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The Effects of Recreation Specialization and Motivations on the Environmental Setting Preferences of Backcountry Hikers

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THE EFFECTS OF RECREATION SPECIALIZATION AND MOTIVATIONS ON THE ENVIRONMENTAL SETTING PREFERENCES OF BACKCOUNTRY HIKERS

by

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by

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This study explored how recreation specialization and different types of motivations were related to environmental settings preferred by backcountry hikers. A questionnaire was developed that measured the level of hiking specialization, desired psychological outcomes, and preferred environmental setting attributes. Questionnaires were mailed to 619 backcountry hikers from three Intermountain West hiking areas; a response rate of 68 percent was attained.

Results of the study revealed significant associations between the level of hiking specialization and the psychological states desired by backcountry hikers. In general, increased hiking specialization served to increase the importance of specific psychological outcomes such as autonomy, exercise, achievement and nature. Significant associations were also found between the level of hiking specialization and the types of environmental settings

preferred by hikers. Hiking specialization exhibited significant relationships with 55 percent of the studied environmental setting attributes, especially within the physical and managerial setting domains. The five study motives were especially adept at explaining the physical setting attributes desired by hikers, but lacked predictive power in explaining preferences for managerial settings.

The final study analysis utilized two canonical correlation analyses to allow the specialization and motive variables to be combined as a set of independent variables to see which combinations would emerge as important predictors. The specialization variable emerged in both canonical analyses as the first and dominant indicator of the setting attributes. Additional interpretations of the canonical results indicated that two motive-based orientations to backcountry hiking may exist.

The findings of this study have implications for researchers and managers seeking to understand why environmental settings are valued differently by recreationists, even within the same activity style. Secondly, researchers studying recreation motivation could utilize recreation specialization as a useful developmental framework for explaining differences in motivational states over time. The results also imply that management strategies sensitive to changes in levels of recreation specialization may be less costly in dollars and offer a more precise way of defining the diversity of opportunity and settings sought by recreationists.

(237 pages)

INTRODUCTION

> We act as if wilderness were real--rocks, trees, canyons, mountains--but it is actually a state of mind evoked by a state of nature, a quality associated by some people with some places (Nash 1978, p. 39).

It is the intent of this study to investigate the linkage between the environment in which recreation occurs, and the resulting recreation experience. There is considerable evidence that the environment, whether physical, social or managerial, is an important influence on how recreationists ascertain meaning from their recreation experiences (Kelly 1982). The popularity of outdoor recreation in general, and more specifically the varied activity styles and resources frequented are testimony to the diversity of environments sought by recreationists. A logical question for recreation researchers and managers to ask is "why do recreationists differ in their preferences for desired environmental settings?" Two behavioral forces which may help explain this diversity are the foci of this study.

Within the federal land agencies, the major responsibilities of recreation resource management can be categorized into three general domains: (1) to provide recreation opportunities which are demanded and appropriate for the area being managed; (2) to prevent unacceptable damage to the resource; and (3) to protect users from serious harm (Driver and Brown 1978, p. 24). All three goals suggest an understanding of human nature. For example, how do managers decide which opportunities are demanded by the public? What steps can

managers take to motivate recreationists to cooperate in the protection of the recreation resource? What actions by managers encourage safe behavior among different user groups? These questions are meant to underscore the human element of recreation resource management. Just as foresters must understand certain silvicultural and ecological principles to manage timber resources, the recreation manager must depend upon relevant social and behavioral principles to manage human resources. Many recreation researchers have recognized the value of understanding outdoor recreation behavior (Clark and Stankey 1979; Driver and Brown 1978; Hendee, Stankey and Lucas 1978; Iso-Ahola 1980; Knopf 1986). In the words of one researcher, "If the impacts of humans on the natural environments, not to mention each other, are to be minimized, the dynamics of the recreationists' behavior must be understood" (Schreyer 1980, p. 338).

Earlier studies in the social psychology of leisure and recreation emphasized the effects of the shorter work week, increased free time, and work on recreation behavior (deGrazia 1964; Neulinger 1974). Other researchers explored the relationship between demographic indicators and leisure behavior (Hendee and Campbell 1969; Mueller and Gurin 1962; Neulinger 1974). As outdoor recreation participation increased in the 1960's and 1970's, new problems emerged which focused outdoor recreation research on applied management problems. Researchers measured the responses of recreationists to congestion and crowding (Lime 1976; Stankey 1972; Stankey, Lucas and Lime 1974). Other researchers investigated the feasibility of establishing carrying capacities at the more popular recreation resources (Frissell and Stankey 1972; Roggenbuck 1975; Stankey 1972).

The study of recreation conflict (Jacob and Schreyer 1981; Knopp and Tyger 1973; Shelby, Heberlein, Vaske and Alfano 1983) has emphasized the importance of understanding the motivations and expectations of differing recreation styles (e.g., between backcountry hikers and off-road motorcyclists). Recreation managers and planners have increasingly utilized carrying capacities and permit systems as means for mitigating overuse. Since the effects of these policies on the recreation experience are not well understood, a significant portion of recent research has been focused on the recreationists' attitudes and preferences toward different management strategies (Bowley 1979; Haas 1979; McLaughlin and Paradice 1980).

Recreation Opportunity Spectrum

As the demand for recreation opportunities grew in the twentieth century, the federal land management agencies, with the exception of the National Park Service, were forced to assume responsibility for providing a variety of outdoor recreation opportunities. The Multiple-Use and Sustained-Yield Act of 1960 broadened the legislative role of land management agencies to include recreation (Dana and Fairfax 1980). In 1970, the National Environment Policy Act (NEPA) formalized decision-making and public involvement in federal agency planning and management. Among the legislation that specifically mandated that recreation be fully integrated into multiple-use land management planning were the Renewable Resources Planning Act of 1974, the National Forest Management Act of 1976 and the Federal Land Policy and Management Act of 1976. The resulting challenge for the land management agencies was to formulate a systematic approach for

planning recreation opportunities and to guide management decision-making (Driver, Brown, Gregoire and Stankey 1984).

The resulting framework, the Recreation Opportunity Spectrum (ROS), is now being utilized by the U.S. Forest Service for inventorying, planning, and managing recreation resources (Clark and Stankey 1979). The ROS concept is also being used by the Bureau of Land Management (Buist and Hoots 1982). The ROS framework emphasizes the setting in which recreation occurs, assuming that users have preferences for particular environmental settings which aid in the attainment of a satisfying recreation experience. A recreation opportunity setting is defined as the combination of physical, biological, social, and managerial conditions that give value to a place (Clark and Stankey 1979). The responsibility for recreation managers is to provide a variety of recreational opportunity settings so that different types and styles of recreation use can be accommodated. The assumption guiding the ROS concept is that the broadest segment of the public will find quality recreation experiences through diversity of opportunity.

To a large extent, diversity is determined by the recreation resources available on a given district or forest. According to Clark and Stankey (1979), the recreation manager can also change different opportunity settings by manipulating six opportunity factors (i.e., access, non-recreation resource uses, on-site management, social interaction, acceptability of visitor impacts and acceptable level of regimentation) in different ways. These factors are organized to produce six classes of recreational opportunity settings that vary on a continuum from primitive to urban. Through this classification

procedure it is then possible to inventory all existing recreation resources into one of the following six classes: primitive, semi-primitive nonmotorized, semi-primitive motorized, roaded natural, rural, and urban. A necessary assumption implied within the ROS framework is that meaningful recreation experiences and valued psychological outcomes will follow from ROS oriented recreation resource management. Presumably, if managers offer a diverse array of settings, demand will be met because diversity increases the probability that people will find a setting which will lead to a satisfying recreational experience.

The development of the ROS is still in its early stages, and it needs additional refinement and research to improve its usefulness. It has been utilized extensively in the Forest Service as an inventorying tool (i.e., mapping different forests). To date, limited research has been done to measure how diverse recreation opportunity settings are linked to quality recreation experiences. More specifically, scant literature exists suggesting which types of recreation settings are demanded by different types of users.

Problem Statement

Unfortunately, providing the recreation manager with a list of "magic" behavioral principles is not as easy or simple as it would appear. Part of the problem is that outdoor recreation behavior is a complex and dynamic phenomenon. Each recreationist carries with himself/herself a unique set of inherent, situational, and learned characteristics that influences his/her thinking and behavior. Past recreational experience, perceived needs, preferences, knowledge about

activities and opportunities, amount of education, available time, available income, work environment, willingness to try new experiences and age are all variables that interact to influence the desire to recreate, and to recreate in specific ways. Not only must a recreation planner or manager attempt to understand the multi-dimensionality of a recreationists' behavior, he/she must also predict how a given management action will influence future behavior. In the absence of accepted and established behavioral principles, managers most often base their actions on professional intuition and trial and error problem-solving.

While the ROS framework has been utilized extensively by the U.S. Forest Service, its treatment of recreation behavior is somewhat incomplete. The expressed goal of the ROS is to provide quality recreation opportunities. The extent to which these opportunities are realized as quality recreation experiences is partially dependent upon the recreationist who shares the responsibility of determining his/her experience. However, managers need relevant information to help understand their role in affecting quality recreation experiences. There is a need to understand how different recreation opportunity settings are linked to the recreation experience. At the conclusion of the ROS paper written by Clark and Stankey (1979), five future research topics were identified. Two of these topics directly attempt to link the recreation experience with the recreation setting. The first topic area was "to define the psychological outcomes associated with different activity setting combinations to help reveal how management can better help the visitor achieve a diversity of experiences" (Clark and Stankey 1979, p. 27). The second topic area

was related to the evolution in tastes of the recreationist. More specifically stated, the authors asked, "How do persons at different stages in this evolution differ in terms of the experiences, activities, and settings they seek?" (Clark and Stankey 1979, p. 27). These two topic areas are centrally related to the theoretical frameworks which guide this investigation.

As previously mentioned, numerous researchers have investigated the preferences of different recreationists to different management actions and other setting attributes. However, there is no common denominator by which these studies can be compared. Outdoor recreation behavioral research, in general, is rarely interrelated or integrated. One researcher in summing up past research in the field, stated, "Although data abound, theory does not" (Knopf 1986, p. 210). Exploratory data analyses are valueless (to science) unless they are framed according to some theoretical orientation. Ideally, what is needed are theoretical frameworks that aid managers and researchers in understanding and predicting the value of different settings to the recreationist. An important step in that direction is to identify and understand the systematic underlying forces resulting in different preferences for various setting conditions to attain desired experiences. Perhaps just as important is the identification of the forces and settings which arouse conflict and consequently hinder the achievement of these desired experiences. Until our internal theoretical frameworks are expanded to include the setting in which recreation occurs, we are only hoping that quality recreation opportunities are being provided.

Experience-Setting Linkages

In the absence of a comprehensive theoretical framework, some behavioral models for explaining different aspects of recreation behavior have been proposed. A recently developed theory is B. L. Driver's (1976) model of recreation behavior. The model proposes that the recreationist is influenced by many quantifiable characteristics, ranging from psychological and physiological traits to social/environmental factors to past experiences. The portion of the model that has received the most attention from researchers is Driver's concept of psychological outcomes, which are used to identify a preferred state the recreationist is seeking to attain. The outcomes explain the "why" or motives of outdoor recreationists' behavior (e.g., to enjoy nature, to be with friends, for the exercise, to escape personal pressures). Driver originally suggested that an activity is chosen because of the desired outcomes associated with it by the recreationist. While this may be true, recent research suggests that a variety of different outcome profiles exist within an activity and that these profiles may be associated with different setting preferences (Brown and Haas 1980; Knopf and Barnes 1980; McLaughlin and Paradice 1980). For example, Camper A, who is seeking nature-oriented outcomes, may find a particular setting very satisfying. However, Camper B, who desires a social experience, finds the same setting to be very unrewarding. In this manner it may be possible to predict a person's esteem toward a particular setting from the psychological outcomes he/she desires.

The specialization principle put forth by Hobson Bryan, from his research on trout fishermen (Bryan 1977; 1979) offers a different focus on the recreation experience-setting link. Bryan recognized the existence of diversity in the types of settings sought by different groups of trout fishermen. He identified the experience-related concept of specialization as an important force behind this diversity. Where Driver focused on the internal motivational states of recreationists, Bryan shifted to actual manifestations of recreation behavior. As Bryan defines recreational specialization, it refers to a continuum of behavior from the general to the specific, as reflected by the recreationist's experience, equipment utilization, level of skill and activity setting preferences (Bryan 1979). When one moves (or develops through time) across this continuum from the novice recreationist to the more specialized, there is variation in terms of an activity's meaning to the individual and his/her resulting behavior. By identifying recreational subtypes based on levels of specialization within an activity, Bryan suggests it may be possible to explain user differences in regards to preferences toward the physical, social and managerial settings. For example, an experienced, skillful, and knowledgeable backcountry hiker might seek an appreciably different physical and social setting than a beginning hiker with nominal experience. Unlike Driver's model, the specialization principle has undergone a modicum of empirical testing to date, and has not been tied to specific preferences for setting attributes, except in a general attitudinal context.

Research Purpose

The purpose of this study is to integrate two behavioral frameworks in order to better understand the link between environmental setting attributes and satisfying recreation experiences for a diverse group of backcountry hikers. Empirical testing is employed to identify the attributes that backcountry hikers perceive as important in defining a quality backcountry setting. It is proposed that the combining of Bryan's specialization principle with Driver's psychological outcome model may provide a means for differentiating and predicting the physical, social and managerial setting features that add or detract from hiking satisfaction. While numerous researchers have demonstrated some success in associating recreationists' setting preferences with outcome motives across different activities, recent studies indicate that outcomes lack homogeneity even among recreationists participating in the same activity (Knopf 1986). The suggestion that specialization can be utilized to explain differing attribute preferences within recreational activities was made by Bryan in 1979. This research study suggests that Bryan's intra-activity continuum will add more precision to, and thus complement, the prediction potential of Driver's desired outcome approach. By uniquely integrating these two frameworks a more powerful tool may result for explaining how environmental setting attributes can be linked to recreation satisfaction.

Objectives of the Study

1. To identify the environmental setting attributes that backcountry hikers perceive as important in defining a satisfying backcountry experience.
2. To explore how psychological outcomes differ within different levels of specialization among backcountry hikers.
3. To investigate how the principle of specialization will function as a predictor of the environmental settings attributes that contribute to a satisfying backcountry experience across different hikers.
4. To determine which psychological outcomes are important to backcountry hikers and how these outcomes relate to environmental setting attributes.
5. To integrate two theoretical approaches of recreation behavior to investigate their value in predicting which environmental setting attributes are satisfying to different hikers.

REVIEW OF LITERATURE

> People differ about quality, not because quality is different, but because people are different in terms of experience (Pirsig 1974, p. 244).

This chapter serves as a literature review and theoretical discussion of the important conceptual frameworks and behavioral studies upon which this study is built. The presented literature is grouped into three major areas. The first addresses B. L. Driver's model of recreation behavior with special emphasis placed upon the concept of psychological outcomes. Next, recreation specialization is presented, with an in-depth discussion of Hobson Bryan's work on the subject. The third theoretical area examines how the recreation setting relates to recreation behavior, particularly with regard to the Recreation Opportunity Spectrum, an applied recreation management framework utilized by federal land management agencies.

Driver's Model of Recreational Behavior

Introduction

In contrast to those scholars who define recreation in terms of the activity a person chooses, Driver characterizes recreation as the experience that results from an activity or group of activities. Driver defines the "recreation experience" as the sum of the recreationist's mental, spiritual, physiological or other responses to a recreational engagement (Driver 1976). According to Driver this experience can be generalized into a final outcome that may be

satisfying or not satisfying to the recreationist. In this respect there can be "good" and "bad" recreation experiences. Furthermore, an overall or general recreation experience, like a family camping trip, can be separated into a set of more specific recreation experiences. These specific experiences, referred to by Driver as psychological outcomes, define the "types" of satisfaction a person derives from a general recreation engagement. For example, person A may enjoy rock climbing specifically for the exercise and risk taking involved. By contrast, person B may enjoy rock climbing to socialize with close friends and to enjoy a natural setting. Both people value rock climbing as an appropriate and desired recreational pursuit. While both rock climbers enjoy the same activity in general, their recreation motivations differ with respect to the specific satisfactions sought. In this way a recreation experience is defined, in part, by the value or meaning an individual recreationist attaches of any particular outcome. Relatedly, the first climber may be primarily dependent on the physical setting to attain a satisfying experience, while the second may be much more sensitive to the social environment.

While psychological outcomes are important consequences to any recreation experience, Driver does not assume that they just happen. Rather, he proposes that the recreationist desires and expects certain psychological outcomes from his/her recreation participation even prior to the recreation engagement. From this perspective, recreation behavior is characterized as non-random, goal-directed, and purposeful behavior (Driver 1977). Psychological outcomes are considered an important factor in determining which recreation opportunity choice a

recreationist will make. Prior to the recreation experience they are referred to as desired or expected psychological outcomes. Furthermore, these desired outcomes determine to some degree how a particular recreationist will behave. Once the recreation experience has occurred it is then possible for the recreationist to evaluate the "end product" of his/her recreation experience. These end products can be described as actual or realized psychological outcomes. It is also important to establish that multiple outcomes are usually expected and realized from any given recreation experience. Therefore a backpacker, for instance, may simultaneously realize important socializing, nature enjoyment and escape outcomes from one backpacking experience. The following section presents some of the psychological theories which support Driver's characterization of recreation behavior.

A Theoretical Basis for Components of Driver's Model

Social psychologists, as well as scholars from a variety of other disciplines, have studied human motivation in a variety of social contexts. Whether the object of human behavior is material, psychological, physiological or spiritual, much of this behavior seems directed towards attaining certain desired outcomes. The purpose of this section is to identify groups of outcomes that individuals find desirable and to help explain why certain outcomes may be valued over others.

Need Theories. A number of psychologists have attempted to explain human behavior in terms of satisfying basic human needs. One common approach has been to develop a classification system of human

needs which then can theoretically be called upon to explain behavior. Perhaps the best known of those theories is the self-actualization theory developed by Maslow (1964). According to Maslow, human needs are arranged in a hierarchy beginning with the basic need for food, water, shelter and other existence requirements. Once these needs are met the individual moves onto the next level. In rank order, the remaining four levels include safety and security needs, social needs, ego needs and the need to be self-actualized. Therefore, the ultimate human need is toward self-actualization. At any time, if one of the lower needs is not met, human motivation will be directed down to that level until fulfillment is temporarily attained.

The application of Maslow's hierarchy to recreation behavior is rarely tied to the first level, unless to explain why people choose not to recreate. Poorly realized safety and security needs can be utilized to explain a variety of recreation behaviors from gambling to gun collecting. Social need motives can be used to explain why recreationists enjoy parties, family camping trips and on and on. While Maslow's theory is intrinsically appealing and can be applied on both an individual and societal level, it has not proven to be a reliable predictor of recreation behavior, as its level of organization is too general to be useful in most applied settings. Perhaps the most valuable contribution provided by the self-actualization theory is its insight into the types of outcomes individuals seek in both everyday living and their recreational pursuits.

Other need theorists have identified and emphasized the existence of one or two basic motives. Achievement is one example.

D. C. McClelland has done considerable research on the achievement motive and concludes that achievement motivation is present in most individuals with varying degrees of strength. Achievement is defined as an individual's success in competing within the framework of some standard of excellence (McClelland, Atkinson, Clark and Lowell 1976). Thus, the goal of achievement may be extrinsic as in competing with others toward a common goal or intrinsic as in achieving a desired degree of skill in rock climbing. Research indicates that individuals with high achievement needs search for environments which allow those needs to be met (Lawler 1973). While this may make it fairly easy to conceptualize how achievement might be related to competitive recreation activities like basketball or races, it may also account partially for why certain individuals seek a high level of expertise in non-competitive activities like fishing or backpacking.

Another unidimensional orientation to need theory is the arousal motive. Arousal can be defined as behavior which is directed toward maintaining an optimal flow of stimulation for the individual (Levy 1978). Levy maintains that each individual at any given time has a normal optimal level of activation in which he/she feels adequately stimulated. When the actual level of arousal a person experiences varies too far, in either direction, from the optimal, anxiety results. While not addressing why, he contends that each person's optimal level of arousal will vary on a continuum from low to high. Through experience most people learn to avoid situations and environments which are associated with too large of a discrepancy between desired and actual arousal levels. High arousal seekers have commonly been associated with risk-taking activities like parachuting

or rock climbing. While many people seek natural environments for excitement and risk, many others seek them for their serenity and beauty. Leaving the structured urban life to "enjoy nature" may be an attempt by over-stimulated individuals to retreat back to a level that is closer to their optimal arousal.

R. W. White theorizes that human beings have a need to master different facets within their world. He termed a person's motivation to exert control over his/her environment as the competence motive (White 1959). The ability to successfully interact with the environment is something that comes through learning. When new situations present themselves, competence is aroused until that situation is mastered, then the individual moves on to another challenging situation. White's notion of competence came in part from H. Hartmann's theory of ego autonomy (Arkes and Garske 1977). While more closely linked with psychoanalytic theory, Hartmann conceived of an ego state relatively free of instinctual drives, where the individual's actions become intrinsically motivated. Where instinctual behavior is controlled and regulated, individuals also seek these internal autonomical ego states such as egoism and self-assertion (Hartmann 1958). Hartmann describes ego autonomy as a developmental process to be utilized for affecting one's environment. Autonomy has been described by one leisure scholar as "competence and freedom in action" (Levy 1978, p. 185).

Expectancy Theory. Where need theories provide insight into the types of motives that influence individuals to seek certain outcomes, expectancy theory focuses on why certain outcomes are sought above other outcomes. Originating in the work of the English utilitarians,

expectancy theory began to take more of a cognitive orientation in the 1930's (Lawler 1973). During this time, Lewin introduced the concepts of "valence" and "force" (Lewin 1935). Valence is defined as the attractiveness of an outcome to an individual. Lewin's concept of force has evolved in current versions of the theory to "expectancy" (Atkinson 1964). Expectancy can be defined as the perceived likelihood that an action will lead to a given outcome (Lawler 1973).

Several recent theorists have expanded on the early expectancy theory work with their own terminology for the determinants of outcome seeking behavior. Vroom's theory pertaining to work motivation provides a useful framework in explaining the dynamics of expectancy and valence. He focuses on the affective attractiveness of an outcome (valence), where the individual may have a positive or negative preference toward attaining a particular outcome (Table 1). For

Table 1. Expectancy theories of motivation

Theorist	Determinants of impulse to action
Tolman	Expectancy of goal, demand for goal
Lewin	Potency x valence
Edwards	Subjctive probability x utility
Atkinson	Expectancy x (motive x incentive)
Rotter	Expectancy, reinforcement value
Vroom	Expectancy x valence; where valence is (instrumentality x valence)
Peak	Instrumentality x attitude (affect)

Source: Lawler 1973, p. 45.

example, a child might possess positive valence toward visiting Disneyland while the child's parent may possess negative valence. Vroom maintains that valence can be measured and will vary between +1 and -1, where a neutral outcome is given the value of zero. If the individual believes that a particular act will result in a particular outcome he/she is said to have positive expectancy. Thus, expectancies are stated in terms of their relative strength from a minimized 0 to a maximum 1. As with other expentancy value theorists, Vroom argues that an individual's motivation is then determined by the multiplicative effect of valence and expectancy.

Lawler's Expectancy Model extends the concept of expectancy one step further. He begins with four assumptions about human motivation:

> (1) People have preferences among the various outcomes that are potentially available to them, (2) people have expectancies about the likelihood that an effort on their part will lead to the intended behavior or performance, (3) people have expectancies (instrumentalities) about the likelihood that certain outcomes will follow their behavior, and (4) in any situation, the actions a person chooses to take are determined by the expectancies and the preferences that person has at the time (Lawler 1973, p. 49).

While the first and last assumptions are consistent with Vroom's framework, the second and third propose two different types of expectancies. The first is a person's probability estimate that a given behavior (e.g., climbing Mt. Rainier) can be accomplished. In other words, to what degree a person believes he/she can accomplish a given performance. Lawler terms this an E-P (effort-performance) expectancy, which can vary mathematically from 0 to 1. These expectancies are represented in Lawler's model between effort and performance (Figure 1).

