

       ☐ Some high school

       ☐ High school graduate or GED

       ☐ Some college, business or trade school

       ☐ College, business or trade school graduate

       ☐ Some graduate school

       ☐ Master's, doctoral or professional degree

What is your zip code? (Or, if you do not live in the United States, what is your country of residence?

      _____

Which of the following categories applies to you? *(Please check ✓ only one.)*

☐ Employed full-time   ☐ Unemployed or homemaker

☐ Employed part-time or temporary   ☐ Student

    ☐ Self-employed   ☐ Retired

What is your marital status? *(Please check ✓ only one.)*

☐ Single   ☐ Married (no children)

☐ Divorced or separated   ☐ Married (with children)

What is your yearly **individual income**, before taxes? *(Please check ✓ only one.)*

    ☐ less than $20,000   ☐ $20,000-$39,999   ☐ $40,000-$59,999

    ☐ $60,000-$79,999   ☐ $80,000-$99,999   ☐ $100,000 or more

What is your yearly **total household income**, before taxes? *(Please check ✓ only one.)*

    ☐ less than $20,000   ☐ $20,000-$39,999   ☐ $40,000-$59,999

    ☐ $60,000-$79,999   ☐ $80,000-$99,999   ☐ $100,000 or more

THANK YOU
This is the end of the survey. Your participation in this study is truly appreciated. Please use this space to make any comments.

REFERENCES

Adelman, B. J. E., Heberlein, T. A., and Bonnicksen, T. M. (1982). Social psychological explanations for the persistence of a conflict between paddling canoeists and motorcraft users in the Boundary Waters Canoe Area. *Leisure Sciences*, 5 (1), 45 – 61.

American Association for Public Opinion Research. (2011). *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 7th edition*. AAPOR.

Barker, L., and Dawson, C. (2010). Exploring the relationship between outdoor recreation activities, community participation, and environmental attitudes. *Proceedings of the 2010 Northeastern Recreation Research Symposium.* USDA Forest Service General Technical Report NRS-P-94, 190 – 196.

Baumgartner, R. M., and Heberlein, T. A. (1981). Process, goal, and social interaction differences in recreation: What makes an activity substitutable? *Leisure Sciences*, 4, 443 – 458.

Bishop, G. F. (2005). *The Illusion of Public Opinion: Fact and Artifact in American Public Opinion Polls*. Lanham, MD: Rowman and Littlefield Publishers, Inc.

Bixler, R. D., and Floyd, M. F. (1997). Nature is scary, disgusting, and uncomfortable. *Environment and Behavior*, 29 (4), 1 – 12.

Bixler, R. D., Floyd, M. F., and Hammittt, W. E. (2002). Environmental socialization: Quantitative tests of the childhood play hypothesis. *Environment and Behavior*, 34 (6), 795 – 818.

Bixler, R. D., and Morris, B. (1998). The role of "outdoor capital" in the socialization of wildland recreationists. *Proceedings of the1997 Northeastern Recreation Research Symposium.* USDA Forest Service General Technical Report NE-241, 237 – 242.

Blahna, D., Smith, K., and Anderson, J. (1995). Backcountry llama packing: Visitor perceptions of acceptability and conflict. *Leisure Sciences*, 17 (3), 185 – 204.

Bogardus, L. M. (2012). The bolt wars: A social worlds perspective on rock climbing and intragroup conflict. *Journal of Contemporary Ethnography*, 41 (3), 283 – 308.

Borrie, W. T., and Harding, J. A. (2002). Effective recreation visitor communication strategies: Rock climbers in the Bitterroot Valley, Montana. (USDA Forest Service Research Note RMRS-RN-15, pp. 1 – 11). Paulden, AZ: Rocky Mountain Research Center.

Bright, A. D., and Porter, R. (2001). Wildlife-related recreation, meaning, and environmental concern. *Human Dimensions of Wildlife*, 6, 359 – 276.

Brunson, M. W., and Shelby, B. (1990). A hierarchy of campsite attributes in dispersed recreation. *Leisure Sciences,* 15, 67 – 74.

Brunson, M. W., and Shelby, B. (1993). Recreation Substitutability: A Research Agenda. *Leisure Sciences*, 15 (1), 67 – 74.