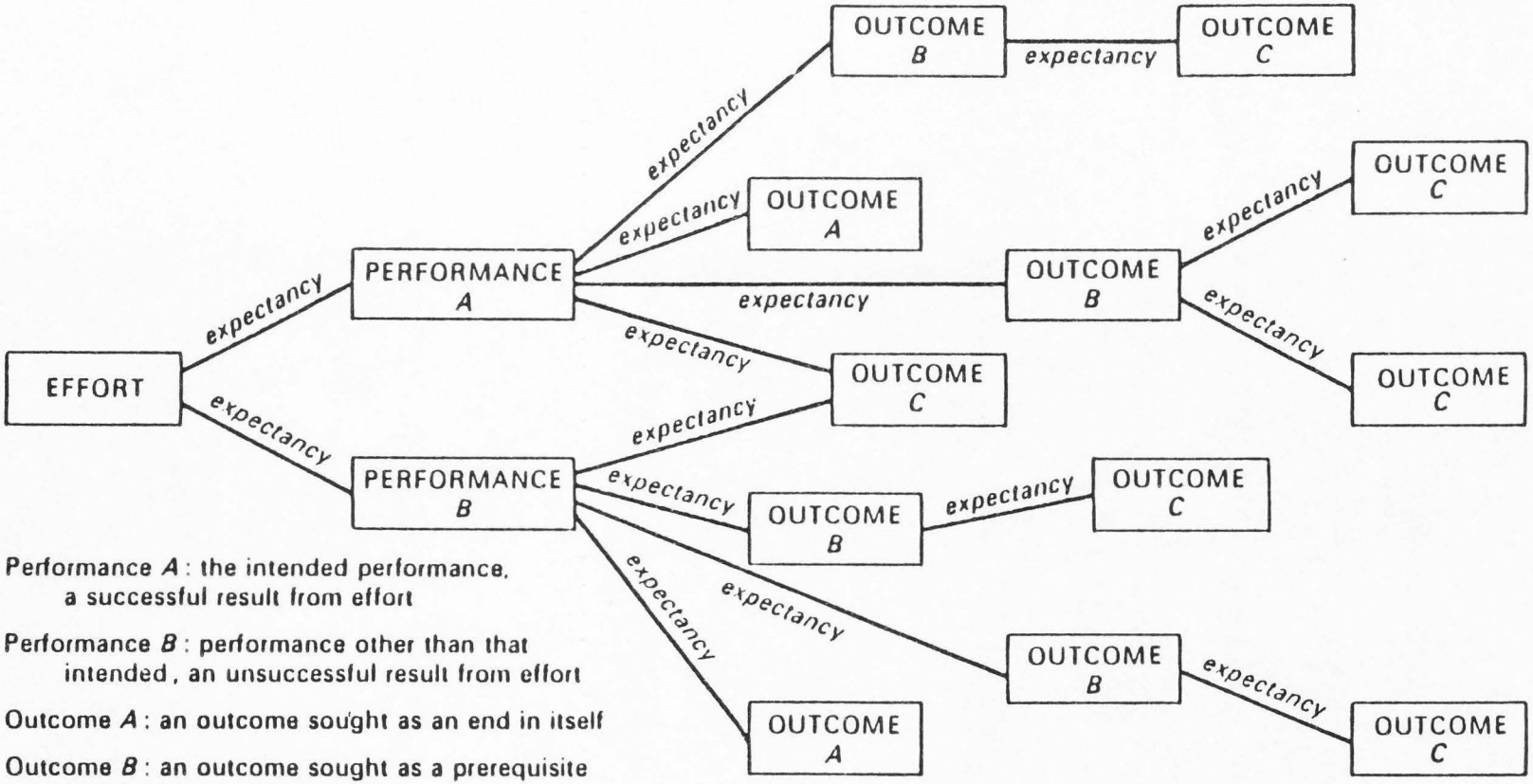


Figure 1. Lawler's expectancy-value model (Lawler 1973, p. 50)

The second expectancy identified by Lawler pertains to the consequences of performance. These are referred to as P-O (performance-outcomes) expectancies. They reflect a persons belief that certain outcomes will result from the performance of a certain task. Lawler calls these expectancies instrumentalities and they can be expressed on a continuum from 0 to 1. As seen in the illustration of the model, some outcomes are ends in themselves and others act as means to other expected outcomes. In summary, Lawler is saying that a person's motivation to perform a certain task will be influenced both by his/her expectancies that the task can be performed and by the outcomes which he/she associates with that performance. Finally, when the attractiveness of the outcomes is also considered, Lawler's formula portrays the multiplicative effect of the motivation a person will have toward a particular outcome. This formula can be expressed as $[(E\text{-}P)x\{(P\text{-}O)(V)\}]$.

Obviously, the process portrayed in Lawler's Model is dependent upon how the individual perceives any given situation. Consider the person who is trying to decide what to do with a week's vacation. The E-P expectancy could be characterized by the person's estimate of his/her probability of completing a week-long solo canoeing trip on a remote river. Performance A is characterized by successful completion of the trip and has a strength of .75. Part of this strength is related to the canoeist's previous experience on that river, his/her skill level and knowledge about current river conditions. The evaluation that the trip will fail (Performance B) is .25, since it is possible that the weather, an accident or other unforeseen events could jeopardize the trip. The desire to enjoy nature is reflected by

Outcome C and can occur regardless of the E-P result. Another desire of the canoeist is to gain some needed physical exercise (Outcome A). If Outcome B reflects the canoeist's desire to escape work and family pressures at home, a different Outcome C could be to improve work performance or to strengthen family relationships. Since the canoeist is relatively sure that these outcomes will occur whether the intended or unintended performance occurs, there is a strong likelihood of taking the trip.

A number of outcomes could be envisioned within the model including material objects. However, to accurately characterize the recreation decision-making process, a number of specific experiences would have to be evaluated simultaneously. Most people choose their recreation pursuits from a number of available opportunities. To best predict which opportunity would be chosen, they would have to be compared. Lawler offers some additional insight into expectancies. As individuals gain experience with a particular performance a more accurate E-P expectancy is usually made. In other words, people can better estimate their ability to perform if they have had trial and error experience with the task previously. People with high self-esteem are also more accurate in estimating their own ability to carry out certain tasks. Additionally, a person's ability to accurately appraise a given situation and the influence of others have both been shown to affect E-P expectancies.

The ability to predict accurate outcomes from a given performance is also influenced by past experience. People who are highly attracted or highly unattracted to an outcome will respectively overestimate or underestimate the likelihood of achieving a certain

outcome. Belief in internal versus external control, E-P expectancies, the actual situation and communications from others have also been found to be associated with P-O expectancies (Lawler 1973).

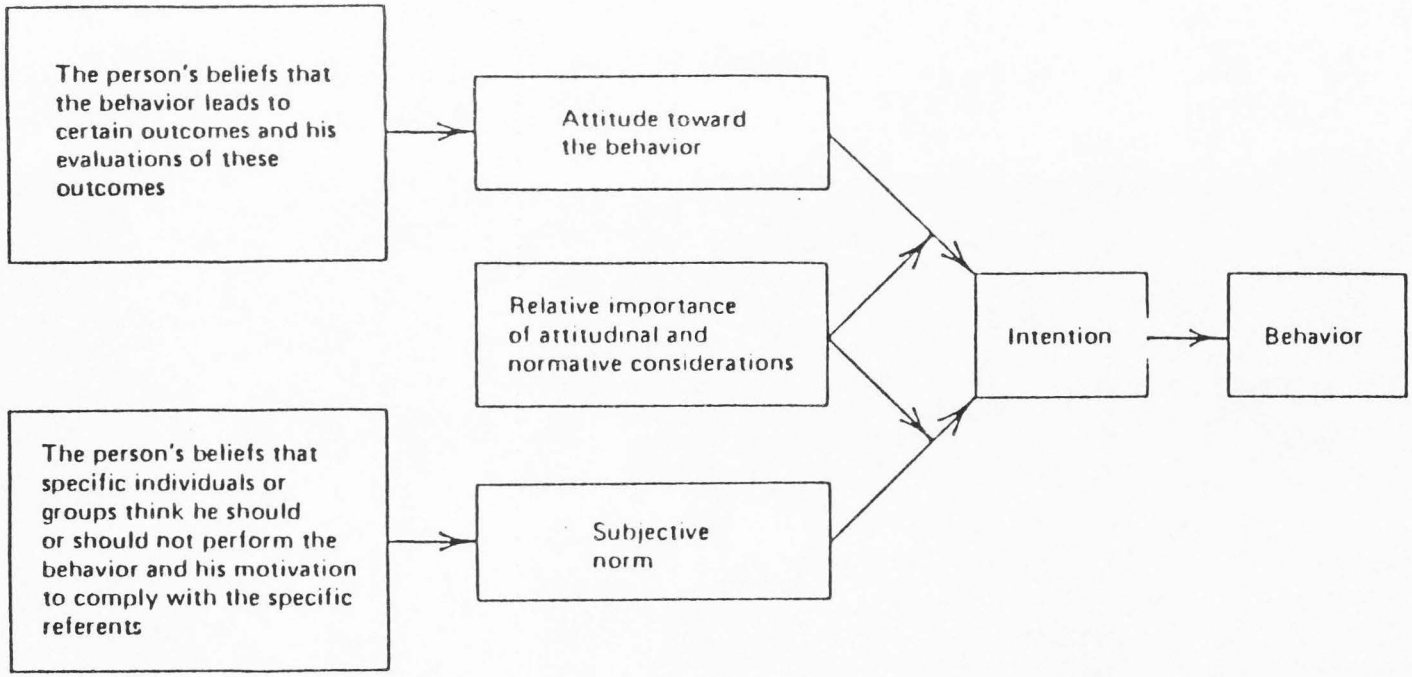
Theory of Reasoned Action. Fishbein and Ajzen have spent over fifteen years developing "a theory of reasoned action," which focuses on the prediction of actual behaviors in both experimental and applied settings (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980). This theory is based on the assumption that human behavior is not controlled by unconscious motives, but is rather quite rational, with human beings making systematic use of information available to them (Ajzen and Fishbein 1980).

Ajzen and Fishbein suggest that actual behaviors are determined from a person's intention to perform that behavior. In other words, a person with a strong intention of attending a rock concert on Saturday is more likely to do so than a person with a weak intention. In the same manner that intentions determine behavior, personal attitudes and normative considerations together function as the determinates of one's intentions. First, a person's attitude toward a particular behavior will in part determine if he/she intends to perform a specific behavior. Secondly, subjective norms are identified as an important factor in shaping one's intentions. These subjective norms are "the person's perception of the social pressures put on him to perform or not perform the behavior in question" (Ajzen and Fishbein 1980, p. 6). The degree to which a person's "attitude toward the behavior" or "subjective norms" influence intentions varies from person to person. Ajzen and Fishbein suggest that the relative importance of each can be measured and expressed in relative weights.

Consequently, if two college students have identical positive attitudes toward attending a concert, but only the first student intends to attend, a possible explanation of the second student's lack of intention would be his/her perception of social pressures not to attend.

The final level of factors identified as important in determining a person's behavior are one's beliefs. Ajzen and Fishbein identify two different types of beliefs. First "behavioral beliefs" underlie a person's attitude toward performing a particular behavior. For example, if student A believes attending rock concerts to be a rewarding social experience, he/she is more likely to possess a positive attitude toward attending rock concerts. It should be pointed out that beliefs are the determinates of attitudes, rather than actual behavior. The second type of beliefs are identified as normative beliefs (Figure 2). Normative beliefs are the person's beliefs that specific individuals or groups think he should or should not perform the behavior (Ajzen and Fishbein 1980). These beliefs underlie the person's subjective norms and underscore the importance of social forces in one's life.

In summary, the "theory of reasoned action" suggests that human beings are rational organisms who seek to behave in meaningful, structured ways. These behaviors can best be understood if a person's intentions can be examined. These intentions can also be understood if the person's attitudes and subjective norms can be determined. Finally, the basic factor in influencing behavior is one's beliefs. Ajzen and Fishbein acknowledge the existence of external variables such as personality traits, demographic variables and intelligence.



Note: Arrows indicate the direction of influence.

Figure 2. A theory of reasoned action (Ajzen and Fishbein 1980, p. 100)

They suggest however, that these external variables may influence behavior, by affecting a person's beliefs. They maintain that the belief, attitude, intention and behavior linkage intervene between the external variables and actual behavior (Ajzen and Fishbein 1980).

Driver's Model

Driver's model is a "general" orientation toward recreation behavior to "help structure thinking" (Driver 1977). Emphasis is placed on the belief that man is a complex information processing organism capable of goal-directed problem-solving behavior. Consequently, to fully understand recreation behavior, researchers and managers must look beyond the site where recreation occurs.

Driver's model characterizes recreation behavior as problem-solving behavior (Figure 3). Each potential recreationist carries with himself/herself a unique set of inherent, situational and learned characteristics that influence his/her thinking and behavior. Past recreation experiences, the socio-economic environment, psychological and physiological traits, available time, available income and perception of recreational opportunities are all characteristics that interact to influence the desire to recreate in specific ways. When an individual desires a recreation experience, he/she has created a perceived "problem." It is a problem in the sense that something is desired, but not yet attained. Driver refers to this as the gap or disparity between an existing and desired state.

Once the individual perceives a problem, a variety of different alternatives are evaluated. Expected probable consequences are considered for each alternative and a choice is made with the

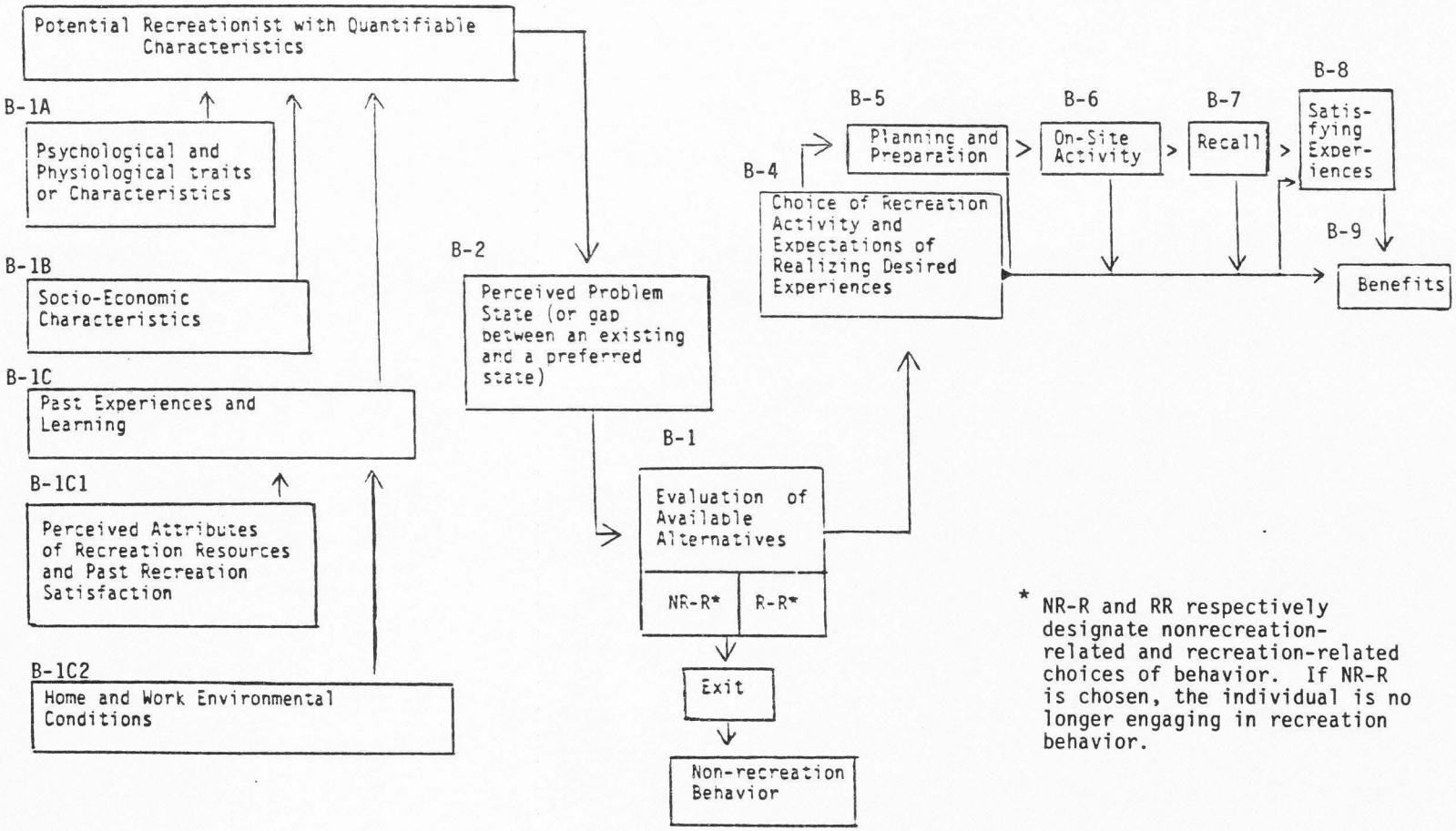


Figure 3. Driver's model of recreational behavior (Driver 1976, p. 173)

expectation that desired experiences will follow. These desired or expected outcomes eventually become the criteria by which the recreation experience will be evaluated. After choosing a particular recreation activity and opportunity setting, further behaviors are invested in preparation, on-site engagement and recall after the experience. Once this process is completed, the recreationist compares the actual experience with the desired, or expected experience. If this evaluation is favorable, then satisfaction and recreational benefits are said to have occurred (Driver 1976).

While Driver's model may be overly complex for day-to-day management decisions, it does provide a useful framework for conceptualizing recreation behavior. The model accounts for the numerous internal and external characteristics that affect the decision to recreate, as well as the environmental influences that impact the recreation experience. Additionally, the reasons for recreation directed behavior are explained in terms of desired experiences. As previously mentioned, these experiences can be divided into separate types of experiences, each associated with a particular psychological outcome. These specific desired psychological states (i.e., outcomes) are the part of Driver's model which will be utilized in the study.

Psychological Outcomes. Research into the psychological motives or outcomes associated with outdoor recreation participation is based upon need theory (Crandall, 1980). The recreationist is portrayed as having a problem in that he/she has a need that is not being met, such as a need for recognition or a need for social interaction. Recreation is then viewed as problem solving behavior designed to

attain the desired state where the associated needs will be fulfilled. The human condition is such that once one set of needs are met, a new set manifests itself in a cyclical fashion. Driver maintains that these motives or desired states determined by the recreationist's needs and other influences, can be measured reasonably accurately. To the degree that the recreationist stays in the "market," Driver argues that a major portion of the user's expectations have been met during previous similar experiences. In order to identify and measure these desired states, he has utilized the term "psychological outcomes," need-related reasons for participating in a chosen recreation activity.

Nineteen categories for psychological outcomes have been identified by Driver. These categories, termed domains, include: achievement, risk-taking, socializing, learning-discovery, relationships with nature, escape personal-social pressures, and exercise-physical fitness. For empirical measurement, each domain is constructed from one to several Likert responses that range from extremely important to not at all important (Driver 1977). For example, for the exercise-physical fitness domain, three separate statements are presented to the respondent, who indicates their relative importance to his/her particular recreation experience. In order for the items to be used in a domain scale, Driver suggests each item should exhibit at least a correlation of .4 with the other items within the scale. Secondly, the intra-scale reliability should exhibit a Cronbach's Alpha of at least .6.

Related Research

Driver's psychological outcome scales have been utilized in numerous studies. Several of these studies that address the linkage between these scales and preferences for specific environments or specialized type behavior will be briefly discussed.

Bowley studied overnight backpackers in the Allegheny National Forest and utilized seven different motive scales in conjunction with other selected and measured variables using a mailed questionnaire (Bowley 1979). The hikers were categorized into five distinct outcome related groups that were created through cluster analysis. Bowley reported that these groups were found to be significantly related to: age, experience level, perceptions of crowding satisfaction, preferences toward different management, approaches for controlling use levels, perceived impact of hiking and camping practices.

The highest rated motives among the 406 backpackers included in the study were experiencing nature and stress/release solitude. The group with the strongest social motives tended to be the least experienced of all the clustered groups of hikers. Additionally, this group was more opposed to management regulation.

Knopf, Peterson and Leatherberry (1983) investigated the linkage between recreationists attracted to river recreation settings and their associated motives. Investigation rendered psychological motive and environmental preference data on over 1800 canoeists, kayakers, rafters and tubers on 11 diverse rivers nationwide. Additionally, the authors collected similar data on seventeen other recreation activities for comparison purposes. The results indicated a great degree of agreement among river recreationists from different rivers

with respect to their motive profiles. The "average river profile" accounted for 88 percent of the variation among mean motive scores reflecting the consistency across river settings on motives for river users. The three strongest motives of the sample were respectively, friendship, escape and exercise. When the motives of river recreationists were factor-analyzed along with the motives of other activity-style recreationists, three component factors emerged to account for 88.7 percent of the total variance. The recreationists from the eleven rivers were in the first factor along with sailing motorboating and fishing recreationists. The other two factors contained non-water based activities. The results of this study give credence to the hypothesis that a recreationist's motives are related to the type of environmental setting preferred.

Brown and Haas studied the psychological outcomes sought by the users of Rawah Wilderness in Colorado (Brown and Haas 1980). Five types of recreationists were identified reflective of groups created by cluster-analyzing the psychological outcomes of the sample. The first group was labeled "positivists" based upon their strong scores on a majority of the scales. The second group, labeled "traditionalists," tended to score low on the meeting/observing other people scale and high on escape. Group three was characterized by highly valuing social interaction and rejecting risk-taking. Groups four and five were distinguished by their overall low ratings for all the scales. The emphasis of the study was to identify psychological outcome types and to explore how socioeconomic variables varied with these outcome types so that more insight could be obtained for developing management strategies sensitive to each type. Age,

education, income, and past experience were found to vary significantly between groups (Brown and Haas 1980). The extreme high and low outcome scale scores within groups of clustered hikers raises the question of response bias. Since these scales are operationalized with a Likert type format, each respondent is forced to establish a norm on the scale by which the varying motive statements are compared. To the extent that one respondent's norm is different from the next respondent represents a response bias. Relatedly, to the extent that these biases are systematic (e.g., hikers with greater experience generally rate the scales higher), the resulting pattern of response could be a function of the respondent's method of evaluation as much as actual motive differences.

Manfredo, Driver and Brown (1983) investigated the effect of outcome profiles on management preferences in their study of wilderness users in the Wind River Range. Two hundred seventy-six persons responded to a mailed questionnaire that measured the desirability of 46 psychological outcomes and 72 resource, social, and managerial attributes (Manfredo, Driver and Brown 1983). By means of cluster analysis, three outcome based groups were identified: enthusiast-risk takers, low risk-isolation seekers and socially oriented users. The results indicated the enthusiast-risk taker group had higher means on restricting large groups and outfitter and commercial groups than did the socially-oriented group (Manfredo, Driver and Brown 1983). Additionally, the socially-oriented group showed greater acceptance of development related actions. Differences were also found in the types of activities (e.g., photography, rock-climbing and fishing) each group engaged in while visiting the

area. The authors concluded that the results offered enough information to implement experience-based outcome dependent management actions. The enthusiast-risk takers and low risk-isolation seekers tended to be dependent upon specific physical and social environments while the socially oriented group appeared to be unconcerned with setting changes.

McLaughlin and Paradice investigated the value of psychological outcome types to better understand dispersed winter recreation behavior. Two hundred winter snowmobilers and cross-country skiers were surveyed by mail questionnaire. The users were classified by activity type, either snowmobiles or cross-country skiers, and each activity described by demographic and psychological outcome information (McLaughlin and Paradice 1980). Activity type and experience type (groupings of psychological outcomes) were used as dependent variables. Measures of preference toward the physical, social and managerial settings were used as the independent variables. Only four psychological outcome domains were employed in the study: relationships with nature, exercise-physical fitness, social contact and escaping physical pressures (McLaughlin and Paradice 1980). Four significantly distinct groups of users were identified by means of clustering the outcome responses. Discriminant analysis was used to predict the activity and experience categories of the recreationists from their stated preferences. The results indicated that this technique was more reliable in predicting the psychological outcome categories when physical and social attributes were used than when managerial attributes were employed.

Schreyer (1982) investigated how the importance of psychological outcomes differed between experienced and inexperienced users. This study utilized a sample of river recreationists from the Green and Colorado Rivers in Utah. The type of desired psychological outcomes sought by the recreationists were obtained from open-ended on-site interviews. Additionally, the degree of specificity, judged high if specific outcome details were expressed, was determined for each desired outcome. Ten different groups of outcomes were identified along with four levels of specificity. Additionally, the respondents were divided into three experience levels, including first-time floaters, moderate experience and high experience. The results indicated that no significant differences could be discerned from outcome types across experience levels. That is, the types of desired outcomes did not vary significantly between experience categories. However, differences were found in specificity of outcomes across experience levels. While 29 percent of the high experience group was highly specific in regards to stated outcomes, only 3 percent of the moderately experienced group and none of the first-timers were highly specific. It was concluded that while "persons with differing levels of experience do not differ significantly in the types of outcomes they desire, experienced users tend to be more specific in the way they describe the outcomes" (Schreyer 1982, p. 156).

Recreation Specialization

Introduction

Specialization has long been used as a biological and technological concept. Recently, it has also been applied to human

behavior. Little has investigated the phenomenon of psycho-specialization. He describes the process of specialization as, "the selective channeling of dispositions and abilities...involving the organism in its environment" (Little 1976, p. 84). Little presents specialization as a developmental process where the individual learns to focus his/her cognitive, affective and behavioral responses to a particular environment. For example, a neurosurgeon is specialized toward a specific type of surgery. The surgeon's thinking, emotions and surgical actions are all focused on a particular level when operating. According to Little, the behavioral aspects of specialization are tied to the cognitive and affective systems. They cannot be separated.

Bryan (1977, 1979) has been instrumental in defining the concept of recreation specialization. According to Bryan, recreation specialization refers to a continuum of behavior from the general to the specific as reflected by experience, skill, equipment utilization and value orientation. As one moves through learning, across this continuum from the general recreationist to the more specialized, over time, there is a predictable change in terms of an activity's meaning to the individual and his/her resulting behavior.

Bryan's Specialization Principle

One motivation for Bryan's development of the specialization principle was his dissatisfaction with traditional recreation motivation studies (i.e., outcome profiles) and their emphasis on predicting behavior from a single classification dimension (Bryan 1979). As an avid fisherman, Bryan was aware of subgroups of

sportspersons within an activity, a premise overlooked in recreation research that often treated users within an activity as a homogeneous group. He contends the recreationist goes through a process of "leisure socialization," where people approach their sports or hobbies differently, depending on their state of development in the activity (Bryan 1979).

In his research on fishermen, Bryan supplemented 263 on-site interviews with participant observation techniques. In order to gain insight about the values and behavior of fishermen, Bryan posed questions concerning: (1) fishing preference; (2) orientation toward the water resource; (3) history of interest and participation in the sport; and (4) relationship of the leisure activity to other life areas such as family, career or other leisure activities. The contention guiding Bryan's research was that "flyfishing" for trout represented "the end product" of a progression of angling experiences leading to a more "mature or specialized state" (Bryan 1979). Ultimately, he developed a fishermen typology consisting of four different categories. These categories, occasional fishermen, generalists, technique specialists, and technique-setting specialists were placed on a continuum reflecting each category's degree of specialization, based upon the information gathered from interviews and observation. A summary of the typology is presented in Table 2. Bryan maintains that specialized fishermen share similar beliefs, attitudes and values about their sport. Additionally, he suggests that as specialization increases, resource dependency also increases. If true, the degree of specialization would in part explain the types

Table 2. Degree of angling specialization and fisherman characteristics

Degree of Specialization	Fishing Orientation Equipment	Resource Orientation, Management Philosophy	Social Setting Leisure Orientation
Occasional fishermen	Catching a fish, any fish on any tackle available.	Any water containing fish. Ease of access to water.	Fishing with family. Seldom take vacations.
Generalists	Catching a limit of trout on spinning or spincasting tackle.	Lakes, larger free-stone streams. Stocking to supplement fish reproduced in streams.	Fishing with peers. Take short vacations within region.
Technique specialists	Catching large fish on specialized equipment (fly-tackle).	Prefer stream fishing to lake. Harvesting policy to enhance fish size.	Fishing with peers. Take extended fishing vacations.
Technique-setting specialists	Catching fish under exacting conditions--on spring streams with specialized equipment (fly-tackle).	Limestone spring streams. Habitat management, preservation of natural setting.	Fishing with fellow specialists (a reference group). May center lives around sport.

Source. Bryan 1979, p. 66.

of recreation opportunity setting preferred by a given group of recreationists.

Bryan has grounded his concept of specialization in a behavioralist or reinforcement theory framework. The recreationist learns to become specialized over time because of the extrinsic and intrinsic rewards derived from participating in a particular activity. From this perspective, experience becomes the series of rewarding stimulus/response functions learned by the recreationist and revealed through specialized behaviors. In short, the more experience an individual has accumulated, the more likely he/she is to have developed a specific orientation to a particular activity. While behavior is emphasized as the most obvious indicator of recreation specialization, Bryan suggests that specialists share other important characteristics. Skill level, psychic commitment, activity time investment, economic investment in equipment and travel, equipment utilization, knowledge, experience, anticipated rewards, management preferences, resource setting preferences, social setting preferences, and vacation patterns are other identified indicators of specialization. These characteristics raise the issue of what indicators define specialization and what these indicators predict. Conceptually, Bryan does not clearly establish the cause and effect relationships between these characteristics. For example, does skill level actually define specialization or does it result from commitment or a specific motivational orientation? Perhaps specialization is a cognitive orientation and valuing process which results in many of the above characteristics.

While the empirical evidence in support of the specialization concept is limited and inconclusive, Bryan suggests a number of areas for additional research in his book, Conflict in the Great Outdoors (1979). He also offers a variety of preliminary analytical frameworks for investigating the specialization principle in a number of activity groups, including hiking and backpacking (Figure 4). Bryan hypothesizes that the specialization dimension underlies any recreation activity, and differs only in range. For example, the range of specialized behavior in rock climbing, which utilizes extensive equipment and skill, is expected to be larger than the range anticipated for automobile touring (Bryan 1979). From a theoretical perspective, specialization accounts for variations within a recreation activity. By identifying recreational subtypes within an activity it may be possible to explain user differences in preference toward the physical, social and managerial settings. Finally, Bryan's framework can be utilized to trace the developmental stages (i.e., life cycle) of outdoor recreation activity. Understanding the evolution of the recreationist in terms of his/her activity career would provide an additional understanding of the dynamics of outdoor recreation behavior, as well as making projections of future use trends (Bryan 1979).

Theoretical Perspectives on Specialized Behavior and Developmental Theory

The theoretical basis for Bryan's principle of specialization appears to be based to a large degree on social learning theory. It is the belief of most learning theorists that human behavior and

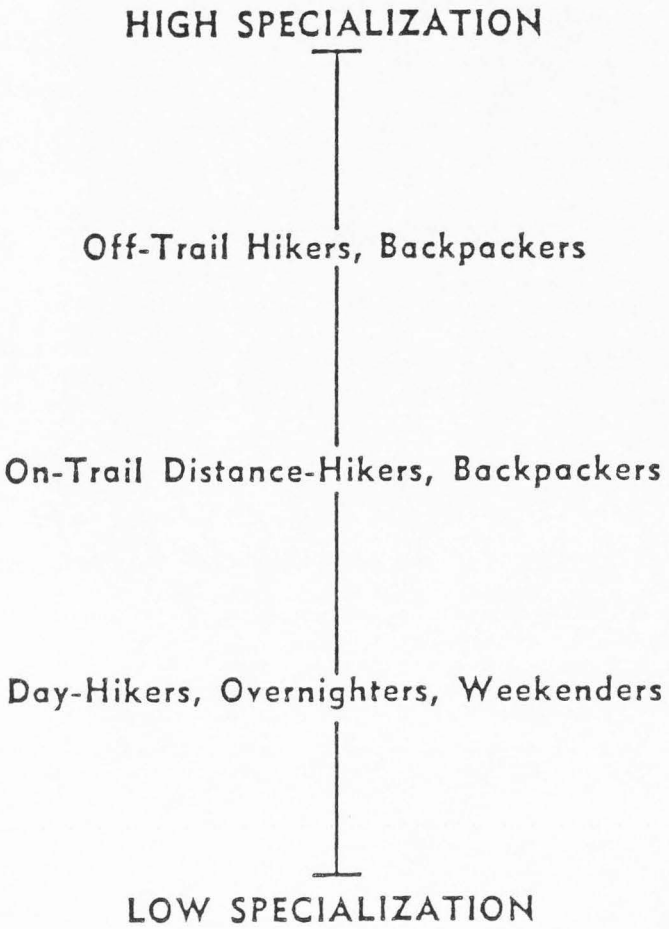


Figure 4. Hiking specialization (Bryan 1979, p. 66)

development occurs because of experience or the accumulation of experiences (Miller 1983). The tenets of modern social learning theory can be found within traditional behavioralism in the work of Watson and Skinner, among others.

Behavioralism at its simplest level states that an organism responds to stimuli in a way that maximizes pleasure and minimizes pain. When an individual repeats these stimulus/response interactions over time, they become ingrained (i.e., learned). The stimuli refer to cues from the environment such as another person or a falling tree, while responses refer to behaviors exhibited by the individual such as waving hello or dodging the tree. Carrying the argument further, when a response is reinforced (e.g., the wave is returned), the original response is strengthened, and when repeated enough times, with continual reinforcement, it will be learned (Gewirtz 1967). Traditional behavioralists like Watson and Skinner ignore internal processes like perception, mental images, and consciousness (Van der Zanden 1981). The rationale here is that these processes are not observable phenomena, but only subjective states of the individual. Other non-traditional behavioralists have incorporated perception and other cognitive concepts in more liberal interpretations of human nature (Mead 1965; Gewirtz 1967; Bandura 1977).

Bryan, in discussing recreation specialization, has utilized reinforcement to explain why recreationists continue to pursue a particular activity over time. The extrinsic and intrinsic rewards derived from a particular experience strengthen the S-R bond. Bryan suggests that the shorter the time interval between one encounter and

the next, the more likely the individual is to repeat his/her action. While Bryan draws heavily on behavioralism, he fails to expand on the cognitive notions of motives, intrinsic rewards and attitudes that he claims high specialists share (Bryan 1977). Bryan's argument is that increased specialization and the shared values of specialized trout fishermen are learned.

In recent years, social learning theory has evolved to include cognitive processes (Miller 1983). The work of Bandura (1977) in particular, has integrated cognition and information processing with the more traditional reinforcement concept, to explain learning. Bandura suggests that reinforcement is adequate for explaining relatively simple behaviors, but more sophisticated learning requires the individual to synthesize information and manipulate symbols. He proposes that learning is not only dependent on direct experience, but also instruction from others and by observing the environment (Bandura 1977). Additionally, Bandura expands the traditional behavioralism tenet of the environment being the stimulus for behavior with his concept of "reciprocal determinism." This concept suggests that the individual/environment link is reciprocal and that the individual can actually create "environments" which in turn have rewarding behavioral consequences. Reciprocal determinism could be utilized to explain why Bryan's specialized trout fishermen seek different social and physical environments from novice fishermen.

A cognitive psychologist, Neisser, in his book Cognition and Reality (1976), offers some insight into the process of cognitive development. Neisser maintains that cognitive or perceptual development is not a uniquely internal process, but occurs in concert

with one's environment. The environment continually provides sensory information which the individual picks up and organizes in his/her own unique way. Neisser refers to the individual cognitive structures used to organize perception as schema. These schemata comprise the portion of the perceptual cycle that is internalized. They are continually evolving through experience and rendering meaning and order to the world as a cognitive plan or map.

According to Neisser, the link between the perceiver and the environment is the process of perceptual exploration, when locomotion and action allow an individual to focus on certain types of external information. This exploration is directed by already existing schemata, while new information acts to modify those schemata. Neisser states that "perception, like evolution, is surely a matter of discovering what the environment is really like and adapting to it" (Neisser 1976, p. 9). Through one's schemata, meaning can be attached to perceptual objects and events and attention can be selectively focused. Neisser also includes motives as part of schemata organization.

An important issue which is not addressed by Bryan, is how specialized recreationists perceive and give meaning to their recreational environment. Neisser sheds some light on the subject when he discusses highly-skilled performances. The performer begins with a referent of the desired level of performance. He/she acts, perceives the consequences of those actions and evaluates. This process continues until the final product is achieved. He characterizes the unexperienced actor as facing many "ambiguous" choices in terms of perception. The experienced actor has learned,

however, to channel his/her perception in the direction of "rich" environments, with less room for misconceptions and wasted choices. Specialized hikers or fishermen may well have gone through a similar perceptual learning process when they found that certain environmental settings provide meaningful and satisfying recreation experiences. As the recreationist develops within his/her activity it could be that the preferences for specific environmental settings evolve the schema in ways that are common across other specialized recreationists in that activity.

A final theoretical perspective comes from a paper written by Schreyer, Knopf and Williams (1985) that challenges traditional motive research studies as being the most effective indicators of why recreationists choose certain environments. In the words of the authors, "after more than a decade of intensive research on the dynamics of recreation choice, the capacity to predict either behavioral or environmental choice through knowledge of motive scores has yet to be demonstrated" (Schreyer, Knopf and Williams 1985, p. 9).

While the authors suggest some alternative avenues for restructuring motive research, their major message is that additional types of information are needed to understand why certain behavioral and environmental settings will be sought. These additional types of information can better be understood if recreation behavior is reconceptualized in terms of both content and process components. The "content" of recreation behavior is described as the psychological motives of the recreationist which are reflected by the traditional motive studies. However, the authors offer an expanded model of recreation behavior which does not focus on the "products," but rather

the "process" which refers to the subjective states which occur during the recreation experience. These states are characterized as subjective feelings of fun or satisfaction which operate on a perceptual attention continuum. At the basic level this continuum involves states described as "involuntary attention" where the mood is free to follow its will without outside distractions (Schreyer, Knopf and Williams 1985). As one moves up, the continuum becomes more directed toward "sensory arousal" and finally evolving into "flow experiences" (Csikszentmihalyi 1975) which are characterized as the ultimate display of human cognitive capacity (Schreyer, Knopf and Williams 1985). In terms of the behavioral/environmental link these states are created by the recreationist by focusing attention upon certain environmental stimuli. Additionally, when constraints offered by the environment are not sufficiently critical to cause the person's attention to deviate from the tasks at hand, that person can be described as satisfied.

The authors suggest that the "process of the state" is an important attraction for recreationists, as well as the outcomes or psychological rewards they derive from a given experience. For example, the motive to "experience nature" could be a means by which people engage in behaviors designed to attain cognitive states at any point along the continuum (Schreyer, Knopf and Williams 1985). From this perspective, motive or outcomes scales can be conceptualized as measuring learned modes of expression which allow one to attain desirable cognitive states. If the authors reconceptualization of the motive environmental link has merit for future research, the problem that needs to be addressed is what are the best indicators of those

cognitive states and how can they be measured. Two suggestions are taken from their paper. In addition to the learned pattern of behavior, some information must be considered from the recreationist's antecedent conditions. The authors feel that two of these conditions are of major importance; experience use history and life-style. Experience use history is important because it relates to the nature and extent of information needed by the individual in order to make recreation choices. As argued by Bryan, the authors suggest that while motives exist in recreationists, other influences and processes exist which are of equal importance in determining why recreationists choose certain environments. From Bryan's perspective these influences are perhaps best explained from an understanding of how the recreationist has been conditioned or socialized through time.

Related Research

Wellman, Roggenbuck, and Smith (1982) employed Bryan's specialization framework in their study of canoeists in Virginia. The purpose of the investigation was to determine how attitudes toward depreciative behavior varied with specialization. Initial contact with canoeists was made on-site to obtain names and addresses of canoeists. Subsequently, a ten-page questionnaire was mailed to the sample of 624 river users. Ten questions measuring canoeing investment, past experience and centrality to lifestyles were used to create a cumulative index of specialization. The index ranged from 1.94 to 8.31, reflecting a high degree of variation among the canoeists. It should be noted that the assumption was made that the index was a valid representation of specialization. The means of the

highest quartile of respondents, based on their specialization score, were compared with the means of the lowest quartile on their responses to 68 depreciative behaviors. Within the 68 dependent variables, 11 differences were significant between the two groups, nine of these were in the hypothesized direction (Wellman, Roggenbuck and Smith 1982). They concluded, "overall, there was an absence of consensus among both low and high specialists as to the seriousness of the behaviors as problems, as indicated by the large number of standard deviations" (Wellman, Roggenbuck and Smith 1982, p. 336).

Devall and Harry (1981) investigated the role of recreation specialization as a means of explaining conflict between different recreation user groups. They hypothesized that an individual's recreation participation occurs within technology-related activities. By asking which activities a recreationist engaged in, and which activities might interfere with recreational enjoyment, different activities were cluster analyzed across participants. People who engaged in motorboating, also tended to participate in waterskiing, boat fishing and hunting. Nature study and sailing formed independent clusters. The investigators concluded that recreationists tend to participate in activities that use similar technologies. Additionally, they found evidence to support the conflict hypothesis, that resenting relationships between activity users are most often found between clusters, rather than within. While Bryan identified a series of specialization indicators, Devall and Harry relied upon technology utilization during recreation as the major indicator of specialization.

A study investigating the perception of perceived crowding among non-specialized innertube floaters on the Hiwassee River in east Tennessee was conducted by Hammitt, McDonald and Noe (1984). While their article does not explicitly state how non-specialized floaters were defined, it appears that the authors assumed all inner-tube floaters were non-specialized recreationists. Data were collected on the use level, perception of crowding, number of visual encounters, expectations toward the number of users and feelings toward the number of users encountered. Their results indicated that actual use levels and number of visual encounters were the most significant predictors of perceived crowding. Since these findings challenge the results of other crowding studies (Shelby 1980) which often attribute perceived crowding to expectations and antecedent variables, the authors cited the low degree of specialization as a possible explanation. The authors suggest, "if an activity and the place where it is conducted are not very specialized, few norms and expectations may have developed concerning appropriateness" (Hammitt, McDonald and Noe 1984, p. 7).

A study on the degree of specialization among canoeists was also made by Kauffman and Graefe (1984). The primary focus of this study was to test two propositions suggested by Bryan (1977); that attitudes and values toward desired rewards shift as specialization changes, and that the importance of the resource setting is directly tied to the level of specialization. Kauffman and Graefe operationalized specialization by creating a specialization index derived from years of canoeing experience, the type of canoeing equipment owned and made, perceived skill level and the importance of canoeing to the overall

lifestyle of the canoeists. The final index ranged from 4 to 12 and the canoeists were divided into categories of low, medium and high specialization based upon their overall score.

Kauffman and Graefe's first set of dependent variables were an adaptation of eleven of Driver's expected outcome scales. The results indicated that seven of the eleven scales varied significantly with the level of specialization among the canoeists. The most significant ($p < .001$) were exploration, achievement, exercise and equipment testing. The tension release, dominance, family togetherness and regulation scales showed no significant systematic variations with specialization. The second set of dependent variables measured the type of water resources canoeists preferred to canoe on, and the type most often canoed on. As the level of specialization increased among the canoeist their preferences and actual canoeing setting changed from rivers and streams to whitewater. The authors concluded that their findings were "consistent" with Bryan's contention that expected rewards and resource-related attitudes change as one becomes more specialized, at least in canoeing.

A second study by Graefe re-examined the relationship between specialization and crowding (Graefe, Donnelly and Vaske 1985). In this study, a similar specialization index was constructed from three variables; perceived hiking skill, years of prior hiking experience and number of hiking trips per year. Where Hammitt et al. (1984) examined the perception of crowding among only low specialists, this study examined the same perceptions across hikers of diverse specializations in the White Mountain National Forest in New Hampshire. The dependent variables included perception of crowding,

number of actual contacts, preference of number of contacts and expectations of anticipated contacts. The results indicated that high specialists perceived significantly more crowding than low specialists and that low specialists preferred 8.2 contacts, significantly more contacts than high specialists (6.2). Neither the number of contacts nor expected contacts were found to significantly vary with the level of specialization. However, when contacts, preferences and expectations were regressed upon perceived crowding for each level of specialization, the results suggested that low specialists are more dependent on actual contacts than high specialists for determining crowding perception. Additionally, the high specialists indicated a stronger relationship with their preferences than low specialists. The authors cite the findings as support to differentiate activity users into more homogeneous groups in order to better understand crowding.

While not specifically investigating specialization, Schreyer and Lime (1984) utilized past experience as a means of exploring the relationships between internal states (i.e., attitudes, motives, etc.) and recreation behavior. They utilized three quantitative variables (e.g., number of times respondent floated the study river, etc.) to create six qualitative categories. These categories were then explored for relationships with respondent's motives, perceptions of conflict and attitudes toward management. The researcher's underlying hypothesis was that different amounts and types of past experience (i.e., EUH categories) serve as indicators of how individuals cognitively structure information. By measuring past experience, the investigators were able to find support for their hypothesis.

Recreation Opportunity Setting

Recreation Settings and Behavior

What types of recreation environments are being demanded by the public? What kind of environmental setting is considered aesthetic? Does crowding affect the recreation experience? The setting or environment in which recreation occurs has long been of interest to recreation managers and researchers. Many of the characteristics that influence the desire to recreate such as needs, work environment and income are not easily influenced by recreation management. However, once an individual arrives at a site to recreate, the attributes of the recreational setting play a key role in shaping the recreation experience. For example. resource managers can stock a fishing lake or maintain a campground. The amount of use on a small lake beach may influence whether an afternoon picnic is a success or failure. Naturally occurring physical features, management actions, and the social atmosphere are all aspects that can influence the recreation experience.

Driver and Brown (1978) discuss recreation demand in terms of a four level hierarchy of publicly needed recreation products. As we move from level one demand to level four demand, the conceptual focus of demand changes. According to Driver and Brown, individual recreationists are more consciously aware of their demand for level one products (activities), than they are at level four (psychological benefits). Consequently, demand is easier for economists and researchers to quantify at the lower levels of the hierarchy.

Level one demand is for recreation activity opportunities. The public demands and participates in a variety of recreational activities each year. Traditionally, the Forest Service has quantified these activities into "visitor use days." The associated visitor use days are categorized according to individual activities (e.g., swimming, camping, hiking, etc.). The Outdoor Recreation Resources Review Commission, which studied future recreation demand, utilized this approach in their report on Outdoor Recreation For America (1962).

Level two demand focuses upon the environmental settings that are demanded by the public for their recreational pursuits. It is a demand for particular physical, social and managerial settings. This demand can be conceptualized as a between activity or within activity phenomenon. For example, a rock climber would demand a very different setting from that of a water skier. However, even within a particular activity like hiking, some people prefer a rugged, mountainous experience, while others prefer the relatively flat and well-used trails at the nearby city park. Recreationists may not always think about the specific setting attributes that attract them to a recreation site. Researchers have identified demanded setting attributes most often by asking recreationists their setting preferences.

The third demand level in Driver and Brown's hierarchy concerns specific psychological outcomes. People are looking for more specific payoffs from their recreation behavior than camping. They desire specific psychological outcomes that are intertwined with their expectations and needs. Again, the average recreationist may not

consciously consider each psychological payoff he/she expects. Nevertheless, certain psychological goals are sought by recreationists. A variety of these goals or psychological outcomes have been identified and classified into a series of independent psychological domains (Driver 1977). Again, measurement is not direct and must be approached through the perceptual senses of the recreationist.

The fourth and final level of demand is for actual benefits. These benefits can be realized by the individual or by society. For example, family camping or hiking may strengthen the family unit, teach self-reliance and increase social stability in the community. Scant research has been effected on the actual benefits derived from recreation participation. Measurement, or even the identification of these benefits, is most often a subjective evaluation by the recreationist or researcher.