Bryan, H. (1977). Leisure value systems and recreational specialization: The case of trout fishermen. *Journal of Leisure Research*, 9, 174 – 187.

Buchanan, T., Christensen, J., and Burdge, R. (1981). Social groups and the meanings of outdoor recreation activities. *Journal of Leisure Research*, 13, 254 – 266.

Burch, W., Jr. (1969). The social circles of leisure: Competing explanations. *Journal of Leisure Research*, 1, 125 – 147.

Camp, R. J., and Knight, R. L. (1998). Effects of rock climbing on cliff plant communities at Joshua Tree National Park, California. *Conservation Biology*, 12 (6), 1302 – 1306.

Carothers, P., Vaske, J., and Donnelly, M. (2001). Social values versus interpersonal conflict among hikers and mountain bikers. *Leisure Sciences*, 23 (1), 47 – 61.

Cheek, N., Jr. (1971). Toward a sociology of not-work. *Pacific Sociological Review*, 14, 245 – 258.

Corcoran, P. B. (1999). Formative influences in the lives of environmental educators in the United States. *Environmental Education Research*, 5, 207 – 220.

Cordell, H. K., Betz, C. J., and Green, G. T. (2002). Recreation and the environment as cultural dimension in contemporary American society. *Leisure Sciences*, 24, 13 – 41.

Cordell, H. K., and Tarrant, M. A. (2002). *Socio-6: Forest-based outdoor recreation.* Retrieved 30 March, 2007 from http://www.srs.fs.usda.gov/sustain/draft/socio6/socio6.pdf.

Deutsch, M. (1994). Constructive conflict resolution: Principles, training, and research. *Journal of Social Issues*, 50 (1), 13 – 32.

Ditton, R., Loomis, D., and Choi, S. (1992). Recreation specialization: Re-conceptualization from a social worlds perspective. *Journal of Leisure Research*, 24 (1), 33 – 51.

Dunlap, R. E., and Heffernan, R. B. (1975). Outdoor recreation and environmental concern: An empirical examination. *Rural Sociology*, 40, 18 – 30.

Dustin, D. L., Schneider, I. E., McAvoy, L. H., and Frakt, A. N. (2002). Cross-cultural claims on Devils Tower National Monument: A case study. *Leisure Sciences,* 24, 79 – 88.

Ewert, A. W., and Hollenhorst, S. J. (1997). Adventure recreation and its implications for wilderness. *International Journal of Wilderness*, 3 (2), 21 – 26.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., and Strahan, E. J. 1999. Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*. 4, 3: 272 – 299.

Gramann, J. H., and Burdge, R. J. (1981). The effect of recreation goals on conflict perceptions: The case of water skiers and fishermen. *Journal of Leisure Research*, 13 (1), 15 – 27.

Graves, P. (2010). *CONSUMER.ology*. London: Nicholas Brealey Publishing.

Hamilton, L. C. (1979). Modern American rock climbing: Some aspects of social change. *Pacific Sociological Review*, 22 (3), 285 – 308.

Hammittt, W. E., and Schneider, I. E. (2000). Recreation conflict management. In *Trends in Outdoor Recreation, Leisure and Tourism*, edited by Gartner, W. C., and Lime, D. W., 347 – 356. New York: CABI Publishing.

Harris, J. R. (1995). Where is the child's environment? A group socialization theory of development. *Psychological Review*, 102 (3), 458 – 489.

Hendee, J. C., and Burdge, R. J. (1974). The Substitutability Concept: Implications for Recreation Research and Management. *Journal of Leisure Research*, 6, 157 – 162.

Heywood, I. (1994). Urgent Dreams: Climbing, Rationalization and Ambivalence. *Leisure Studies*, 13, 179 – 194.

Hollenhort, S. (1990). What makes a recreation specialist? The case of rockclimbing. In *Social Science and Natural Resource Recreation Management*. J. Vining (Ed.). Boulder, CO: Westview Press.

Iso-Ahola, S. E. (1986). A theory of substitutability of leisure behavior. *Leisure Sciences*, 8 (4), 367 – 389.

Ivy, I. M., Stewart, W. P., and Lue, C. (1992). Exploring the role of tolerance in recreational conflict. *Journal of Leisure Research*, 24 (4), 348 – 360.

Jacob, G. R., and Schreyer, R. (1980). Conflict in outdoor recreation: A theoretical perspective. *Journal of Leisure Research*, 12 (4), 368 – 380.