These four levels of recreation demand are not mutually independent. When a person demands and participates in a particular activity, he/she also seeks a specific setting, and certain psychological outcomes and benefits. The four levels are merely different ways of conceptualizing recreation demand. Each emphasizes a different aspect of the recreation experience. Haas (1979) has constructed a table to portray an example of how two individuals differ in their demands across two activities (Table 3). Notice how the demand for one example cuts across all four levels, yet can be applied to one person or group of persons. According to Driver and Brown, level one demands have been the focus of most outdoor recreation resource planning and management decisions (Driver and

Table 3. Examples of different levels of recreation demand

Level of opportunity demand	Example 1	Example 2
Activity opportunity	Wilderness hiking	Family picnicking
Desired attributes of:		
A. Physical setting	Rugged terrain	Grass fields
B. Social setting	Few people	No boisterous teenagers
C. Managerial setting	No restrictions	Picnic tables
Outcomes	Risk-taking Challenge Physical exercise	In-group affiliation Change of pace
Benefits (personal, social)	Enhanced self-esteem Physical health Increased commitment to conservation	Better mental health Family solidarity Increased work production

Source: Haas 1979, p. 11.

Brown 1978) The recreation planning framework being employed by the Forest Service, the Recreation Opportunity Spectrum (ROS), is directed toward level two demands. By providing a variety of recreational settings and accommodating different types and styles of recreational use, it is believed that the broadest segment of public demand will be met (Clark and Stankey 1979).

As mentioned previously, the Forest Service and Bureau of Land Management are interested in the ROS planning framework, and both agencies have assigned task forces with the responsibility of applying it on the ground (Buist and Hoots 1982). The spectrum refers to the variety of opportunities that are offered to recreationists through varied recreational settings. A recreation opportunity setting is the combination of physical, biological, social, and managerial conditions that give value to a place (Clark and Stankey 1979). Of course, the value of any one place can vary depending on who is perceiving it and individual differences in their preferences and values. Additionally, nature has to a large degree dealt out a natural card hand to different geographical areas. Some have a great deal of variety with regards to physical and biological settings, while others are monotonously similar. Relatedly, managers can directly influence the social and physical managerial setting. For example, they limit the size of backcountry groups and/or require permits at many of the more popular recreation resources.

Rather than viewing the settings on a particular recreation resource as fixed, the ROS framework recognizes that managers can influence individual settings through six means: access, the other nonrecreational resource uses allowed, on-site management, social

interaction allowed, acceptability of visitor impacts, and the degree of regimentation imposed. These six means can be manipulated by recreation planners and managers to define or change a recreational setting. However, the major ROS efforts of the Forest Service have gone into inventorying existing recreational resources. Each area is evaluated along a continuum that ranges from a primitive to an urban classification. Remoteness, the size of an area, evidence of humans, user density and amount and noticeability of managerial control are used as criteria for assigning a particular geographical area to one of the six classes in the primitive-urban spectrum. At the conclusion of the inventorying process, each forest or district is mapped, each map indicating the general types of settings and activities available.

The ROS planning framework does not account for how recreationists relate to different physical, social, and managerial environments. It assumes that if a diverse array of settings are offered, quality recreation experiences will result. However, little is known about which type of settings different users or activity styles prefer. More research is needed to better link specific recreation opportunity settings with different types of recreation experiences and activities (Clark and Stankey 1979). Until the ROS framework is expanded to account for the meaning of different recreation opportunity settings to the recreationist, managers are only hoping that quality recreation opportunities are being provided. Some of the psychological outcome studies previously mentioned attempted to predict setting preferences by utilizing Driver's outcome scales. Other studies that have investigated the role of specific recreation settings are described in the following section.

Related Research

Several of the related research studies discussed in the previous two sections investigated the relationship between recreation behavior and recreation setting. Bowley (1979), Brown and Haas (1980), and Manfredo, Driver and Brown (1983) all examined and found relationships between the psychological motives of recreationists and their preferences for specific managerial settings or strategies. McLaughlin and Paradice (1980) found significant psychological motive differences and significant differences in the preferences for specific managerial, social and physical setting attributes between cross-country skiers and snowmobilers. In the specialization study by Kaufman and Graefe (1984), the authors were able to find a relationship between the level of specialization of canoeists and the type of physical environment preferred. Finally, Graefe et al. (1985) found evidence that the level of specialization was linked to the preferred social setting preferences of backcountry hikers.

Lucas studied the wilderness perceptions of canoeists and motorboaters in the Quetico-Superior area of northern Minnesota (Lucas 1964). As part of a carrying capacity investigation, three aspects of wilderness perception were studied: the importance of wilderness qualities, the area perceived as wilderness, and amounts and type of use considered to be important to the respondents. Canoeists were more sensitive to wilderness characteristics (e.g., primitive, uncivilized, rugged, wild, etc.) than motorboaters. While the motorboaters perceived a large wilderness, the canoeists defined the existing wilderness as only 10 percent of the study area, excluding development and roaded areas. Canoeists were also influenced by

social setting factors, as heavily used areas were less often considered wilderness. While Lucas recognized that different visitors had rather clear wilderness perceptions, he concluded that variation in perception is largely attributed to the type of recreation chosen (Lucas 1964).

Within-activity perceptions were studied by McLaughlin, Krumpe and Paradice on river recreationists in northwestern Montana. The purpose of the study was to evaluate proposed river management actions on the basis of how different types of floaters perceived specified physical and social attributes. Their analysis indicated that floaters on differently designated portions of the Flathead River, including wild, scenic and recreational designations, did not agree with legally designated classifications. When floaters were divided into outfitted (commercial) and non-outfitted users, the non-outfitted floaters were more liberal in their tolerance of acceptable group size (McLaughlin, Krumpe and Paradice 1982). While this study was designed for a specific management problem, it supports the assumption of within activity variation in regards to preferred environmental settings.

Stankey (1972) investigated the satisfaction and attitudes of wilderness users across four wilderness areas from different states. Wilderness users were ranked along an attitude scale ranging from a strong "purist" concept of wilderness to "non-purist." While those who were identified as purists generally were more intense in their responses, the results mentioned here refer to all wilderness users in the sample. Eighty-two percent of the sample desired solitude--not seeing many other people except those in their party (Stankey 1972).

Low intensity of use was identified as an important social attribute. Party size (traditional small party versus large group) preference for the majority of users was toward the small traditional party. The ability to find an isolated campsite was also important to visitors in all four wilderness areas. Stankey implies that the "purists" responded in a fairly uniform way to questions about what the wilderness should be like (Stankey 1972). While the general direction of the responses of all the users were similar, it could be inferred that "nonpurists" or "neutralists" exhibited less agreement in their responses.

THEORETICAL FRAMEWORK

This chapter presents a theoretical model depicting how psychological motives and recreation specialization are hypothesized to interact with preferred environmental setting attributes. The assumptions and rationale underlying the model will also be discussed. Finally, the specific hypotheses to be tested will be presented. The operationalization of the behavioral framework and procedures used to test the hypotheses will be presented in the next chapter.

The Specialization-Outcome Model

Numerous methodologies have been proposed and employed to explain differences in physical setting, social setting and managerial setting preferences of recreationists. Stankey's concept of a "purist" scale indicated that certain wilderness users were more intense and uniform in their preferences. However, such a scale would appear less useful in more urban-related recreational pursuits. Bryan's specialization principle suggests that environmental preferences can be explained by the recreationist's level of specialization in a particular activity. The concept has the advantage of being applicable to any recreation activity. Outside of Bryan's own research, however, little investigation has been directed toward verifying the specialization concept. Driver and Brown, as well as other researchers, have emphasized the value of psychological outcomes to explain why recreationists prefer certain recreational opportunities. Traditionally, these studies have focused on activity dependent motive

profiles, but recent research indicates that both desired outcomes and preferences vary within activity type.

The model proposed for this study will link Bryan's concept of specialization with the concept of psychological outcomes in an attempt to explain differences in the preference for different environmental settings among backcountry hikers. Both concepts have theoretical frameworks that indicate their relevance in explaining environmental setting preferences. However, specialization is based predominantly on social indicators (i.e., experience, skill, equipment, centrality to lifestyle), while psychological outcomes emphasize the internal motivational states of recreationists. Previously, these two concepts have not been linked together in an empirical investigation to explain the preferred environmental setting attributes of recreationists. Additionally, it is not known what value specialization may have in explaining psychological outcomes nor how psychological outcomes may be associated with specialization. While Bryan hypothesized that specialists share similar objectives and motives, there is little support for this hypothesis in the psychological outcome research, with the exception of Kauffman and Graefe (1984).

If the specialization principle does underlie outdoor recreation behavior, it is assumed that it can be identified in any outdoor recreation activity, including backcountry hiking. However, it is reasonable to assume that certain activities offer a richer capacity to facilitate specialization development than others. For example, rock climbing and downhill skiing offer a wider array of potential skill development, equipment utilization and lifestyle identification

than either picnicking or driving for pleasure. Assuming that the principle of specialization is applicable to backcountry hiking, it would be expected that specialized hikers view their activity differently than low specialists. They therefore value different psychological outcomes as being more important. As a consequence, the specialized hiker will seek different attributes in the environment to attain a satisfying recreation experience than low specialists. Given these assumptions, the objectives of this study were identified. They were: (1) to identify the environmental setting attributes that backcountry hikers perceive as important in defining a satisfying backcountry experience, (2) to explore how psychological outcomes differ within different levels of specialization among backcountry hikers, (3) to investigate how the principle of specialization will function as a predictor of the environmental settings attributes that contribute to a satisfying backcountry experience across different hikers, (4) to determine which psychological outcomes are important to backcountry hikers and how these outcomes relate to environmental setting attributes, and (5) to integrate two theoretical approaches of recreation behavior and to investigate their value in predicting which environmental setting attributes are satisfying to different hikers.

As depicted by the following conceptual model (Figure 5), within the activity of backcountry hiking, hikers can be located along a continuum that reflects their level of hiking specialization. To better demonstrate the dynamics of the model, the group of hikers at the top end of the continuum are categorized as high specialists and the group at the bottom end as low specialists. The criteria for determining the level of specialization are based upon a cumulative

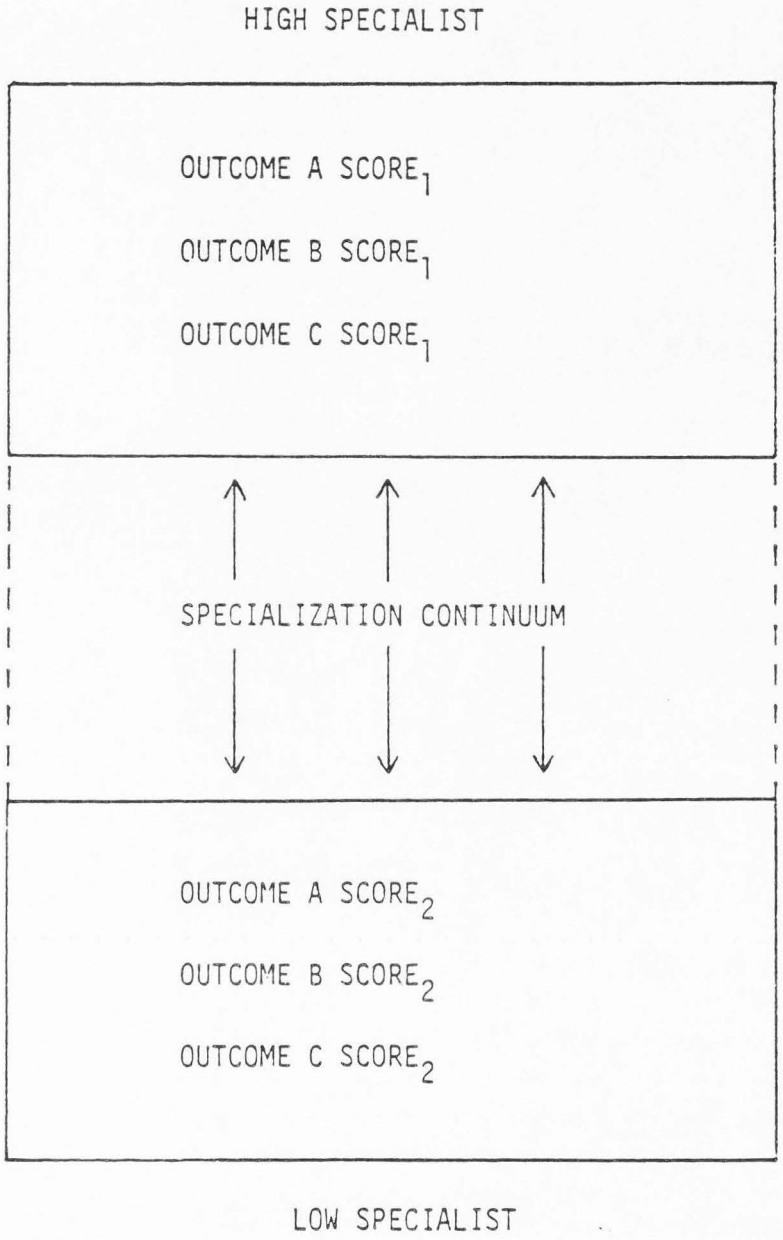


Figure 5. The specialization/psychological outcome model

index score derived from measureable experience, equipment and lifestyle questions. Within the high and low specialist groups are mean scores on each of three psychological outcome scales. It is hypothesized that high specialists will value these outcomes differently than low specialists as reflected by their significantly different scale scores. From this perspective, the hiker's motives are dependent upon the level of hiking specialization. The theoretical assertion of this relationship can be taken directly from Bryan (1979). Therefore, the first study hypothesis was:

H1. High specialists differ significantly in the rated importance of desired outcomes from low specialists.

A second related hypothesis addresses the direction and magnitude of the different evaluations of psychological motives between low and high specialists. In the absence of any major theoretical information, it seemed reasonable that the changes in the importance of psychological outcomes would be bi-directional. As a hiker becomes more specialized certain outcomes will be held in higher esteem. In similar fashion, other outcomes will lose importance to the hiker as he/she develops into the activity, resulting in a different ordering of outcomes. A comparison of the rankings of outcomes between low and high specialized hikers should reveal the nature of those changes. Given this, the related hypothesis was developed:

H1a. High specialists have different rankings of outcomes from low specialists.

Studies by several recreation behavior researchers (Bowley 1979; Haas 1979; Manfredo, Driver and Brown 1983; and McLaughlin and Paradice 1980) have found several distinct outcome based groups within

the same recreation activity. Bowley (1979) found more than one outcome dependent group which displayed a significant amount of hiking experience. While Bryan (1979) suggests that highly specialized recreationists of any activity type are likely to share motives, the formerly mentioned studies indicate that more than one outcome orientation often exists. In order to explore this possibility with respect to specialization, it is necessary to group the hikers according to some outcome based scheme. Since few recreationists can be characterized by only one outcome value, a scheme which incorporates several motives at one time better represents "reality." If high specialized hikers can be found in more than one outcome based group, it would offer support for the argument that multiple outcome based specializations occur within one activity. Secondly, if these motive based groups are related to systematic changes in specialization, it would be expected that the hikers within any group might weigh toward one extreme of the specialization continuum. Based upon these considerations, the following hypotheses were designed:

H2. Different outcome profiles within the same activity have significantly different mean specializations.

H2a. There are different outcome profiles within the same activity that have different distributions of specializations.

The second model (Figure 6) presented in this chapter indicates how the two behavioral frameworks are thought to influence the environmental preferences of hikers. The right half of the model represents the many environmental setting attributes that can be found on a given recreation site. The circle can represent the set of

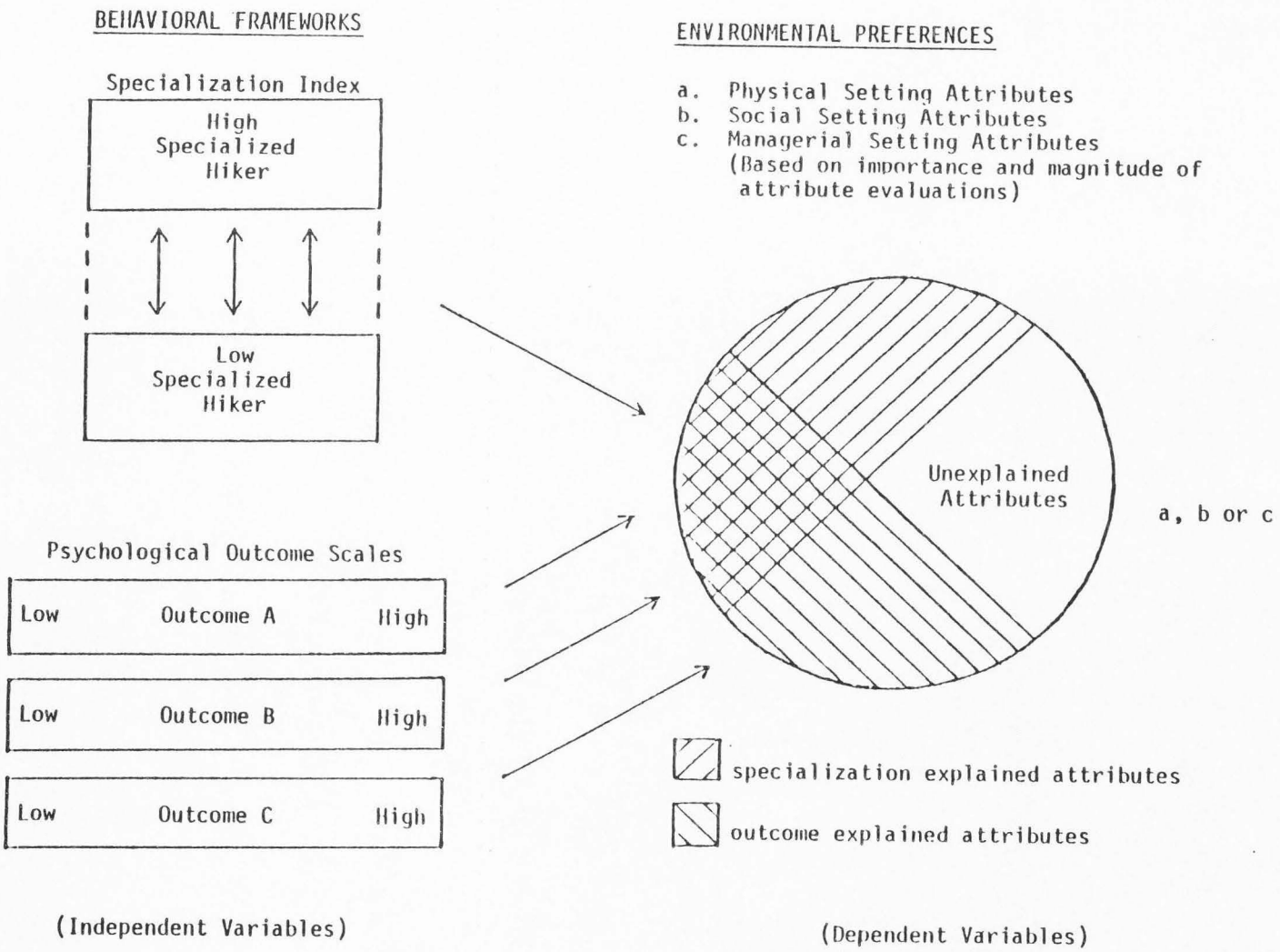


Figure 6. Environmental preference model

physical, social, or managerial setting attributes or all of the environmental setting attributes at once. This model is based on the assumption that the recreationist can rationally isolate and report on the importance of a given attribute to his/her own recreation experience. Consequently, the dependent variables in the model are specific environmental setting attributes (e.g., seeing bears in the backcountry) that are or are not preferred by the hikers.

The left half of the model presents the two behavioral frameworks that have been hypothesized to influence the environmental setting preferences of recreationists. Any type or number of psychological outcome scales could be inserted into the model. Based upon the motive studies discussed in the previous chapter, these scales have been successful in accounting for a subset of the environmental setting preferences of a variety of recreationists. In the case of backcountry hikers, it is assumed that the scales utilized in this study will account for a subset of each of the three setting domains. The degree of specialization of a given hiker is depicted in the upper left. The model assumes that highly specialized hikers will seek different attributes in the environment than low specialized hikers. It is not implied that either behavioral framework can explain all the environmental setting attributes. It is implied however, that each framework will explain some attributes which the other cannot. Finally, and perhaps most importantly, the model will allow for the comparison of these two behavioral frameworks in explaining the preferred setting attributes of hikers.

The following hypotheses focus on how these two behavioral perspectives relate to the setting preferences of backcountry hikers.

The third hypothesis is taken directly from Bryan's work:

H3. Persons varying in level of specialization will differ significantly in preferences for environmental attributes.

A related hypothesis addresses the magnitude to which an attribute is preferred or not preferred. Stankey (1972) found that "purist" wilderness users were more likely to respond extremely toward certain social setting attributes in wilderness areas. Bryan (1979) suggests that specialized recreationists are more dependent upon the physical setting than non-specialists. An obvious question to ask is, "are high specialists generally more apt to respond that an attribute detracts or contributes to a greater degree than low specialists who are drawn toward the neutral position?" This question is addressed in the following hypothesis:

H3a. The environmental setting attributes of high specialists detract from or contribute to satisfaction to a greater degree than the attributes of low specialists.

The second hypothesis assessing the direct relationship between specialization and the preferred environmental setting attributes of hikers focuses on the homogeneity of their responses. Bryan (1977) suggests that specialists share more similar values toward the resource than low specialists. Given this, the following general hypothesis was developed:

H3b. High specialists exhibit less variation in their environmental setting attribute preferences than do low specialists.

In order to directly compare the predictive power of psychological outcomes with that of specialization, it is desirable to

know how each operates independently of the other. The fourth hypothesis explores the ability of each of the psychological outcome scales to explain setting attributes. To explore the direct relationship between motives and environmental attributes, the following hypothesis was designed:

H4. Different outcome motives are associated with different types of environmental setting attributes.

As previously stated, there have been a number of studies which have been able to link environmental setting attributes with groups of recreationists based upon their native or desired outcome scores. The combining of motives to create groups of recreationists is also more reflective of the overall recreation experience. If psychological outcomes are directly linked to environmental setting attributes, it would be expected that hikers with opposite motive scores would value environmental setting attributes differently. Based upon these considerations the following hypothesis was stated:

H4a. Persons with contrasting outcome profiles differ in the importance of their environmental setting attributes.

The final hypothesis was designed to explore how specialization and desired outcome function together to explain the environmental setting attributes of backcountry hikers. If more information than just psychological outcomes is needed to better understand the recreation choice/environment linkage, as suggested by Schreyer, Knopf and Williams (1984), Bryan's specialization framework offers a promising alternative framework. It has been previously hypothesized that motives will systematically vary with the level of specialization. To the extent that this is true, both behavioral

frameworks would predict the same environmental attributes. However, it is hypothesized that each framework will also explain a portion of environmental attributes which are unique to that theoretical perspective (see Figure 6). Since neither of these behavioral perspectives is assumed to portray the whole choice or behavioral process, some portion of the set of environmental setting attributes will be unexplained by either perspective. These theoretical considerations made possible the final hypothesis:

H5. Specialization and desired outcome scales combined as independent variables will significantly explain the preferred environmental attributes of backcountry hikers.

METHODS AND PROCEDURES

The subjects utilized for analysis in this study were backcountry hikers from three primitive roadless areas in the Intermountain West. The primary instrument of data collection was a mailed questionnaire that was administered during the fall and winter of 1982-1983.

This chapter provides an overview of the research design and sampling format employed for data collection. First is a discussion of the overall sampling framework including study areas, study population, and sampling procedure. Next, the survey instruments are described with an explanation of how the research questions were operationalized and measured. The final section presents the procedures employed in the data analysis.

Sampling Framework

This sampling design was targeted to reach a broad range of hikers from low to high specialists, and to include a variety of reasons (desired psychological outcomes) for engaging in hiking experiences with differing degrees of importance. Bryan suggests that specialists are more likely to travel further and to seek a particular type of environment (Bryan 1979). Driver and Brown suggest that desired outcomes are related to the type of setting opportunity a person chooses. To maximize setting diversity, this study surveyed users in three distinct Intermountain areas ranging from high alpine mountains to low Sonoran Desert. One study area was directly adjacent to a major urban area, while another was several hundred miles from

areas of sizable urban population. This strategy was based on the assumption that diversity in urban proximity, and variety in physical settings would allow for a comprehensive examination of the two theoretical frameworks previously described. Thus, the sampling design was constructed to generalize about the nature of specialization and psychological outcomes, rather than to generalize about all backcountry hikers or all users of the chosen study areas.

Study Areas

All three areas used as study sites in this investigation were located in the Intermountain West (Figure 7). The Bridger Wilderness in Wyoming and Superstition Wilderness in Arizona were officially designated as part of the National Wilderness Preservation System at the time of the study. The High Unitas, in Utah, was classified as a U.S. Forest Service primitive area during the time data were collected (in 1984, the High Uintas entered the Wilderness Preservation System).

Bridger Wilderness is located in east-central Wyoming, 70 miles southeast of Grand Teton National Park. The Wilderness lies on the west slope of the Wind River Range and is administered by the Bridger-Teton National Forest. It is approximately 75 miles in length and 15 miles in width, bordered on the east by the continental divide. The Bridger Wilderness contains over 1,300 lakes, many above 10,000 feet, making it a popular trout fishing resource in the Rocky Mountains. Additionally, the area can be characterized by high alpine mountains, rugged terrain, coniferous forests, fast flowing streams and cool summer temperatures. Among the more popular activities are hiking,

Figure 7. Map of study area

fishing, horseback riding, rock and mountain climbing, hunting and photography.

The High Uintas Primitive Area is located in Northeastern Utah, approximately 90 miles east of the greater Salt Lake City metropolitan area. It is one of the earliest designated primitive areas in the United States, established in 1931. The High Uintas Primitive Area is administered by both the Ashley and Wasatch National Forests. Located in the Uinta Mountains, the most prominent east-west range in the U.S., the area is characterized by high mountain peaks (26 over 13,000 feet above sea level), scenic basins, glacial mountains, mountain meadows, coniferous forests, lakes (over 500), streams and abundant wildlife. The western edge of the primitive area is adjacent to a large semi-primitive roaded recreation area in Wasatch National forest, including a high mountain access highway, numerous campgrounds, picnic areas and accessible lakes. Popular activities within the High Uintas Primitive Area include hiking, horseback riding, fishing, hunting, rock and mountain climbing and photography.

The Superstition Wilderness is located in Central Arizona approximately 15 miles east of the Phoenix metropolitan area. In contrast to the other study areas, the Superstitions are located in a southern desert shrub environment. The wilderness is administered by the Tonto National Forest and was first set aside as a primitive area in 1939. The Superstition mountains rise abruptly from the desert floor of the Phoenix Basin and range from 1,800 to 6,266 feet above sea level. These mountains are renowned for the legendary Lost Dutchman Gold Mine which has to some degree been responsible for a significant amount of prospecting in the wilderness area. The

Superstition Wilderness can be characterized by its rugged topography, mesas, sheer-walled canyons, desert vegetation and wildlife, and perennial streams. In addition to prospecting and treasure hunting, popular activities include hiking, horseback riding, nature photography, hunting, target shooting, camping and picnicking. The relative size and use levels for all three of these study areas are provided in Table 4.

Table 4. Acreage and visitor-days of each backcountry study area

Area	State	1982 Use/Total	Size
Bridger Wilderness	Wyoming	224,072*	383,399 acres
High Uintas Primitive Area	Utah	180,200*	236,509 acres**
Superstition Wilderness	Arizona	98,400*	124,140 acres**

*United States Forest Service estimates base on visitor-use days.
**Both of these areas have increased in acreage since 1982-83.

Study Population

The primary sampling task for this study was to identify a set of backcountry hikers whose degree of specialization, desired psychological outcomes and preferred environmental setting attributes could be measured and analyzed. As mentioned in the preceding section, the target population was limited to backcountry hikers in the three study areas with the goal of capturing a range of responses regarding level of specialization and desired psychological outcomes. Thus, the sample was not so much designed to represent the total population of visitors to the study areas as it was a sample of a

range of backpacking experiences. The target population was further limited by an eight week sampling time frame. Backcountry hikers from Bridger Wilderness and the High Uintas Primitive Area were contacted on site from July 25 thru September 18, 1982. Of the eight weeks surveyed, peak use clientele comprised six weeks of the sampling time frame, as peak use in these areas decreases after Labor Day. Peak use was represented to approximately the same degree in the Superstition Wilderness whose backcountry hikers were sampled from November 12, 1982 thru January 6, 1983. The peak use period in the Superstition Wilderness is from December thru March. A year-round systematic sampling would have provided a more accurate basis in which to generalize about the three study areas. However, constraints on time and study costs, and similar sampling time frames by others (McLaughlin and Paradice 1980; Haas 1979) suggested that a smaller sample population would be adequate for the intended analysis.

The target population was further limited by mode of travel and age. All horseback riders were excluded from the study in order to restrict the population to one activity type. Backcountry hikers included both backpackers and day hikers. Secondly, hikers younger than eighteen years old were excluded from the sample population. Based upon previous research with similar exclusions, these individuals were hypothesized to lack the financial independence or autonomy needed to respond meaningfully to the specialization items and the outcome scales.

Sampling Procedure

The sampling goal for this study was to effectively represent the backcountry hiking population from medium to high density trailheads in each of the three study areas within the previously described eight week periods. Because the time commitment and travel costs of sampling low use trailheads and non-trail access points would have been great, the decision was made to include medium and high density access points. Randomly drawn sampling units of days within the seven week period provided the basis for selecting the study sample. Within each study area, six weekend days and six weekdays were chosen. The High Uintas Primitive Area, because of the number of trailhead access points, required an additional four days to adequately represent the hiking population.

The sample that eventually received the questionnaire was taken from the sample frame of names obtained from on-site interviews on the sampling unit days. Only those hikers over seventeen years of age and traveling on foot were selected as elements for the questionnaire. To control for over-representation by larger groups, only four hikers per group (chosen randomly) were allowed to be part of the final sample.

Within each of the study areas, all major trailheads were surveyed (Table 5). Additionally, the researchers made two overnight backcountry trips into each area to increase the likelihood of representing hikers who may not have utilized a conventional or popular access point. Because of the greater number of trailheads, not all trails in the High Uintas received equal representation. Four of the more remote trails were only surveyed on weekend days. As use

Table 5. Major trailhead surveyed

Area/Name of trailhead
Bridger Wilderness
Bridger Trailhead
Green Lakes Trailhead
Big Sandy Trailhead
High Uintas Primitive Area
Hi Line Trailhead
Weber Trailhead
Bald Mountain Trailhead
Crystal Trailhead
Christmas Tree Meadows Trailhead
Granddaddy Lakes Trailhead
Rainbow Trailhead
Brown Duck Tailhead
Swift Creek Trailhead
Uintas Canyon Trailhead
Henry's Fork Trailhead
Superstition Wilderness
Peralta Trailhead
First Water Trailhead
Reavis Trailhead

on these trails is relatively low, the weekday population was not included.

The sample size was based on the nature of data analysis, desired statistical precision and expected response rate. The decision was made to place the sample size at 600. This number was equally divided to include at least 200 sample elements for each of the three study areas.

At the time of the on-site interview, names and addresses of the hikers were obtained. The questionnaires were administered by mail in November, 1982 for the Bridger Wilderness and High Uintas Primitive area samples. Since the interview in the Superstitions was delayed to sample during peak fall and winter use, there was a time lapse in the mailings. However, the questionnaire was designed to ask about generic hiking preferences rather than specific trip preferences to help control for memory or time related biases. The Superstition Wilderness questionnaires were mailed in January, 1983. Three weeks after the first mailing a follow-up mailing to the non-respondents was made. The final response rates are reported by study area in the next chapter.

Survey Instruments

Backcountry Interview

During the eight week sample period for this study, initial contact was made with the backcountry hikers who comprised the sample for this study. Each hiker was contacted on the trail and was administered a brief interview. The interviewer explained that researchers in the Forestry Department at Utah State University were

interested in gaining more insight into the preferences and characteristics of users of that particular area. The hikers were asked if they would be interested in participating in the study. Their names and addresses were then recorded and they were told that a questionnaire would be arriving by mail at their residence in the near future. Additionally, the interviewer recorded if the interviewees were dayhiking or backpacking and the number of people in their group. The respondents were asked how many times they had previously visited the area in the past year and how many miles they traveled on their current hiking outing.

Six hundred and twenty hikers were interviewed. One interviewee refused to participate in the study at the time of the interview. The remaining six hundred and nineteen interviewees were subsequently sent the questionnaire during the mailing period.

Mail Questionnaires

The primary instrument utilized for data collection in this study was a mailed questionnaire. The questionnaire was four pages long and required approximately 20-25 minutes to be completed. Included in the mailing with the questionnaire was a cover letter providing general instructions and a postpaid return envelope. The complete questionnaire and cover letters are contained in Appendix A.

The questionnaire itself was divided into five parts: (1) questions about hiking experience, equipment, and life-style, (2) scaled questions about the hikers' desired psychological outcomes, (3) questions concerning preferred physical, managerial and social setting attributes, (4) questions about the relative importance of

psychological outcome decisions, and (5) some questions concerning demographic characteristics of the respondents. Respondents from all three study areas received identical questionnaires.

Specialization. The method of content development within the questionnaire differed according to section. In the first section the intent was to measure several dimensions of specialization for each backcountry hiker. Based on Bryan's conceptualization of specialization and a previous study by Wellman, Roggenbuck and Smith (1982) those dimensions were identified as past experience, skill level, economic investment in equipment and travel, and relationship of the leisure activity to other life areas. The original questionnaire contained fourteen questions which were designed to measure these dimensions of specialization. During March and April of 1982 the questionnaire was pretested on 63 hikers from both Utah and Arizona. This pretest sample was selected by networking with hikers at Utah State University and through contact with adult backpacking classes in the Phoenix area. Several of the specialization items were changed or eliminated because of questions about content and construct validity of the items or the low amount of discrimination precision in the results. Trying to determine the degree of cooking, navigational, hiking technique and packing expertise presented both validity and operationalizing problems for a questionnaire. In addition, while Bryan hypothesized that the skill dimension should underlie all activities, he also suggests that it may be of greater or lesser importance depending on the activity studied. The degree of skill development is more apparent in activities like fly-fishing and rock climbing. Possibly, a participant observation or naturalistic

methodology would better be able to discern its subtle differences in backcountry hiking.

The specialization items on the questionnaire are representative of the three following domains: (1) past experience, (2) economic investment in equipment and travel, and (3) relationship of backcountry hiking to other life areas. Since the past experience domain included questions concerning general hiking experience and current hiking participation, it included five items. The other two domains each included three items. Once the domain items were selected, the next task was to combine individual item scores into an overall specialization index. Individual item scores were standardized across all respondents to control for parity in levels of measurement and range of possible responses. Table 6 contains a list of the 11 items that contributed to the final specialization index.

Desired Outcomes. The second section of the questionnaire contained a set of developed psychological outcome statements reflecting the reasons why the respondents choose to hike in the backcountry. Driver scales were utilized to identify specific outcome items. Driver has performed considerable testing on 42 psychological outcome scales on over 40,000 subjects (Driver 1977). Each scale is composed of several individual item responses which should exhibit at least a .40 intra-scale reliability. Nineteen different domains are represented by the 42 scales based on their relevance to backcountry hiking and specialization, the following five outcome domains were included in this study: (1) exercise/physical activity, (2) achievement, (3) freedom/autonomy, (4) social contact, and (5) relationships with nature. The fifteen items representing those

Table 6. Specialization index items

Specialization index items
Past Experience
Years of hiking experience
Number of hiking trips taken over the past year
Number of different places hiked over the past year
Self rated level of hiking experience
Longest distance hiked on one trip over the past two years
Equipment and Economic Commitment
Amount of money invested in hiking related equipment
Amount of money spent over the past year on hiking expenditures
Number of hiking items owned (from a 15 item list)
Lifestyle
The relative importance of hiking when compared with other leisure pursuits
The degree of hiking opportunities affected the hikers choice of geographical residence
Number of commitment items (books, magazine subscriptions, conservation or hiking organization memberships)

five domain scales organized into a seven point Likert format ranging from "not at all important" to "of utmost importance" were included on the questionnaire (Table 7).

Setting Attributes. The content development within the third section of the questionnaire was guided to some degree by the Recreation Opportunity Spectrum. The initial task was to identify relevant physical, social and managerial setting attributes that contributed to or detracted from satisfying backcountry hiking experiences. Attributes which exhibit some variance among different hikers were sought to test the study hypotheses (i.e., why ask how litter affects the hiking experience if most hikers agree that it detracts). Several past studies of attribute preferences gave insight into attributes that vary to some degree among backcountry users (Lucas 1964; Mclaughlin, Krumpe and Paradice 1982; Haas 1979; Stankey 1972; and Roggenbuck 1975). After the pretesting of the questionnaire, only those attributes in which the hikers exhibited some disagreement were retained for the final questionnaire. Additionally, an open ended section on the pretest questionnaire generated some new attributes which were important in determining hiking satisfaction. Finally, several researchers and hikers were interviewed to identify other important attributes that might significantly detract from or contribute to a satisfying hiking experience.

Thirty-eight environmental setting attributes (physical, social and managerial) were identified and included in the final mail questionnaire (Table 8). Included in the thirty-eight were twelve physical attributes, eight social attributes and eighteen managerial

Table 7. Driver scales and outcome items

Driver scale and items
Exercise/Physical Activity
To challenge myself physically
To improve my physical health
For the exercise
Achievement
To develop my skills and ability
To learn what I am capable of
To get a sense of accomplishment
Freedom/Autonomy
To do things on my own
To be at a place where I can make my own decisions
To travel where I desire
Social Contact
To enjoy an experience with my family or friends
To be with others who enjoy the same things I do
To have a good time with my friends
Relationship with Nature
To gain a greater appreciation of nature
To observe the beauty of nature
To enjoy the smells, sights, and sounds of nature

Table 8. Environmental setting attribute items

Environmental setting items*
High mountain trails
Presence of logging
Availability of firewood
No evidence of man-made structures
Seeing others near your campsite
Trail quotas for high use periods
Outhouse-type toilets at popular campsites
Open meadows
Other recreationists carrying firearms
Natural lakes and streams
Revegetating of over-used areas
Required permits to day hike
Well-placed and accurate directional signs
Availability of natural drinking water
Domestic livestock on trails
Seeing others on the trail
Seeing wildlife
Readily available information on regulations
Paved access roads
Fining of backcountry regulation violators
Fish stocking of backcountry lakes
Well-maintained trails
Timbered pine forests
Presence of commercial and organizational groups (outfitter, scouts, etc.)
Pets in the backcountry
A party size limit of 10 or less persons
Rugged terrain
Seeing motorized recreationists
Presence of bears
A fee to use the backcountry ($1-$5)
Natural swimming areas
Hikers and horseriders using the same trail
Desert canyons
Presence of mining
Required permits to backpack
Loud recreationists
Absence of regulations
Readily available information on the natural history of an area

*The respondents were asked to rate to what extent each attribute added to or detracted from their hiking experiences.

setting attributes. The importance of each individual attribute was measured on a seven point Likert-type format ranging from "strongly detracts from" to "strongly adds to" satisfaction while hiking in the backcountry. The final task within section three was to combine the attributes into meaningful groups of similar variables so that the analysis would be both meaningful and concise. Orthogonal factor analysis, employed to group the environmental setting attributes for this purpose, will be described subsequently.

The fourth section of the questionnaire again measured the hiker's response to psychological outcome domains. Rather than utilizing individual outcome items to represent a psychological domain, eight general domain motives were presented, and the respondent was asked to rank order them from most important to least important. It was hypothesized that this format might offer more direct insight into the relative importance of each of the domains.

The final section of the questionnaire contained personal questions concerning the demographic characteristics of the respondent. Age, sex and level of education were included in order to compare the sample population for this study with demographic information on other backcountry research.

Scale Design

Two of the most important issues applicable to measurement quality are the validity and reliability of the measuring instruments. Validity can be defined as the extent to which an empirical measure adequately reflects the meaning of the concept under study (Babbie 1986). Reliability refers to how consistent a measure is in yielding

the same results repeatedly to the same object. Generally, in survey research, validity is more difficult to establish since there is little opportunity to obtain feedback about specific questions in the survey format (Babbie 1986). Since reliability can be more directly assessed and is a necessary precondition for validity to occur, the mathematical reliability of the survey instruments will be discussed.

The content validity of the specialization principle has not been conclusively established. While Bryan introduced the concept in 1977, it has not been defined precisely with respect to what specialization is and what it will predict. Recent empirical studies which have established differences in the motives and attitudes of recreationists who exhibit varying degrees of experience, offer indirect support for one dimension of specialization. The investigations by Kaufman and Graefe (1984) and Graefe, Donnelly and Vaske (1985) offer direct empirical support for Bryan's general definition.

This study attempted to improve the construct validity of the specialization concept, by operationalizing several related dimensions. This approach is consistent with Bryan's conceptualization, and has been used in the majority of other recreation specialization studies. To the degree that specialization is represented in this index it is conceptualized and measured as past experience, equipment and economic commitment and centrality of backcountry hiking to ones lifestyle. These dimensions were verified with other researchers who were familiar with Bryan's work. Additionally each of the items on the questionnaire which measured one of these three dimensions was pretested and subsequently discussed with respondents to check their construct and face validity.

Fourteen items were included under the specialization section on the questionnaire. Three of these items were eliminated from further analysis, leaving 11 items to represent the final specialization index. Item 12, which asked the respondent to rank the importance of backcountry hiking with 6 other life interests proved to be an unreliable and invalid measure as numerous people either misinterpreted the directions or did not respond altogether. Items 5 (average length of stay) and 7 (longest one way travel distance) were also eliminated to increase the mathematical reliability of the overall specialization index. The average length of stay raises some content validity issues. Perhaps the hiker who chooses several shorter hiking experiences over the course of a year is more specialized than the hiker who goes on one five day trip every year or two. Item 7 did not specify hiking opportunity as the prerequisite for travel. This means that the person who plans a 2,000 mile extensive backpacking trip is just as specialized as the person who gets bored on vacation and decides to take a short day hike on a trip to a well known national park. The reliability of the final index instrument was increased by dropping the above three items, and provided a final internal consistency coefficient (Cronbach's Alpha) of .833.

One advantage of using Driver's scales is that their validity and reliability have been extensively studied in a variety of activity opportunities, including backcountry hiking. Through consultation with other researchers and after reviewing other backcountry hiking studies, the following domains were chosen as valid motives for this study: (1) exercise/physical activity, (2) achievement, (3) freedom/

autonomy, (4) social contact, and (5) relationships with nature. The tolerances established by Driver for reliability in his own scales are inter-item correlations of at least .4 and an internal reliability (Cronbach's Alpha) of at least .60. Usually each scale includes from two to four items which are then tested for acceptance in the final scale. One of the items in the autonomy scale fell below the .4 tolerance level and was eliminated. The final scales used for analysis exhibited reliability coefficients above these levels (for individual items see Table 15).

A seven point multidimensional Likert type scale was developed to measure the extent an environmental setting attribute detracted from or contributed to hiking satisfaction. To enhance content validity the pretest questionnaire contained an open-ended section asking hikers to identify important environmental attributes that influenced their decision to or not to visit a particular area. Several new items were added to the list. Since this section was the more applied part of the study, Forest Service recreation planners at the Regional Office in Ogden, Utah, also evaluated the attribute section to enhance face validity. Overall, thirty-eight individual social (e.g., other recreationists carrying firearms), physical (e.g., open meadows) and managerial (e.g., required permits to day hike) setting attributes were included.

The remaining attributes were factor analyzed in order to determine underlying dimensions that may exist and help in simplifying the number of dependent variables. While the results of this analysis will be provided in the next chapter, ten multi-item factors were identified and utilized in the analysis. As a further check on

reliability, sections two and three of the questionnaire were designed with a split order format. Items in those two sections were randomly reordered on one half of the questionnaires to control for item order bias.

Data Analysis

Once collected, the data from this study were coded, entered onto the VAX 2000 mainframe computer at Utah State University and checked for coding bias. In May of 1984 the data was transferred to the IBM 3081 mainframe computer at Arizona State University in Tempe. All exploratory, descriptive, and inferential analyses were performed with the fifth revision of the Statistical Package for the Social Sciences (SPSS-X). Prior to the actual testing of the study hypotheses, study objectives required that the specialization, psychological outcome and setting attribute items be organized and analyzed in specific ways.

First, the specialization items were combined in an additive index, each item representing its relative strength as one eleventh of the total score. Each item was standardized across all respondents to determine individual Z-scores for each respondent. The overall specialization index and subsequent sub-indices were constructed with the Reliability SPSS-X command function. All indices were checked for internal reliability utilizing the Cronbach's Alpha reliability coefficient.

The desired psychological outcome items within each domain were combined in an additive fashion and averaged by the number of items included to give a mean score for each scale. These final scale scores ranged from zero (no importance) to seven (high importance).

As with the specialization items, each outcome scale was tested with the Reliability SPSS-X program. Items which did not meet the minimum tolerance levels were excluded from the analysis of the hypotheses.

Finally, to simplify and collapse the thirty-eight different dependent variables, an orthogonal factor analysis was performed on the environmental setting attributes. Factor analysis includes a number of statistical techniques; the common objective of these techniques representing a set of variables in terms of a smaller number of hypothetical variables (Kim and Mueller 1978). These hypothetical variables, termed factors, indicate their relationship with the original set of variables through a correlation coefficient. Its application in leisure research has grown increasingly popular in recent years (Foster and Jackson 1979; Kass and Tinsley 1979; Chase and Cheek 1979; Graefe, Ditton, Roggenbuck and Schreyer 1981). Since factor analysis seeks to reduce data to more interpretable forms, it has been utilized by leisure researchers to investigate concepts like motives, satisfaction, preferences and activity styles.

A principal components extraction technique was utilized on the environmental setting attributes. The principal components procedure simply utilizes shared variance (correlations) among the variables to produce the best linear combinations of those variables. In this procedure, common, specific and error variance are all included in the analysis. The first principal component factor will seek to account for as much variance as possible in all of the variables. The residual variance is then analyzed for a second factor, and so on. The limitation here is that, while this procedure may be mathematically efficient, it is not always theoretically meaningful.

Hence, a factor is only a mathematical representation. Since the researcher must interpret the meaning of each factor, the strongest factor loadings are most often utilized. This interpretation usually results in a name characterizing that factor.

The second area of data analysis addresses the study hypotheses. Table 9 provides an overview of the statistical procedures utilized to perform the research tasks and hypothesis tests. Hypothesis H1 and H1a were examined with the analysis of variance procedure which was used to explore if the motives of hikers vary with the level of hiking specialization. The second set of hypotheses (2 and 2a) required that the hikers be put into motive dependent groups (termed profiles). Student's t-tests and chi-square analyses were then employed to determine if these profiles differed in regards to their specialization characteristics. The third set of hypotheses (3, 3a and 3b) explored the basic relationship between hiking specialization and the environmental setting attributes. Three separate tests: Pearson's r, Student's t-test and Fisher's F test were used in these analyses. The forth set of hypotheses (4 and 4a) investigated how hiking motives related to the environmental setting attributes. Pearson's r was utilized to explore the direct relationship between each of the individual motives and the complete set of setting attributes. Hypothesis 4a required that the hikers be classified into groups based on their motive profiles and a Student's t-test was employed to detect significant differences between these groups.

Canonical correlation analysis was the multivariate technique chosen to access the final relationships between the study independent variables and the environmental setting attributes for Hypothesis 5.

Table 9. Statistical analysis and SPSS programs utilized for data analysis

Research task		Statistical analysis	SPSS program
Classification of environmental setting attributes		Factor analysis	FACTOR
H1	Specialization - Types of outcomes	Analysis of variance	ANOVA
H1a	Specialization - Ranking of outcomes	Analysis of variance	ANOVA
H2	Outcome profiles - Specialization means	Student's t-test	ONEWAY
H2a	Outcome profiles - Specialization distributions	Chi-square	CROSSTABS
H3	Specialization - Types of setting attributes	Pearson's r	PEARSON CORRELATION
H3a	Specialization - Specificity of setting attributes	Student's t-test	T-TEST
H3b	Specialization - Range of setting attributes	Fisher's F test	ONEWAY
H4	Outcome profiles - Types of setting attributes	Pearson's r	PEARSON CORRELATION
H4a	Outcome profiles - Specificity of setting attributes	Student's t-test	T-TEST
H5	Specialization and outcomes - Setting attributes	Canonical correlation	MANOVA

The canonical correlation procedure is a multivariate linear technique which allows for multiple relationships to be identified between a set of independent variables and a set of dependent variables. Similar to factor analysis, a canonical correlation procedure creates several hypothetical variables in which the original variables load to varying degrees. However, where the factor analysis data reduction technique produces hypothetical factors which load to some degree by all the original variables, a canonical correlation analysis creates two separate hypothetical variates, one representing the independent or predictor variables and the other representing the dependent or criterion variables (Lambert and Durand 1975).