Kuehn, D. M., Dawson, C. P., and Hoffman, R. (2006). Exploring fishing socialization among male and female anglers in New York's Eastern Lake Ontario area. *Human Dimensions of Wildlife*, 11, 115 – 127.

Lawson, S., Wood, K., Hockett, K., Bullock, S., Kiser, B., and Moldovanyi, A. (2006). Social science research on recreational use and users of Shenandoah National Park's rock outcrops and cliffs. Study completion report. Virginia Polytechnic Institute and State University.

Manfredo, M. J., and Anderson, D. (1987). The influence of activity importance and similarity on perception of recreation substitutes. *Leisure Sciences*, 9, 77 – 86.

Mannell, R. C., and Kleiber, D. A. (1997). *A Social Psychology of Leisure*. State College, PA: Venture Publishing, Inc.

Manning, R. E. (2010). *Studies in Outdoor Recreation: Search and Research for Satisfaction*. Corvallis: Oregon State University Press.

Mazel, David. (1991). *Pioneering Ascents: The Origins of Climbing in America, 1642 – 1873*. Harrisburg, PA: Stackpole Books.

McCool, S. F., and Utter, J. (1982). Recreation use lotteries: Outcomes and preferences. *Journal of Forestry*, 80, 10 – 11.

McMillan, M. A., Nekola, J. C., and Larson, D. W. (2003). The effects of rock climbing on the land snail community of the Niagara Escarpment in Southern Ontario, Canada. *Conservation Biology*, 17 (2), 616 – 621.

Mellor, D. (1995). *Climbing in the Adirondacks: A Guide to Rock and Ice Routes in the Adirondack Park*, 3rd edition. Lake George, New York: The Adirondack Mountain Club, Inc.

Mueller, D. J. (1986). *Measuring social attitudes: A handbook for researchers and practitioners*. New York: Teachers College Press.

Nord, M., Luloff, A. E., and Bridger, J. C. (1998). The association of forest recreation with environmentalism. *Environment and Behavior*, 30, 23 – 34.

Outdoor Industry Foundation. (2006). Outdoor Recreation Participation Study. Retrieved on 30 November 2006 from http://www.outdoorindustryfoundation.org.

Outdoor Industry Foundation. (2013). Outdoor Recreation Participation Report: Topline 2013. Retrieved on 20 June 2013 from http://www.outdoorindustry.org.

Palmer, J. (1993). Development of concern for the environment and formative experiences of educators. *Journal of Environmental Education*, 24 (3), 26 – 30.

Perkins, M. (2005). Rock climbing ethics: A historical perspective. *Northwest Mountaineering Journal*, 2. Retrieved on 20 November, 2005 from http://www.mountaineers.org/nwmj/05/051_Ethics.html.

Ramthun, R. (1995). Factors in user group conflict between hikers and mountain bikers. *Leisure Sciences*, 17 (3), 159 – 169.

Rapelje, B. W. (2004). Rock climbing sub-worlds: A segmentation study. Unpublished master's thesis, Texas A&M University, Texas.

Roe, M., and Benson, J. (2001). Planning for conflict resolution: Jet-ski use on the Northumberland coast. *Coastal Management*, 29 (1), 19 – 39.

Salz, R. J., Loomis, D. K., and Finn, K. L. (2001). Development and validation of a specialization index and testing of specialization theory. *Human Dimension of Wildlife*, 6, 239 – 258.

Schuett, M. (1995). Predictors of social group participation in whitewater kayaking. *Journal of Park and Recreation Administration*, 11, 67 – 72.

Schuster, R. M., Thompson, J. G., and Hammittt, W. E. (2001). Rock climbers' attitudes toward management of climbing and the use of bolts. *Environmental Management*, 28, 403 – 412.

Scott, C. (2000). *Pushing the limits: The story of Canadian mountaineering*. Calgary, AB: Rocky Mountain Books.

Selters, A. (2004). *Ways to the Sky: A Historical Guide to North American Mountaineering*. American Alpine Club Press: Golden, CO.

Shelby, B., Goodwin, J., Brunson, M., and Anderson, D. (1989). *Impacts of recreation use limits in the Alpine Lakes wilderness*. (Final Report to the USDA Forest Service, Project No. PNW 87-243). Corvallis: Oregon State University.