The primary goal of canonical correlation analysis is to create a hypothetical variate from the first set of variables and a hypothetical variate from the second set of variables in such a way that the correlation between these two variates is maximized. The canonical variates (predictor and criterion) are linear combinations of the original variables. Each original variable is assigned a canonical leading coefficient which reflects to what degree that variable is represented by the derived variate, similar to the way individual variables load on factors derived from factor analysis. The first pair of canonical variates are created to account for the highest degree of inter-correlation as possible between each other. The analysis then creates a second set of canonical variates from the residual variance not explained by the first set. This process continues until all of the variance is explained by the resulting pairs of canonical variates (also referred to as a root) (Nie, Hall, Jenkins, Steinbrenner and Bent 1975).

SPSS-X does not provide a specific procedure for performing canonical correlation analysis. Instead it provides a sub-procedure which reports canonical correlations within the multiple analysis of variance (MANOVA) routine. Through this sub-procedure, significant roots are identified with the use of a generalized F test. The relationships of the original variables to the canonical variates are reported in the following three ways: the raw canonical correlations, standardized canonical correlations and correlations between the original set of variables and the canonical variates created. The standardized canonical correlations were utilized to report the canonical coefficients between the created canonical variates and the individual variables included in the dependent variable or independent variable sets. The results for each of these tests are reported in the next chapter.

RESULTS

This chapter presents the data collected by self administered, mailed questionnaires sent to backcountry hikers of three Intermountain West backcountry areas. These results are summarized in three sections. The first section includes descriptive information about the study sample for each of the three study areas. The second section explains the refinement and results of the specialization index, outcome scales and environmental setting attribute variables. The final section reports the results of the tests on each of the study hypotheses. Since the sample was chosen to represent diversity in regards to key hypothesis variables, the test results are reported for the overall sample, rather than individual study areas.

Descriptive Information on Backcountry Users

Sample Size and Response Rate

A total of 619 questionnaires were mailed to the sample of backcountry hikers from the three study areas. Three and one half weeks later, a follow-up mailing was made to the non-respondents. The final questionnaire response rate for this study was 68 percent (n = 421). However, this rate varied according to study area. The following data (Table 10) separates the response rates by study area.

User Characteristics

Respondents were asked several descriptive questions, including: years of hiking experience, age, sex, education level, size of party,

Table 10. Sample size and response rate

Study area	Questionnaires mailed	Received	Rate (%)
Bridger Wilderness	204	154	75.5
High Uintas Primitive Area	213	129	60.6
Superstition Wilderness	202	138	68.3
Total sample	619	421	68.0

number of previous visits to the area, and state of residence. The following descriptions summarize the responses on these items by study area.

Bridger Wilderness. Backcountry hikers interviewed during the summer of 1982 averaged 34.6 miles (for that trip) hiked and reported an average of 5.7 previous visits to the area (44 percent were first time users). A majority of the respondents were male (70.9%) and 92.1 percent were backpacking (as compared to daypacking) at the time of the interview. The average age and amount of hiking experience were 32.8 and 11.9 years respectively. While respondents from the Bridger Wilderness were more educated (15.7 years), they were also less likely to reside in-state (11.3%). Finally, the average size of a hiking party observed during the study period was 2.3 persons.

Uintas Primitive Area. Uintas users interviewed during the summer of 1982 averaged 19.3 miles (for that trip) hiked and reported an average of 14.8 previous visits to the area (14.3 percent were first time users). A majority of the respondents were male (72.2) and 78.6 percent were backpacking (as compared to dayhiking) at the time of the interview. The average age and amount of hiking experience

were 33.4 and 11.8 years respectively. While respondents from the Uintas Primitive Area were the least educated (14.9 years), they were also more likely to reside in-state (86.4%). Finally, the average size of a hiking party observed during the study period was 2.9 persons.

Superstitions Wilderness. The Superstition users interviewed during the winter of 1982-83 averaged 7.7 miles hiked and reported an average of 13.7 previous visits to the area (12.2 percent were first time users). A majority of the respondents were male (66.4%) and only 29.2 percent were backpacking (as compared to dayhiking) at the time of the interview. The average age and amount of hiking experience were 34.9 and 9.1 years respectively. Respondents from the Superstition Wilderness reported an average education level of 15.3 years. Finally, the average size of a hiking party was 2.7 persons and 88.7 percent of the respondents were from Arizona (in-state).

Comparisons and Overall Sample

Overall, the backcountry respondents averaged 15.3 years of education (college seniors) and 33.7 years of age. At the time of the interview 67.1 percent of the respondents were backpacking (as compared to dayhiking) and they reported an average of 11.1 previous trips to the study area. The proportion of females and males were 27.8 percent and 72.2 percent respectively. The average hiking respondent reported 11.0 years of backcountry hiking experience and 25.0 percent were first time users in the study area where the interview occurred.

For comparative purposes, the respondents from Bridger Wilderness were younger, more experienced, better educated and more likely to be backpacking, instead of dayhiking, than the respondents from the other areas (Table 11). They were also more likely to be first time users

Table 11. User characteristics of the backcountry hikers

Characteristic	Bridger	Uintas	Superstitions	Total
Age (years)	32.8	33.4	34.9	33.7
Years experience	11.9	11.8	9.1	11.0
Day hikers/ Backpackers (%)	7.9/92.1	21.4/78.6	70.8/29.2	32.9/67.1
Education (years)	15.7	14.9	15.3	15.3
Female/Male (%)	29.1/70.9	19.8/80.2	33.6/66.4	27.8/72.2
First-time users (%)	44.4	14.3	12.2	25.0
Number of previous visits	5.6	14.8	13.7	11.1
In-state residence (%)	11.3	86.4	88.7	60.1
Average party size	2.3	2.9	2.7	2.65

of that area. However, this may in part be due to the high proportion of out-of-state users who cannot frequent this area as often as Wyoming residents. The Uintas respondents were the least educated (14.9 years), reported the largest party size and were more likely to be male than the other respondents. Finally, the Superstition respondents were much more likely to be dayhikers and travel less distance (at the time of the interview). These users were also more likely to be female (33.6%) and older than respondents from

the other study areas. Respondents from both the Uintas and Superstitions tended to reside closer to the study area and reported more previous visits than the Bridger respondents.

Non-Response Bias

Slightly over 68 percent of the original sample completed and returned the questionnaire by mail. The remaining 199 backcountry hikers did not respond to the questionnaire after being contacted twice by mail. The non-response rate was highest in the Uintas sample (see Table 10). While no systematic method was employed to resurvey these hikers at a later date, information gathered during the initial field interview provides some insight into the characteristics of these users.

Table 12 provides comparisons between respondents and non-respondents by the three study areas. Useful information about the in-state residence, hiking style and proportion of first-time users was obtained for the entire sample during the initial interview. The greatest difference between respondents and non-respondents was found in residence. While 58 percent of the respondents visited a study area in their state of residence, over 66 percent of the non-respondents were in-state residents. An examination by study area shows that Wyoming non-respondent residents were more likely to not respond than the non-residents from the Bridger sample. The Superstition sample reflected the opposite, where in-state residents represented 84.7 percent of the respondents and 76.6 percent of the non-respondents.

Table 12. Respondent and non-respondent comparisons

Sample (n)	In-state residents (%)	Dayhikers	First-time visitors
Bridger sample			
Respondents n=151	14 (9.3)	12 (7.9)	67 (44.4)
Non-respondents n=50	9 (18.0)	9 (18.0)	26 (52.0)
Uintas sample			
Respondents n=126	110 (87.3)	27 (21.4)	18 (14.3)
Non-respondents n=84	74 (87.1)	15 (17.7)	13 (15.3)
Superstition sample			
Respondents n=137	116 (84.7)	97 (70.8)	16 (12.2)
Non-respondents n=64	49 (76.6)	50 (78.1)	18 (28.1)
Total sample			
Respondents n=414*	240 (58.0)	136 (32.9)	101 (24.5)
Non-respondents n=198	132 (66.3)	74 (37.2)	57 (28.6)

*Seven of the returned questionnaires were not included in these totals because of incomplete data.

The non-respondents (37.2%) were more likely to be dayhikers at the time of the interview than the respondents (32.9%). This pattern was stronger with the Bridger and Superstition non-respondents who reported dayhiking at 18.0 percent and 78.1 percent respectively. The trend was reversed in the Uintas sample where respondents reported a greater proportion of dayhiking than non-respondents. Finally, the overall non-respondent sample was composed of hikers more likely to be first time study area users (28.6%) than the respondent sample (24.5%). This pattern remained true in all three study areas.

Refinement and Description of Variables

Specialization Index

The mailed questionnaire initially contained fourteen specialization questions. Each item was designed to provide information about the respondents level of specialized development into backcountry hiking (Table 13). In order to examine the study hypotheses, these items were combined additively to develop a specialization index. Three of the original fourteen items were eliminated from this index due to both validity and reliability problems. Prior to its inclusion in the index, each item value was standardized across all respondents to control for different ranges and levels of measurement that existed between items. Consequently, the final specialization index used for analysis on this study had a mean score of .16 and exhibited a range of 39.12 (-15.00 to 24.12).

Respondents from the three study areas reported different scores for each of the specialization items (Table 13). Users from the Bridger Wilderness were the most specialized with a mean

Table 13. Raw specialization means by study area

Item	Bridger	Uintas	Superstitions	Total
Years experience	11.93	11.81	9.11	10.96
Trips/year	6.58	5.06	10.56	7.43
Places visited/ 2 years	8.17	6.24	8.40	7.66
Reported experience (level)[1]	3.87	3.55	3.05	3.50
Longest distance hiked (miles)	46.10	34.64	23.76	35.20
Equipment investment (level)[2]	3.69	2.99	2.59	3.11
Money spent/ last year ($)	405.21	233.66	269.96	309.12
Items owned (from list)	12.12	10.01	8.99	10.44
Hiking importance (rank)[3]	1.86	2.02	1.97	1.95
Residence dependent on hiking[4]	2.03	1.68	1.72	1.82
Lifestyle items[5]	1.69	1.20	1.29	1.41
Specialization index (mean score)	2.86	-1.23	-2.80	.16

[1] Reported experience ranged from one (low) to five (high).

[2] Equipment investment was categorized into five levels: 1 = < $100; 2 = $100 to $200; 3 = $201 to $500; 4 = $501 to $1000; 4 = > $1000.

[3] Hiking importance was determined by comparing backcountry to other leisure activities: 1 = other leisure pursuits are preferred to hiking; 2 = hiking is one of my favorite leisure interests; 3 = hiking is my favorite leisure interest.

[4] Residence dependence was determined by asking the hikers,"How much did local or regional backcountry opportunities affect your decision to reside where you do." The answers were coded: 1 = not at all; 2 = a little; 3 = very much.

[5] The lifestyle items value was determined by the number of "yes" answers to the following four questions: Do you own any hiking books; Do you subscribe to any hiking or backpacking magazines; Do you belong to any conservation organizations; and do you belong to any hiking organizations.

specialization score of 2.86. Additionally, the Bridger users had the highest mean item score for all but one of the individual items (they ranked second behind the Supersition users for hiking trips over the past year). The Superstition respondents reported the lowest mean specialization index score of the three study areas (-2.80). However, when these users are compared to the Uintas sample which reported a mean specialization index score of -1.23 across specialization items, a number of differences are found. The Superstition users engaged in more hiking trips and visited more hiking areas over the past two years. Uintas users rated themselves as more experienced and reported longer distance hikes than the Superstition sample.

While the Superstition users engage in a greater number of hiking experiences, it should be remembered that a majority of these users are dayhikers in a wilderness area that is adjacent to a large metropolitan area. With the mild winter climate many of these users apparently engage in numerous short dayhikes where as users of Bridger Wilderness and the High Uintas are not afforded the same opportunity. Superstition respondents also spend more money on hiking travel (e.g., gas and food), which was expected given their number of visits. Users from the High Uintas owned more, and invested more money in, equipment than the Superstition users. It is interesting that the Superstition users scored higher on each of the lifestyle questions, indicating that hiking is more valued when compared to other life interests. One possible explanation could be that while users in the Superstitions are not as specialized, hiking (at least dayhiking) is more representative of their general lifestyle, at least in the winter months.

A central objective of this study was to identify differences that can be attributed to the concept of hiking specialization. One method for exploring these differences is to separate the respondents into classes that reflect different levels of specialization. Additionally, the nature of the study hypotheses requires a method in which to compare high specialists with low specialists. For each hiker in the entire sample a specialization index score was calculated. The hikers were then separated into three groups of equal size, depending on the magnitude of their specialization index score. The first group, identified as low specialists, exhibited an index score of -2.95 or lower. The mean index score for the low specialists was -7.12 with a standard deviation of 3.05. The second group, labeled medium specialists scored between -2.95 and 2.97 on the specialization index. The medium specialists demonstrated a mean index score of -.04 and a standard deviation of 1.51. The final group, the high specialists, exhibited an index score of 2.97 or above with a mean score of 7.63 and a standard deviation of 3.92.

When classified into three levels of specialization (Table 14), the respondents varied as to their responses to a number of key characteristics as well as the specialization index itself. While 421 questionnaires were returned, seven of these were incomplete, leaving 414 suitable for data analysis. Some of the respondents reported missing data for one or more of the specialization items, making the calculation of an overall index incomplete. These thirty-six respondents were eliminated from any specialization index analysis leaving 378 respondents who were included in the final classification.

Table 14. User characteristics by specialization level

Characteristic	Level of specialization			Total[1]
	Low	Medium	High	
Specialization index mean	-7.12	-.04	7.63*	.16
Age	33.9	32.4	34.5	33.7
Years experience	6.9	11.1	15.6*	11.0
Day hikers/ Backpackers (%)	50.0/50.0	26.2/73.8	20.6/79.4**	33.1/69.9
Education (years)	15.1	15.2	15.7*	15.3
Female/Male (%)	34.9/65.1	23.0/77.0	19.0/81.0**	27.8/72.2
First-time users (%) (of the study area)	21.1	27.0	24.6	24.4
Number of previous visits	5.7	9.8	26.5*	13.3
Bridger respondents	24 (19.0)	44 (34.9)	71 (56.3)**	151 (36.5)
Uintas respondents	47 (37.3)	47 (37.3)	24 (19.0)**	126 (30.4)
Superstition respondents	55 (43.7)	35 (27.8)	31 (24.6)**	137 (33.1)

[1]The total column includes all study respondents, regardless of missing data responses for specialization items

*One-way analysis of variance significant beyond the .05 level of significance

**Chi-square analysis significant beyond the .01 level of significance

Each of the three groups representing the three levels of specialization contained 126 respondents.

Low Specialists. Hikers from the low specialists group were most likely to come from the Superstition sample (43.7%) and were least represented by the Bridger sample (19.0%). Day hikers and backpackers (at the time of the interview) were equally represented within this group. The low specialists exhibited an average age of 33.9 and a mean of 6.9 years of previous hiking experience. The percentage of female and first-time hikers were 34.9 and 21.1 respectively. The low specialists reported 15.1 years of education, the least amount of any of the three specialization groups. Finally, the mean number of previous visits to the study area was 5.7.

Medium Specialists. The Uintas respondents contributed the highest proportion of the medium specialists with 37.3 percent. Users from Bridger Wilderness and Superstition Wilderness contributed 34.9 percent and 27.8 percent respectively. This group exhibited the lowest mean age of any of the three groups at 32.4 years. These respondents also reported more first-time trips to the study area, 27.0 percent visited the area for the first time when they were interviewed. Day hikers (at the the time of the interview) comprised 26.2 percent of the medium specialists while the percentage of female hikers was 23.0 percent. This group of hikers averaged 9.8 previous trips to their respective study area and 15.2 years of education.

High Specialist. As a group, the high specialists exhibited a mean age of 34.5 years, making them the oldest of the three groups. They also reported an average of 15.6 years of previous hiking experience. Hikers from Bridger Wilderness represented over half of

the high specialists, comprising 56.3 percent of the hikers in this group. While the Superstition users contributed the highest proportion of low specialists, it should be pointed out that they contributed a greater proportion to the high specialists group (24.6%) than the Uintas hikers (19.0%). The high specialists were represented by relatively small proportions of day hikers and females, 20.6 percent and 19.0 percent respectively. This group also reported a mean education level of 15.6 years, the highest of the three groups. The average number of previous visits to the study area was 26.5 trips, while 24.6 percent of the high specialists were visiting the study area for the first time during the on-site interview.

In summary, two of the descriptive variables did not vary linearly with level of specialization, age and proportion of first time visitors to the study area. As a hiker becomes more specialized he/she tends to exhibit more hiking experience, a greater number of previous trips to the study area and a higher level of education. The proportion of day hikers and females also declined as the level of specialization increased. Finally, the study area itself was important with respect to which of the three groups its users were classified. The Bridger hikers contributed more hikers to the high specialists group than the other two groups combined. Hikers from the Uintas were equally dispersed in the low and medium groups and contributed only 19.0 percent to the high specialists group. The Superstition hikers were most highly represented in the low specialists group and declined in proportion as the level of specialization increased. It should be mentioned however, that the

Superstition hikers contributed a higher percentage of high specialists than the hikers from the Uintas.

Psychological Outcome Scales

As reported in the previous chapters, fifteen questions were included in the questionnaire to determine to what extent different psychological outcomes were valued by the respondents. Each of these items was measured on a seven-point Likert scale ranging from "not at all important" to "of utmost importance." The choice of which items to include on the questionnaire was made and adopted from a series of domain scales designed by Driver (1977) at the Rocky Mountain Forest and Range Experiment Station at Ft. Collins, Colorado.

Table 15 indicates the psychological outcome items and scales, their specific means and standard deviations, and reliability coefficients. Relationship with nature, which exhibited a mean of 5.52, was the most important desired outcome for the overall sample. This domain also exhibited the greatest amount of agreement among the respondents as indicated by its relatively low standard deviation of 1.06. The exercise, social and escape domains were of relatively moderate importance. Autonomy and achievement had the lowest domain mean scores, however both exhibited a fair amount of variance, indicating that the respondents agreed less on the importance of these domains. The domain standard deviations ranged from 1.06 (nature) to 1.60 (autonomy). Reliability coefficients (Cronbach's Alpha) for the domain scales ranged from .84 (nature) to .64 (achievement). The accepted reliability tolerance limit of .60 is normally acceptable with Driver scales.

Table 15. Fifteen psychological outcome items and their domains: means, standard deviations and reliabilities

Psychological outcome domains and items	Mean	Standard deviation
Exercise/Physical activity	4.54	1.24
To challenge myself physically	4.52	1.44
To improve my physical health	4.49	1.49
For the exercise	4.62	1.44
	.813[2]	
Relationship with nature	5.52	1.06
To gain a greater appreciation of nature	5.19	1.29
To observe the beauty of nature	5.76	1.12
To enjoy the smells, sights, and sounds of nature	5.60	1.22
	.842	
Social contact	4.47	1.34
To enjoy an experience with my family or friends	4.75	1.51
To be with others who enjoy the same things I do	4.26	1.57
To have a good time with my friends	4.38	1.63
	.820	
Freedom/Autonomy	3.66	1.60
To do things on my own	3.85	1.70
To be at a place where I can make my own decisions	3.46	1.77
To travel where I desire[1]	4.10	1.67
	.823	
Achievement	4.04	1.33
To develop my skill and abilities	4.09	1.49
To learn what I am capable of	3.96	1.67
To get a sense of accomplishment	4.08	1.53
	.805	

[1]This item was eliminated from the scale to improve reliability.
[2]Reliability coefficient

To further describe the outcome domain of the respondents, the domain means and standard deviations are provided for each of the three study areas. Additionally, this information is provided for each of the three levels of specialization.

Study Areas. The respondents from the Bridger Wildnerness reported higher means for each of the outcome domains than the respondents from the overall sample (Table 16). However, the Bridger

Table 16. Psychological domain scales by study area

Area	Exercise[1]	Nature	Social	Autonomy	Achievement
Bridger					
Mean	4.73	5.59	4.42	3.82	4.16
Standard deviation	1.23	1.09	1.43	1.68	1.42
Uintas					
Mean	4.29	5.42	4.52	3.41	3.94
Standard deviation	1.18	1.06	1.32	1.46	1.47
Superstitions					
Mean	4.57	5.52	4.36	3.70	4.01
Standard deviation	1.28	1.03	1.27	1.61	1.38
Total Sample					
Mean	4.54	5.52	4.47	3.66	4.04
Standard deviation	1.24	1.06	1.34	1.60	1.33

[1]Only the exercise scale differed significantly between study areas as measured by an analysis of variance test.

respondents also exhibited more variance for each of the domain scales (except for exercise) than the overall respondents. This trend was reversed for the Uintas sample, where the respondents reported means lower than the general sample, except for the social domain. Also the

Uintas respondents were generally more homogeneous in their responses as indicated by their relatively low standard deviations in all of the domains except achievement. Both the Superstition and Bridger respondents valued the different domains in the same rank order with nature being the most important, followed by exercise, social, achievement and autonomy in respective order. The Uintas respondents, however, valued the social aspects of hiking above exercise, reflecting that hiking may be more of a social experience for this subsample. The Superstition respondents varied in both directions from the overall domain means. Exercise and autonomy were valued to a greater extent while the social and achievement outcomes were valued to a lesser extent than the overall sample of respondents. The standard deviations for the Superstition respondents ranged from 1.06 (nature) to 1.60 (autonomy) reflecting the general pattern for the overall sample. In summary, the Uintas and Superstition subsamples tended to report lower means than the Bridger respondents, but also tended to exhibit more agreement, as reflected by their lower standard deviations.

Specialization Levels. When the respondents were separated by specialization level rather than study area, different patterns emerged, especially with respect to the domain mean scores (Table 17). The high specialists reported higher means for every domain except social, suggesting that systematic changes in outcome valuing may be related to the level of specialization. In similar fashion, the low specialists exhibited lower outcome domain means in every category except social, where their mean of 4.52 was the highest of the three subsamples. The medium specialists were in the middle between the low

Table 17. Psychological domain scales by specialization level

Level of specialization	Exercise	Nature	Social	Autonomy	Achievement
Low specialists					
Mean	4.24	5.30	4.52	3.21	3.71
Standard deviation	1.27	1.09	1.25	1.38	1.29
Medium specialists					
Mean	4.55	5.57	4.50	3.77	4.19
Standard deviation	1.21	1.03	1.37	1.60	1.23
High specialists					
Mean	4.81	5.64	4.45	3.98	4.23
Standard deviation	1.20	1.07	1.43	1.73	1.42
Total sample					
Mean	4.54	5.52	4.47	3.66	4.04
Standard deviation	1.24	1.06	1.34	1.60	1.33

and high means across all five outcome domains. The social domain mean was relatively stable across all three specialization levels, however it exhibited more variance in the high specialization group (S.D. = 1.43) as compared with the low specialists (S.D. = 1.25).

While the remaining domain means increased with level of specialization, they did not increase at the same rate. It should be noted that the mean for the autonomy domain, though valued the least of all three levels, increased the greatest from low to high specialization of any of the other four domain means. Achievement and exercise also exhibited moderate increases in magnitude going from the low specialists to the high specialists. While the nature domain scale was valued most highly for all three groups, it showed a modest

increase from 5.30 for the low specialists to 5.64 for the high specialists. The high specialists also exhibited the most variance on three of the domain scales: social, autonomy and achievement. The low specialists exhibited relative agreement on the social and autonomy outcome scales when compared with medium and high specialists.

Environmental Setting Attributes

The questionnaire contained 38 individual items concerning attributes in the social, physical and managerial environment that the respondents perceived as contributing or detracting from their general hiking experiences. The respondents were asked to rate to what extent each attribute added to or detracted from hiking satisfaction on a Likert type scale ranging from strongly detracts (1) to strongly adds (7). A value of four indicated a neutral response to the attribute. While the ROS framework (Clark and Stankey 1979) assumes that recreationists have preferences for particular environmental settings, it does not specify which attributes are most important for a particular activity style.

Table 18 presents the attribute preferences for all of the respondents. The means and standard deviations are indicated for each of the 38 items. A further breakdown of this information can be found in Appendix B, where the attribute preferences are reported by study area and level of specialization. The most important attribute for the overall sample was natural lakes and streams with a mean of 6.70. This attribute was followed closely by seeing wildlife ($\bar{x}$ = 6.67) and availability of natural drinking water ($\bar{x}$ = 6.34). The attribute

Table 18. Attribute preference of total sample: mean and standard deviation

Attribute	Mean	Standard deviation
Physical attributes		
High mountain trails	5.83	1.24
Availability of firewood	4.87	1.22
No evidence of man-made structures	5.82	1.32
Open meadows	6.10	.93
Natural lakes and streams	6.70	.64
Availability of natural drinking water	6.34	.91
Seeing wildlife	6.67	.61
Timber pine forest	5.87	1.42
Rugged terrain	5.88	1.11
Presence of bears	4.19	1.59
Desert canyons	5.89	1.51
Natural swimming areas	5.61	1.26
Social attributes		
Seeing other on the trail	3.76	1.13
Seeing others near your campsite	2.56	1.18
Other recreationists carrying firearms	2.23	1.36
Presence of commercial and organizational groups (outfitters, scouts, etc.)	2.78	1.25
Pets in the backcountry	3.14	1.49
Seeing motorized recreationists	1.38	.78
Hikers and horseriders using the same trail	2.93	1.25
Loud recreationist	1.45	.83
Managerial attributes		
Presence of logging	2.18	1.12
Trail quotas for high use periods	4.60	1.57
Outhouse-type toilets at popular campsites	4.20	1.75
Revegetating of over-used areas	5.66	1.22
Required permits to day hike	2.85	1.39
Well placed and accurate directional signs	5.50	1.22
Domestic livestock on trails	2.55	1.33
Readily available information on regulations	5.11	1.07
Paved access roads	3.77	1.55
Fining of backcountry regulation violators	5.52	1.35
Fish stocking of backcountry lakes	5.14	1.30
Well maintained trails	5.23	1.27
A party size limit of 10 or less persons	4.99	1.54
A fee to use the backcountry ($1-$5)	3.32	1.44
Presence of mining	2.16	1.23
Required permits to backpack	3.18	1.50
Absence of regulations	3.87	1.82
Readily available information on the natural history of an area	5.47	1.08

*The respondents were asked to rate to what extent each attribute added to or detracted form their hiking experience on a Likert type scale ranging from 1 (strongly detracted) to 7 (strongly added). A score of 4 would be a neutral response.

which detracted the most from a satisfying hiking experience was seeing motorized recreationists with a mean of 1.38. Loud recreationists was also rated as a strong detractor ($\bar{x}$ = 1.45). Five of the attribute items displayed a mean within .25 points of 4.0 (i.e., neutral) reflecting that the respondents expressed a great deal of ambivalence on those attributes. These "neutral" attributes were seeing others on the trail ($\bar{x}$ = 3.76), outhouse-type toilets at popular campsites ($\bar{x}$ = 4.20), paved access roads ($\bar{x}$ = 3.77), presence of bears ($\bar{x}$ = 4.19), and absence of regulations ($\bar{x}$ = 3.87).

Since the environmental setting attributes serve as the primary dependent variable in this study, some method of reducing the number of variables was needed to simplify the analysis and conceptual interpretation of the results. Six items reflecting extreme responses (if the mean was less than two or greater than six) and relatively low standard deviations (ranging from .61 to .93) were eliminated from further analysis. Seeing motorized recreationists ($\bar{x}$ = 1.45) was eliminated from the strongly detracts pole. Conversely, open meadows ($\bar{x}$ = 6.1), natural lakes and stream ($\bar{x}$ = 6.70), availability of natural drinking water ($\bar{x}$ = 6.34) and seeing wildlife ($\bar{x}$ = 6.67) were eliminated from the strongly adds direction. Removing these items from further analysis does not shortchange their importance, which will be addressed in the next chapter. Their elimination simply removes variables the respondents already universally agreed upon.

The remaining thirty-two variables were factor analyzed to reveal underlying conceptual dimensions. The factor analysis identified ten underlying dimensions of the environmental setting attributes when the minimum acceptable eigenvalue was set at 1.00. Overall, these ten

factors explained 57.1 percent of the variance in response to the setting items. Table 19 provides a summary of the results of the factor analysis. The strongest factor, named "management permission," accounted for 10.9 percent of the total attribute variance and contained three items. The weakest factor (in terms of explained variance) was "structures," explaining 3.2 percent of the overall variance for the two structure related items.

Since all of the attribute items contributed to each factor to some degree, a decision must be made by the researcher on how to interpret the individual variables. Table 19 reports the variables that remained within each factor when the minimum tolerance was set at .40 on the loading values. The remaining variables for each factor were then tested for intra-factor reliability.

Tests of Study Hypotheses

This section discusses each of the study hypotheses and examines the results of the statistical tests. The following points will be addressed for each of the study hypotheses: (1) each hypothesis is reviewed, (2) the variables used in the test are briefly reviewed, (3) the statistical method used to test each hypothesis is reported along with the results, and the criteria for whether to accept or reject the hypothesis are stated and briefly discussed.

Only one of the ten hypotheses tested in this study utilized one test to determine the hypothesized relationships. Where the environmental setting attributes are utilized as dependent variables, thirty-eight separate tests are employed to test the associated hypothesis. Since it is not assumed that all the tests will or should

Table 19. Description of ten factors extracted from the environment setting attributes, percent of variance explained, list of items, factors and factor loadings

Factor name and items	Percent of explained variance	Factor loading
1: Management permission	10.9	
Required permits to backpack		.84733
Required permits to dayhike		.80649
A fee to use the backcountry		.72288
2: Management support	9.5	
Well placed and accurate directional signs		.72688
Well maintained trails		.66760
Paved access roads		.59109
Rugged terrain		-.41835
3: Other users	6.8	
Hikers and horseriders using the same trails		.74144
Domestic livestock on trails		.60514
Pets in the backcountry		.57274
Presence of commercial and organizational groups (outfitters, scouts, etc.)		.55152
4: Regulation support	6.0	
Fining of backcountry regulation violators		.69090
Readily available information on regulations		.67717
Absence of regulations		-.49172
Revegetating of over-used areas		.48141
5: Consumptive users	5.1	
Presence of mining		.70478
Presence of logging		.70037
Other recreationist carrying firearms		.61954
6: Natural setting	4.3	
Desert canyons		.67233
Natural swimming areas		.65452
Readily available information on the natural history of an area		.52705
Presence of bears		.46399
7: Other hikers	4.0	
Seeing others near your campsite		.71465
Seeing others on the trail		.69988
8: Capacity limits	3.7	
Trail quotas for high use periods		.64184
A party size of 10 or less persons		.62081
9: Natural amenities	3.7	
Fish stocking of backcountry lakes		.57570
Availability of firewood		.55632
High mountain trails		.55222
Timber pine forest		.52796
10: Structure	3.2	
Outhouse-type toilets at popular campsites		.71480
No evidence of man-made structures		-.68210

be significant, the following criteria are systematically employed to determine if an overall pattern of acceptance or rejection occurs: if less than one-third of the tests are significant, partial support is noted, but the hypothesis is rejected; if between one-third and two-thirds of the tests are significant, the hypothesis is moderately supported; if over two-thirds of the tests are significant, the hypothesis is strongly supported.

H1. High specialists differ significantly in the rated importance of desired outcomes from low specialists.

The level of specialization served as the independent variable for this analysis. As discussed earlier, three levels of specialization were determined from the respondents' scores on the overall specialization index. One-third of the respondents whose score on the specialization index was -2.95 or lower were classified as low specialists (n = 126). High specialists were represented by the third of respondents whose index score was 2.97 and above. The remaining one-third of the respondents were classified as medium specialists.

The dependent variable for this hypothesis test was the score of the respondents on each of the five psychological domain scales. An analysis of variance (ANOVA) was utilized to test for the absence or presence of the hypothesized relationship. Table 20 reports the results for each of the psychological outcome domain scales. The last column in the table reports the results from a least significant different (LSD) test. The LSD technique is essentially a Student's t-test between group means which indicates where significant differences are occurring among the three specialization groups. The

Table 20. Analysis of variance and means for level of specialization with score on each of the psychological outcome scales

Source of variation	Degree of freedom	Mean squares	F test value	Level of specialization	N	Mean	Standard deviation	LSD Student's t
Exercise								
Between groups	2	10.111	6.737*	Low	126	4.24	1.27	3 > 1[1]
Within groups	375	1.50	6.737*	Medium	126	4.54	1.21	
Total	377			High	126	4.81	1.20	
Social								
Between groups	2	.18		Low	126	4.52	1.25	no differences
Within groups	375	1.819	.099	Medium	126	4.50	1.37	
Total	377			High	126	4.45	1.43	
Nature								
Between groups	2	3.969		Low	126	5.30	1.09	2, 3 > 1
Within groups	375	1.13	3.524*	Medium	126	5.57	1.03	
Total	377			High	126	5.64	1.07	
Autonomy								
Between groups	2	19.786		Low	126	3.21	1.38	2, 3 > 1
Within groups	375	2.489	7.949*	Medium	126	3.77	1.60	
Total	377			High	126	3.98	1.73	
Achievement								
Between groups	2	10.66		Low	126	3.71	1.29	2, 3 > 1
Within groups	375	1.72	6.172*	Medium	126	4.19	1.23	
Total	377			High	126	4.23	1.43	

*Significant at the .05 level of probability
**Significant at the .01 level of probability
[1]Group 1 = low specialists; Group 2 = medium specialists; Group 3 = high specialists

results indicate that significant differences were found across levels of specialization for each of the outcome scales, except the social domain. The ANOVA yielded significant results when applied to the exercise scale, indicating that the respondents reported significantly different scale means at each level of specialization. When the exercise means are examined, their direction indicates that exercise becomes more important as the level of specialization increases. An alternative way of stating this would be that the novice (low specialized) hiker is motivated to a lesser degree by exercise than the experienced hiker.

No significant differences among the specialization levels for scores on the social scale were found. While the mean score for the social scale remained relatively stable across specialization levels, the standard deviation increased consistently from low to high specialization. The high specialists apparently disagree, as a group, regarding the importance of the social motive.

The hypothesis was supported when applied to the nature motive. The means signify the increasing importance of nature to high specialization. While these means were significant across all levels of specialization, the F value of 3.52 was weaker than the exercise, achievement and autonomy scales, reflecting that nature is not the strongest indicator of specialization.

The autonomy domain scores exhibited the strongest F value at 7.94. Not only was the hypothesis supported for this scale, but autonomy appears to be the strongest indicator of specialization. Since this domain is valued the least for all levels of specialization, one might conclude that the autonomy motive is an

unimportant motive for backcountry hiking. These test results indicate however, that as hikers develop into successively more specialized hikers, the autonomy motive changes more dramatically than the other motives. Perhaps these hikers learn to increasingly utilize hiking experiences as an opportunity to exercise their freedom in an environment where they are their own masters.

The final domain scale, achievement, was statistically significant across levels of specialization. Mean direction again suggests this motive increases in importance as the level of specialization increases. High specialists are likely to be motivated to a greater degree by developing hiking skills and abilities or the sense of accomplishment after the hiking experience than low specialists. Overall, the hypothesized relationship was found in four of the five statistical tests. Since over two-thirds of the statistical tests were significant, the hypothesis is supported. The results of the one way analysis of variance indicated strong support for the hypothesis that high specialists differ significantly in the rated importance of desired outcomes from low specialists. Only the social domain scale failed to reach statistical significance across the three levels of specialization. It may be that level of specialization has no value in explaining variation in the social domain, or it may be that when other key motives are combined with the social motive score (interactive effects) a more significant pattern will emerge. This question will be addressed in Hypothesis 2a.

H1a. High specialists have different rankings of outcomes from low specialists.

The level of specialization (high and low) served as the independent variable for this hypothesis. Rather than comparing mean domain scale scores, the dependent variable was the raw score rank of each of the scales across low and high specialists. Table 21 provides

Table 21. Comparison of outcome rank scores within each level of specialization

Outcome domain	Low specialists Mean	Rank	Medium specialists Mean	Rank	High specialists Mean	Rank
Exercise	4.24	(3)	4.54	(2)	4.81	(2)
Social	4.52	(2)	4.50	(3)	4.45	(3)
Nature	5.30	(1)	5.57	(1)	5.64	(1)
Autonomy	3.21	(5)	3.77	(5)	3.98	(5)
Achievement	3.71	(4)	4.19	(4)	4.23	(4)

the results of the hypothesized question. A formal statistical test was not utilized in evaluating this hypothesis.

An examination of the domain means for the low specialists indicates that nature is the highest valued motive. Valued to a lesser degree, but still greater than important (4.0) on the Likert-type scale are the social ($\bar{x}$ = 4.52) and exercise ($\bar{x}$ = 4.24) domains, ranked two and three respectively. The least valued domains for the low specialists were achievement ($\bar{x}$ = 3.7) and autonomy ($\bar{x}$ = 3.21). The high specialized hikers also ranked the nature domain as most important, but with a significantly higher mean of 5.64. The rankings of the second and third most valued domains were reversed for the high specialists with the importance of the exercise motive increasing to

4.81, followed by social at 4.45. As with the low specialists, the high specialists ranked achievement and autonomy fourth and fifth respectively.

The difference in rankings of the exercise and social scales offer only partial support for the hypothesis. Major shifting of the ranks did not occur between low and high specialized hikers. Except for the social scale, a more accurate description of the changes occurring from low to high specialization would be an increase in the magnitude of the scale means. Hence, the social scale mean remained at the same magnitude of importance across levels of specialization. When the other scale means are compared, it could be concluded that increases in levels of specialization serve to increase the importance of their motives, perhaps sensitizing the hikers to their possible rewards. The issue of response bias should also be raised. The high scores for the high specialists could also reflect a valuing that goes beyond the Likert scale. A pattern that is ignored in the rankings, but which appears when the means are compared, is the increase observed in the autonomy scale. While its rank did not change, the autonomy scale mean showed the most dramatic increase from low to high specialization (.77). This increase was closely followed by the exercise and achievement scales, with increases of .57 and .52 respectively. In summary, the comparisons of ranking between low specialists and high specialists suggest that high specialists do not exhibit significantly different rankings of outcomes from low specialists.

H2. Different outcome profiles within the same activity have significantly different mean specializations.

The level of specialization served as the dependent variable for the testing of this hypothesis. Specialization means were compared for groups of hikers who were classified by the raw values of their motive scores. Each hiker received a low or high classification, depending on whether they were above or below the overall sample mean on each motive scale. For example, if the domain mean was 4.5 (overall), and a particular hiker scored a 4.62 on that scale, he/she would be assigned to the high classification for that particular motive. This procedure was used to classify each hiker as high or low for the exercise, nature, social, autonomy and achievement domains.

The next step in the analysis was to determine a way to create classes of hikers which reflect more than one domain at a time. A considerable amount of time was spent trying to cluster analyze the respondents into similar groups based upon their five domain scores. Regardless of whether these scores were entered as raw or standardized values for each individual, the resulting clusters always separated the hikers into one relatively large group and several small groups making generalizable conclusions either very macro or very micro.

An alternative method of breaking the hikers into groups was developed by classifying each hiker into a multiple motive profile. For each statistical test, three motives were utilized to represent one motive profile. Three motives were chosen as a compromise between trying to accurately portray the whole motive picture and keeping the analysis technically understandable. For example, a particular hiker may score high on the exercise, high on the nature and high on the social motive, while a second hiker may score low on the exercise, low on the nature and high on the social domain. Overall, eight nominal

classifications are possible with any three motives entered into the procedure. Since there are five total motives, there are ten possible combinations of combining three motives at a time. However, once three new domain scores are utilized, they reclassify the hikers into new categories, so comparisons between different combinations of motive profiles are not possible since they are not independent. Comparisons are only possible within different high/low combinations of any given three motives. Table 22 lists the mathematical

Table 22. Possible classifications for three domain variables, when each variable is categorized low or high

Class	Domain #1	Domain #2	Domain #3
1	High	High	High
2	High	High	Low
3	High	Low	High
4	High	Low	Low
5	Low	High	High
6	Low	High	Low
7	Low	Low	High
8	Low	Low	Low

combinations which could be utilized for comparisons given three motives.

This classification system divides the total sample into eight discrete groups for any combination of three motive domains. An alternative approach would be to look at the high and low categories for a single motive. However, such an approach would ignore how

motives interact. Rarely, if ever, does one motive explain the behavior of recreationists. Conversely, it may seem most appropriate to list all five motives and compare the possible categories of high/low combinations. The results would produce 125 classes and require tremendous conceptual skill to understand five motive dimensions at once. Three motive variables are conceptually possible to understand and also provide insight into interactions that might occur. Still, the possibilities for analysis are large since eight groupings are possible for each of ten combinations of three domain variables, creating eighty possible groups.

The results from hypothesis one provide some insight into which classes of motives might be most meaningful to test. Since the exercise, nature, autonomy and achievement domains increased significantly across levels of specialization, it might be expected that hikers who score high on any three motives would have significantly different specialization means than those scoring all low. If one or more of these combinations were not significant, the results may provide some insight into how the motives are covarying or interacting. Secondly, it would be possible to explore which of these combinations of motives is the strongest or weakest indicator of specialization. Table 23 compares the specialization index means between individuals with high exercise, nature, autonomy, and achievement motive packages (only three motives are explored in any one test) and individuals with the opposite package (i.e., all low). A Student's t-test was calculated to test for a significant difference (.05 level of probability) in the specialization index means.

Table 23. Student's t-test of the difference in specialization index scores between individuals with high exercise, nature, autonomy, and achievement motive packages and individuals with the opposite mode of characteristics

Motive package			Number of cases	Mean	Standard deviation	t value	Degrees of freedom	2-tail probability
Au	Ac	Ex						
High	High	High	100	1.58	6.62	2.36*	202	.022
Low	Low	Low	104	- .64	7.15			
Na	Au	Ex						
High	High	High	82	2.43	6.02	3.23**	136	.002
Low	Low	Low	71	-1.08	7.25			
Ac	Na	Ex						
High	High	High	89	1.52	6.34	2.63**	168	.009
Low	Low	Low	85	-1.18	7.14			
Au	Na	Ac						
High	High	High	84	1.85	6.22	3.31**	164	.001
Low	Low	Low	84	-1.54	7.02			

*Significant at the .05 level of probability
**Significant at the .01 level of probability

The results indicate that significant differences were found between individuals who scored high across the three motive packages and those who scored low, for each combination of the four domains. Those individuals who scored high on the autonomy/achievement/exercise package reported a mean of 1.58 as compared to -.64 for the low group. While significant, the t value for this package was also the lowest of the four tests. The nature/autonomy/exercise package exhibited a relatively high t value of 3.23. The high group in this package also exhibited the greatest specialization index mean ($\bar{x}$ = 2.43), suggesting that hikers with these motives are the most likely to be highly specialized. The achievement/nature/exercise motive package reported specialization index means of 1.52 and -1.18 for the high and low groups respectively. The obtained t value was .009, exceeding the .05 level of significance criterion. The last test statistic on Table 23 compares the high and low groups of the autonomy/nature/achievement motive package. The resulting t value was the highest of the four tests with a two-tail probability of .001. The low group exhibited a mean of -1.54, the lowest specialization index mean of the four combinations, suggesting that hikers with this set of motive characteristics are the least likely to be highly specialized.

The statistical tests of the four outcome profile comparisons indicate that any combination of three motive variables, including exercise, nature, autonomy and achievement significantly account for increases in specialization index values when the all high groups are compared with the all low groups for each of the four possible motive packages. When the two packages with the greatest significance, nature/autonomy/exercise and autonomy/nature/achievement, are

compared, only the nature and autonomy motives appear in both, suggesting that these two motives may be the best indicators of high specialization when operating in tandem. This suggestion is supported further by the fact that these same two packages report the highest specialization index means of the four comparisons for the all high groups. The mean for the all high nature/autonomy/exercise motive package and the all high autonomy/nature/achievement motive package had specialization index means of 2.43 and 1.85 respectively. The nature and autonomy motives appear also in the autonomy/nature/achievement package which provided the lowest specialization index mean ($\bar{x}$ = -1.54) of the four all low groups. While the t-tests did not compare standard deviations, Table 23 indicates that the all low groups of each of the motive packages exhibited more specialization index variance than the high groups suggesting that the all high motive group for each package is a more homogeneous group in regard to their degree of specialization.

The relative stability of the social motive in Hypothesis 1 indicates that the social motive does not vary from one level of specialization to another. A logical question to ask is if the social motive possibly interacts or combines with other motives to a degree where it might explain some of the variance in the specialization index variable. Consequently, a second set of t-tests were calculated with the previous four motives combined for all possible combinations with the social motive. Three motive packages were once again utilized for the analysis and the all high motive group was compared with the all low motive group for each of the six possible combinations. Since the social motive does not significantly account

for specialization alone, it should add more unexplained variance, perhaps making comparisons of the all high and all low motive groups insignificant with respect to differences in their specialization index means.

In all, six different motive packages can be constructed when any two motives from the exercise, nature, autonomy and achievement domains are combined with the social motive. The results of the t-tests comparing the all high motive group with the all low motive group are reported in Table 24. The probability of the t values indicates that the results are non-significant in five of the six tests. The only motive package where the social motive combines with two of the other motives to account for significant differences in specialization is the autonomy/social/nature combination. The specialization index mean of 1.78 for the all high motive group was significantly higher than the mean of -.71 for the all low motive group, compared with the all low motive groups of the same package. Additionally, the all high autonomy/social/nature motive package exhibited the highest specialization mean for any of the six motive packages, while the all low group for this package also exhibited the lowest specialization mean. Two of the motive packages, nature/social/exercise and exercise/social/achievement, exhibited all low motive group specialization means which were equal to the overall sample mean, suggesting that hikers who score low in both social and exercise are the least likely to be low specialists of any of the six comparisons. As in the previous set of tests for Hypothesis 2, the standard deviations for the all low motive groups were consistently larger than the all high motive groups, perhaps suggesting that hikers

Table 24. Student's t-test of the difference in specialization index scores between individuals with high social motive packages and individuals with the opposite mode of characteristics

Motive package			Number of cases	Mean	Standard deviation	t value	Degrees of freedom	2-tail probability
Au	So	Na						
High	High	High	76	1.78	6.08	2.18*	126	.031
Low	Low	Low	66	- .71	7.40			
Na	So	Ac						
High	High	High	74	.93	6.33	1.30	144	.195
Low	Low	Low	74	-.51	7.05			
Na	So	Ex						
High	High	High	77	1.60	6.51	1.47	124	.144
Low	Low	Low	63	- .16	7.41			
Au	So	Ex						
High	High	High	75	1.34	6.61	1.37	140	.172
Low	Low	Low	70	- .22	7.06			
Ex	So	Ac						
High	High	High	85	.82	6.82	.91	168	.362
Low	Low	Low	85	-.16	7.22			
Au	So	Ac						
High	High	High	81	.80	6.70	1.08	162	.28
Low	Low	Low	83	-.36	6.99			

*Significant at the .05 level of probability

who value outcomes highly are more similar in their specialization orientation at all levels of the continuum.

In summary, the first set of t-tests revealed that any combination of three motives from the exercise, nature, autonomy or achievement domains account for significant differences in specialization values when hikers who scored high across the motives are compared with hikers who scored low across motives. The packages which contained both the nature and autonomy motives exhibited the greatest ability to discriminate differences in specialization. When these same motives were combined with the social motive in packages of three, the ability to explain significant differences in specialization values was greatly reduced. Only the autonomy/social/nature package was able to account for significant differences between hikers who scored high across all three motives compared to those who scored low across all three. Overall, the motive profile schemes were found significant in 50 percent of the statistical tests. The hypothesis is supported moderately.

H2a. There are different outcome profiles within the same activity that have different distributions of specializations.