Shelby, B., and Vaske, J. J. (1991). Resource and activity substitutes for recreational salmon fishing in New Zealand. *Leisure Sciences*, 13, 21 – 32.

Sherburn, M., and Devlin, A. S. (2004). Academic major, environmental concern, and arboretum use. *The Journal of Environmental Education*, 35, 23 – 36.

Shibutani, T. (1955). Reference groups as perspectives. *The American Journal of Sociology*, 60 (6), 562 – 569.

Shultis, J. (2001). Consuming nature: The uneasy relationship between technology, outdoor recreation and protected areas. *The George Wright Forum*, 18 (1), 56 – 66.

Stankey, G. H. (1973). Visitor perception of wilderness carrying capacity. Research Paper INT-142. USDA Forest Service, Intermountain Research Station, Ogden, Utah.

Stankey, G., and Schreyer, R. (1987). Attitudes toward wilderness and factors affecting visitor behavior: A state-of-knowledge review. *Proceedings – National Wilderness Research Conference: Issues, State-of-Knowledge, Future Directions*. USDA Forest Service General Technical Report INT-220, 246 – 293.

Stewart, W. P., and Cole, D. N. (2001). Number of encounters and experience quality in Grand Canyon backcountry: Consistently negative and weak relationships. *Journal of Leisure Research*, 33 (1), 106 – 120.

Stokowski, P. (1990). Extending the social groups model: Social network analysis in recreation research. *Leisure Sciences*, 12, 251 – 263.

Stokowski, P., and Lee, R. (1991). The influence of social network ties on recreation and leisure: An exploratory study. *Journal of Leisure Research*, 23, 95 – 113.

Strauss, A. (1978). A social world perspective. *Studies in Symbolic Interaction*, 1 (33), 119 – 128.

Stuessy, T. L., Harding, J., and Anderson, J. (2009). Environmental ethics of rock climbers in the Adirondacks: A quantitative approach. *Journal of Outdoor Recreation, Education, and Leadership*, 1 (1), 76 – 96.

Tanner, T. (1980). Significant life experiences: A new research area in environmental education. *Journal of Environmental Education*, 11 (4), 20 – 24.

Teisl, M. F., and O'Brien, K. (2003). Who cares and who acts? Outdoor recreationists exhibit different levels of environmental concern and behavior. *Environment and Behavior*, 35, 506 – 522.

Tejada-Flores, L. (1978). The games climbers play. In *The Games Climbers Play*. K. Wilson (Ed.). San Francisco: Sierra Club Books.

Thapa, B. (2010). The mediation effect of outdoor recreation participation on environmental attitude-behavior correspondence. *The Journal of Environmental Education*, 41 (3), 133 – 150.

Thapa, B., and Graefe, A.R. 2003. Level of skill and its relationship to recreation conflict and tolerance among adult skiers and snowboarders. *World Leisure*, 1, 13 – 25.

Unruh, D. R. (1979). Characteristics and types of participation in social worlds. *Symbolic Interaction*, 2 (2), 115 – 129.

Unruh, D. R. (1980). The nature of social worlds. *Pacific Sociological Review*, 23 (3), 271 – 296.

Vaske, J., Dyar, R., and Timmons, N. (2004). Skill level and recreation conflict among skiers and snowboarders. *Leisure Sciences*, 26 (2), 215 – 225.

Vitterso, J., Chipeniuk, R., Skar, M., and Vistad, O. (2004). Recreational conflict is affective: The case of cross-country skiers and snowmobiles. *Leisure Sciences*, 26 (3), 227 – 243.

Vogler, F., and Reisch, C. (2011). Genetic variation on the rocks: The impact of climbing on the population ecology of a typical cliff plant. *Journal of Applied Ecology*, 48, 899 – 905.

Watson, A.E. (2001). Goal interference and social value differences: Understanding wilderness conflicts and implications for managing social density. *USDA Forest Service Proceedings RMRS-P 20,* 62 – 67.

Wood, K. T., Lawson, S. R., and Marion, J. L. (2006). Assessing recreation impacts to cliffs in Shenandoah National Park: Integrating visitor observation with trail and recreation site measurements. *Journal of Park and Recreation Administration*, 24 (4), 86 – 110.