As a related analysis to the previous hypothesis, it was hypothesized that profiles based on motive scores would redistribute the hikers into the three levels of specialization. Additionally, these distributions would differ significantly from the equal distributions expected if the motive profiles were unrelated to the distribution of specialization. A chi-square test of independence was utilized to test for non-random differences in the all high motive

profiles compared with the contrasting all low motive profile for all ten motive packages (Table 25). If the resulting chi-square statistic was significant beyond the .05 level of probability, support for the hypothesis was noted.

Overall, the hypothesis was supported in seven of the ten statistical tests. The differences in distributions were weakest when the social motive was entered into the motive package. The exercise/social/achievement, autonomy/social/achievement, and nature/social/exercise packages did not account for significant differences in the distribution of hikers across the three levels of specialization. As found in the previous hypothesis, the autonomy/nature/social motive package exhibited the strongest relationship of any of the social related packages, with a chi-square of 9.05. The general orientation of the all high group indicated a more specialized hiker who enjoys an isolated, natural environment with the company of friends or family. The nature/social/exercise and exercise/social/autonomy motive packages also exhibited significantly different distributions of hikers across specialization levels, with chi-squares of 6.37 and 6.59 respectively. Apparently, specialized hikers who exhibit a strong social motive are more likely to have strong nature, autonomy and exercise motives rather than an achievement orientation. These three significant packages are also similar with respect to the direction of their distribution differences. For the all high group of each package, the greatest number of hikers were found in the high specialist group and the smallest proportion in the low specialist group. While the all low group for each package exhibited the

Table 25. Chi-square tests for independence of specialization levels on individuals with all high motive socres and individuals with contrasting all low motive scores for ten different motive packages

Motive packages			Low specialist	Medium specialist	High specialist	Row total
Au	Na	So				
Low	Low	Low	20	14	12	46
High	High	High	14	31	31	76
Column			34	45	43	n=122
Chi-square = 9.05; Statistically significant at .05 level						
Na	So	Ex				
Low	Low	Low	20	14	12	46
High	High	High	17	30	30	77
Column			37	44	42	n=123
Chi-square = 6.37; Statistically significant at .05 level						
Ex	So	Ac				
Low	Low	Low	28	22	23	73
High	High	High	14	24	23	61
Column			42	46	46	n=134
Chi-square = 3.71; Not statistically significant						
Ex	So	Au				
Low	Low	Low	26	23	21	70
High	High	High	10	24	25	59
Column			36	47	46	n=129
Chi-square = 6.59; Statistically significant at .05 level						
Au	So	Ac				
Low	Low	Low	22	20	21	63
High	High	High	15	27	24	66
Column			37	47	45	n=129
Chi-square = 2.50; Not statistically significant						

Motive packages			Low specialist	Medium specialist	High specialist	Row total
Na	So	Ex				
Low	Low	Low	18	12	12	42
High	High	High	17	31	26	74
Column			35	43	38	n=116
Chi-square = 5.14; Not statistically significant						
Au	Na	Ex				
Low	Low	Low	34	18	19	71
High	High	High	13	30	39	82
Column			47	48	58	n=153
Chi-square = 18.58; Statistically significant at .05 level						
Ac	Na	Au				
Low	Low	Low	31	16	16	63
High	High	High	17	33	34	84
Column			48	49	50	n=147
Chi-square = 13.74; Statistically Significant at .05 level						
Ac	Na	Ex				
Low	Low	Low	31	16	16	63
High	High	High	20	31	38	89
Column			51	47	54	n=152
Chi-square = 12.03; Statistically Significant at .05 level						
Ac	Au	Ex				
Low	Low	Low	45	30	29	104
High	High	High	13	26	32	71
Column			58	56	61	n=175
Chi-square = 12.30; Statistically significant at .05 level						

Motive domain key: EX = exercise; SO = social; NA = nature; AU = autonomy; AC = achievement

opposite frequency patterns, suggesting that the importance of these motives increases as the hikers level of specializations increase.

When the social motive was excluded from the motive package, the chi-square tests on the remaining combinations of motives were all significant at the .05 level of probability. The all autonomy/nature/exercise package exhibited the largest chi-square values of 18.58. The achievement/nature/autonomy, achievement/nature/exercise, and achievement/autonomy/exercise profiles all demonstrated larger test values than any of the social motive dependent profiles. Again the low specialists category was the most frequent classification of the hikers when the all low motive profile occurred, while hikers were most likely to be classified as high specialists when the opposite all high profile was examined.

In summary, it appears that opposing motive profiles are related to the level of hiking specialization for the sample. The chi-square tests were significant in seven of the ten tests indicating strong support for the hypothesis. This relationship is non-existent or the weakest when the social motive is included within a motive package, suggesting that the level of specialization is not related to significant changes in the social motive. The exercise, nature, autonomy and achievement motives when combined in different outcome packages (of three) account for significant changes in the distribution of hikers across the three levels of specialization. The combination of nature and autonomy in any motive package appears to exhibit the greatest discrimination potential in determining the level of specialization for the packages examined.

H3. Persons varying in level of specialization will differ significantly in preferences for environmental attributes.

Based on the conceptual model discussed previously, it was hypothesized that differences in the importance of different setting attributes could be explained, in part, by the degree to which a hiker is specialized. The importance of these attributes reflects to what degree the hiker perceives the individual attribute as contributing to or detracting from a satisfying experience. Two criteria affected the choice of a statistical procedure for testing this hypothesis. First, Bryan (1979) conceptualized specialization along a continuum which suggests that systematic changes occur concerning physical, social and managerial setting attitudes and preferences. Secondly, the comparative nature of the study objectives necessitated a similar statistical framework to compare the predictive ability of specialization and psychological motives. For these reasons the first hypothesis in the third and fourth set of hypotheses explored the two conceptual frameworks for direct linear relationships with the environmental setting attributes. The related hypotheses in each set tested for differences between levels of both independent variable schemes. Pearson's product-moment correlations were employed to test for the hypothesized relationship. If the resulting Pearson's r was significant below the .05 level of probability, support for hypothesized relationship was noted.

Table 26 presents the results of the statistical tests and their two-tailed probabilities. Overall, twenty-one of the thirty-eight environmental setting attributes were found to be significantly related to the degree of specialization. Thirteen of the significant

Table 26. Pearson correlation coefficients between the specialization index score and the importance of physical, social and managerial setting attributes

Attributes	Pearson r	(n)	Two-tailed probability
Physical			
High mountain trails	.043	(377)	.409
Availability of firewood	-.160**	(377)	.002
No evidence of man-made structures	.048	(377)	.356
Open meadows	.112*	(376)	.030
Natural lakes and streams	.023	(377)	.654
Availability of natural drinking water	.077	(376)	.139
Seeing wildlife	-.022	(377)	.673
Timber pine forest	-.106*	(374)	.041
Rugged terrain	.376**	(375)	< .001
Presence of bears	.186**	(377)	< .001
Natural swimming areas	-.010	(376)	.852
Desert canyons	.124*	(374)	.017
Social			
Seeing others near your campsite	-.098	(376)	.057
Other recreationists carrying firearms	-.046	(377)	.375
Seeing others on the trail	-.129*	(376)	.012
Presence of commercial and organizational groups (outfitters, scouts, etc.)	-.118*	(378)	.022
Pets in the backcountry	-.062	(378)	.233
Seeing motorized recreationists	-.161**	(378)	.002
Hikers and horseriders using the same trails	-.094	(377)	.068
Loud recreationist	-.117*	(377)	.023
Managerial			
Presence of logging	-.339**	(378)	< .001
Trail quotas for high use periods	.111*	(375)	.032
Outhouse-type toilets at popular campsites	-.118*	(378)	.022
Revegetating of over-used areas	.155**	(375)	.003
Required permits to dayhike	-.095	(378)	.066
Well placed and accurate directional signs	-.324**	(376)	< .001
Domestic livestock on trails	-.225**	(377)	< .001
Readily available information on regulations	-.026	(377)	.617
Paved access roads	-.172**	(377)	.001
Fining of backcountry regulation violators	.014	(377)	.793
Fish stocking of backcountry lakes	-.084	(374)	.106
Well maintained trails	-.285*	(378)	< .001
A party size limit of 10 or less persons	.146**	(378)	.005
A fee to use the backcountry ($1-$5)	-.061	(377)	.240
Presence of mining	-.225**	(377)	< .001
Required permits to backpack	.029	(377)	.580
Absence of regulations	.111*	(377)	.032
Readily available information on the natural history of an area	.100	(378)	.052

*Significant at the .05 level of probability
**Significant at the .01 level of probability

relationships were negative reflecting that either the high specialists found these attributes more detracting than low specialists or that the high specialists found these attributes less important in adding to satisfaction.

Three of the significant relationships exhibited a Pearson's r of over .3, including presence of logging (r = -.339), well placed and accurate directional signs (r = -.324) and rugged terrain (r = .376). Three other attributes, including domestic livestock on trails (r = -.225), well maintained trails (r = -.285), and presence of mining, were significantly related to specialization with correlations above .2. The availability of firewood, revegetating of over-used areas, paved access roads, a party size limit of 10 or more persons, seeing motorized recreationists, and the presence of bears were all significant beyond the .01 level of probability. The weakest non-significant relationships between specialization and environmental setting attributes were found with natural swimming areas (r = .010), fining of backcountry regulation violators (r = .014), seeing wildlife (r = -.022), and natural lakes and streams (r = .023).

When the environmental setting attributes are grouped into the three ROS categories, there appears to be considerable parity concerning which attribute domain is best accounted for by the specialization variable, except within the managerial attribute domain. Fifty percent of the physical and social setting attributes exhibited significant relationships with the level of hiking specialization. However, over sixty percent of the management attributes displayed significant relationships with the specialization variable. The strongest relationships in the physical setting domain

were found with rugged terrain (r = .376), presence of bears (r = .186) and availability of firewood (r = -.160). Within the social domain, seeing motorized recreationists (r = -.161), and seeing others on the trail (r = -.129) exhibited the greatest strength with hiking specialization, both negative. The managerial attributes exhibited strong negative and positive relationships with a variety of variables. Negative management relationships were found for presence of logging (r = -.324), well maintained trails (r = -.285), domestic livestock on trails (r = -.225), and presence of mining (r = -.225). The strongest positive relationships between hiking specialization and management attributes were exhibited by revegetating of over-used areas (r = .155) and a party size limit of ten or less persons (r = .146).

In summary, the significant relationships were found in 21 of the 38 (55%) environmental setting attributes. These findings indicate moderate support for the study hypothesis that persons varying in degree of specialization will differ significantly in their preferences for environmental setting attributes. There is considerable evidence that the degree of specialization can be a useful conceptualization for explaining the importance of managerial setting attributes to hikers. The specific nature of these relationships is more difficult to determine from merely examining correlation coefficients. Hypothesis 3a is designed to examine the direction and degree of these relationships more directly.

H3a. The environmental setting attributes of high specialists detract from or contribute to satisfaction to a greater degree than the attributes of low specialists.

While the previous hypothesis established that there are relationships between environmental setting attributes and the level of hiking specialization, the exact nature of these relationships cannot be determined from Pearson's r values. The dependent variables, or individual attributes, were designed and operationalized with a bi-directional seven point scale where a value of 4.0 represented a neutral response on the item (i.e., a value of 4.0 would indicate that the attribute neither detracts from nor adds to hiking satisfaction). Consequently, an individual score that falls below 4.0 reflects a detracting valence, with the degree of detraction being the greatest as the score approaches 1.0. Conversely, if the value is above 4.0, the attribute contributes to hiking satisfaction, with 7.0 reflecting the greatest degree of contribution. It is expected from this hypothesis that high specialists will not only exhibit different mean values for the environmental setting attributes, but their mean attribute values will be further from the neutral value (4.0) than the means for low specialists. Relatedly, the correlations from the previous hypothesis do not differentiate if an attribute with a negative correlation contributes less (positive valence) or detracts more (negative valence) from hiking satisfaction. Consequently, the results from this hypothesis indicate whether the attribute mean is above or below the neutral position for low and high specialists, whereas the results from hypothesis three do not.

A Student's t-test was performed to investigate if the two groups (low and high specialization) differed as hypothesized for each of the attribute items. Table 27 indicates that sixteen of the thirty-two factored items were significant beyond the .05 level of probability

Table 27. Student's t-tests of the difference in the contribution or detraction of factored environmental setting attributes of low and high specialized hikers

Factor Name and Items	Specialization mean Low	High	t value	Degrees of freedom	2-tail probability
1: Management permission					
Required permits to backpack	3.15	3.25	-0.64	249	.520
Required permits to dayhike	2.98	2.65	2.08*	250	.038
A fee to use the backcountry	3.36	3.20	0.79	250	.428
2: Management support					
Well placed and accurate directional signs	5.82	4.91	6.05**	249	< .001
Well maintained trails	5.61	4.74	5.46**	250	< .001
Paved access roads	3.93	3.50	2.36*	250	.019
Rugged terrain	5.38	6.44	-8.60**	250	< .001
3: Other users					
Hikers and horseriders using the same trails	3.07	2.61	2.55*	249	.012
Domestic livestock on trails	2.99	2.18	4.89**	249	< .001
Pets in the backcountry	3.10	2.91	0.87	250	.385
Presence of commercial and organizational groups (outfitters, scouts, etc.)	2.99	2.60	2.35*	250	.020
4: Regulation support					
Fining of backcountry regulation violators	5.56	5.53	0.26	249	.794
Readily available information on regulations	3.93	3.50	1.20	249	.230
Absence of regulations	3.68	4.12	-1.91	250	.057
Revegetating of over-used areas	5.37	5.87	-3.34**	248	.001
5: Consumptive users					
Presence of mining	2.43	1.80	4.26**	250	< .001
Presence of logging	2.67	1.70	7.22**	250	< .001
Other recreationists carrying firearms	2.32	2.18	0.91	250	.362
6: Natural setting					
Desert canyons	5.77	6.12	-2.64**	248	.009
Natural swimming areas	5.54	5.57	-0.10	248	.917
Readily available information on the natural history of an area	5.52	5.35	1.29	250	.198
Presence of bears	3.75	4.43	-3.44**	249	.001
7: Other hikers					
Seeing others near your campsite	2.70	2.44	1.83	248	.068
Seeing others on the trail	3.93	3.61	1.98*	248	.049
8: Capacity limits					
Trail quotas for high use periods	4.35	4.69	-1.75	248	.081
A party size of 10 or less persons	4.58	5.22	-3.60**	250	< .001
9: Natural amenities					
Fish stocking of backcountry lakes	5.28	4.98	1.72	246	.087
Availability of firewood	5.11	4.75	2.08*	249	.039
High mountain trails	5.75	5.91	-1.09	250	.278
Timber pine forest	6.02	5.71	1.81	249	.071
10: Structure					
Outhouse-type toilets at popular campsites	4.48	4.13	1.73	250	.084
No evidence of man-made structures	5.69	5.85	-0.95	249	.341

*Significant at the .05 level of probability
**Significant at the .01 level of probability

for the two-tailed t value. Of the sixteen attributes which showed significant differences between low and high specialists, all but three were in the hypothesized direction. These three attributes, including well placed and accurate directional signs, well maintained trails, and the availability of firewood, contribute to satisfaction to a greater degree for low specialists than high specialists. One of the items, the presence of bears, actually detracted from the low specialist's hiking experience while it added to the high specialist's experience. The high specialists exhibited a greater degree of detraction or contribution for the remaining ten significant attributes.

When the attributes are classified within the previously identified factors, it is possible to examine which types of attributes are most sensitive to changes between low and high specialists. The factor one attributes, titled management permission indicated only a small difference between low and high specialized hikers as only one of the three attributes was significant at the .05 level of probability. The high specialists found required permits to dayhike significantly more detracting ($\bar{x}$ = 2.65) than low specialists ($\bar{x}$ = 2.98). Significant differences were not found between low and high specialists on the other two management permission attributes. The low and high specialists differed significantly on all of the management support attributes (factor two), but only two of the differences were in the hypothesized direction. The low specialists reported that well placed and accurate directional signs and well maintained trails contributed more to satisfaction than did high specialists. The findings for paved access roads were as

hypothesized, where high specialists ($\bar{x}$ = 3.50) indicated this attribute detracted significantly more than low specialists ($\bar{x}$ = 3.93).

Dividing the hikers into low and high specialization groups was also a useful indicator of evaluations of other users (factor 3), where three of the four attribute means were significant in the hypothesized direction. Hikers and horseriders using the same trails ($t = 2.55$, $p = .012$) domestic livestock on trails ($t = 4.89$, $p < .001$), and the presence of commercial and organizational groups ($t = 2.35$, $p = .020$) all detracted to a greater degree from hiking satisfaction for high specialists than low specialists. Only one of the attributes on the regulation support factor, revegetating of over-used areas was significantly different for the two groups of hikers. High and low specialists also showed significant differences for the consumptive users factor. The presence of mining ($t = 4.26$, $p < .001$) and presence of logging ($t = 7.22$, $p < .001$) detracted to a greater degree for high specialist hikers. The third attribute in this factor, other recreationists carrying firearms, did not differ significantly in importance between the two specialization groups.

The high and low specialist groups accounted for two differences in the natural setting factor. The desert canyon attribute was significant ($t = -2.64$, $p = .009$) in the hypothesized direction, as was presence of bears. High specialists found these attributes a stronger contributor to satisfaction than the low specialists. The "other hikers" factor contained only two attributes, including seeing others near your campsite ($t = 1.83$, $p = .068$) and seeing others on the trail ($t = 1.98$, $p = < .001$). While the latter attribute was

significant in the hypothesized direction (detracted more for high specialists), seeing others near your campsite was relatively close to the .05 level of significance. The "capacity limits" factor was also comprised of two attributes. Trail quotas for high use periods was not significant ($t = -1.75$, $p = .081$), but a party size limit of 10 or less persons was significantly more important to the high specialists than the low specialist group. Only one of the "natural amenities" factor's attributes was significant, that is, the availability of firewood ($t = 2.08$, $p = .039$). However, the means differed from the hypothesized direction. The low specialists expressed that the availability of firewood was significantly more important than for the high specialist. Finally, the "structure" factor contained two attributes, neither of which was significant in the hypothesized direction.

The questionnaire contained six attributes which were not included in the factors reported on Table 27. Student t-tests were also employed to determine if the hypothesized relationship was present between high and low specialists on these attributes. The results are presented in Table 28. The t values indicate that one of the six tests showed a significant difference between the two groups. High specialists reported that seeing motorized recreationists ($t = 3.86$, $p < .001$) detracted to a higher degree than the low specialists.

In summary, seventeen of the environmental setting attributes exhibited significant relationships between low and high specialized hikers. The environmental setting attributes of high specialists detracted from or contributed to satisfaction to a greater degree than

Table 28. Student's t-tests of the difference in the contribution or detraction of non-factored environmental attributes of low and high specialized hikers

Attribute	Specialization mean Low	High	t value	Degrees of freedom	2-tail probability
Open meadows	5.94	6.14	-1.71	248	.088
Natural lakes and streams	6.63	6.71	-0.92	249	.361
Availability of natural drinking water	6.24	6.41	-1.47	249	.143
Seeing wildlife	6.65	6.66	-0.17	249	.865
Seeing motorized recreationists	1.51	1.17	3.86**	250	<.001
Loud recreationists	1.54	1.38	1.41	249	.160

**Significant at the .01 level of probability

low specialists in fourteen of the seventeen significant attributes. While this relationship is not always present, it did occur in 36.8 percent of the examined t-tests and in 82.4 percent of the significant t-tests. Some care should be taken in interpreting this hypothesis. While adequate evidence is found to support the hypothesis, the interpretation of these findings could be misleading. High specialists are not always more extreme in their environmental setting preferences, while there is evidence from these findings that this is most often the case. The choice is made to reject this hypothesis without more conclusive results. Three attributes exhibited significant t values in the non-hypothesized direction. They were well maintained trails, well placed and accurate directional signs,

and the availability of firewood. Two of these attributes were related to man-made improvements by management, indicating that low specialists are in general more appreciating of these actions. The third was the availability of firewood, suggesting that high specialists are less dependent on this attribute than are low specialists. While high specialists in general report a greater degree of detraction or contribution on environmental setting attributes, there are attributes in which the opposite is true.

H3b. High specialists exhibit less variation in their environmental setting attribute preferences than low specialists.

The theoretical model presented in Chapter three suggests that highly specialized users of a particular activity style will agree to a greater extent than low specialists about the importance of particular environmental setting attributes. To test this hypothesis, the variance for both high and low specialist hikers was computed, as variance is directly related to the homogeneity of a group. Once these values were determined, an F test was performed on the two values to determine if the variances differed to a significant degree at the .05 level of probability (Helmstader 1978). The variances for the two groups are contained in Table 29, along with the corresponding F ratio for each of the attribute items.

When the new variance values are examined for high and low specialists, the high specialists exhibited lower values in only sixteen of the thirty-eight attributes. Seven of the F tests were significant at the .05 level of probability. These significant differences were found on the presence of mining, availability of

Table 29. F tests of the difference in the variance on environmental setting attributes between low and high specialized hikers

Attribute	Variance		F test ratio
	High(N)	Low(N)	
High mountain trails	1.600(126)	1.359(126)	.849
Presence of logging	.788(126)	1.367(126)	1.735**
Availability of firewood	1.295(126)	1.793(125)	1.385*
No evidence of man-made structures	1.889(126)	1.700(125)	.900
Seeing others near your campsite	1.065(126)	1.557(124)	1.462*
Trail quotas for high use periods	2.990(126)	2.038(124)	.682
Outhouse-type toilets at popular campsites	3.213(126)	2.619(126)	.815
Open meadows	.947(125)	.899(125)	.949
Other recreationists carrying firearms	1.815(126)	1.623(126)	.894
Natural lakes and streams	.320(125)	.570(126)	1.540**
Revegetating of over-used areas	1.174(126)	1.569(124)	1.336
Required permits to day hike	2.170(126)	1.528(126)	.704
Well placed and accurate directional signs	1.939(126)	.923(126)	.476
Availability of natural drinking water	.905(125)	.775(126)	.856
Domestic livestock on trails	1.622(126)	1.814(125)	1.118
Seeing others on the trail	1.354(126)	1.385(124)	1.023
Seeing wildlife	.402(125)	.357(126)	.888
Readily available information on regulations	1.368(126)	1.071(125)	.782
Paved access roads	2.204(126)	2.574(126)	1.168
Fining of backcountry regulation violators	2.156(126)	1.410(125)	.654
Fish stocking of backcountry lakes	2.185(125)	1.395(123)	.638
Well maintained trails	1.987(126)	1.232(126)	.620
Timber pine forest	2.570(126)	1.476(125)	.574
Presence of commercial and organizational groups (outfitters, scouts, etc.)	1.507(126)	1.406(126)	.933
Pets in the backcountry	2.410(126)	2.208(126)	.916
A party size limit of 10 or Less persons	2.243(126)	1.878(126)	.837
Rugged terrain	.569(126)	1.358(126)	2.387**
Seeing motorized recreationists	.257(126)	.684(126)	2.661**
Presence of bears	2.796(125)	2.207(126)	.789
A fee to use the backcountry ($1-$5)	2.186(126)	1.895(126)	.867
Natural swimming areas	1.598(124)	1.626(126)	1.018
Hikers and horseriders using the same trails	1.461(126)	1.594(125)	1.091
Desert canyons	1.174(126)	1.270(124)	1.081
Presence of mining	1.259(126)	1.399(126)	1.111
Required permits to backpack	2.841(125)	1.595(126)	.561
Loud recreationist	.642(125)	.890(126)	1.386*
Absence of regulations	3.834(126)	2.714(126)	.708
Readily available information on the natural history of an area	.997(126)	1.304(126)	1.308

*Significant at the .05 level of probability
**Significant at the .01 level of probability

firewood, seeing others near your campsite, natural lakes and streams, rugged terrain, seeing motorized recreationists and loud recreationists attributes. In these attributes high specialists do exhibit significantly more agreement than the low specialist hikers. However, since low specialists exhibited lower variances on twenty-two of the thirty-eight attributes and the hypothesized relationship did not occur in thirty-one of the thirty-eight F tests, the hypothesis is not supported. While high specialists often value environmental setting attributes differently than low specialists, they do not exhibit less variation about this mean than low specialists do about their mean value.

H4. Different outcome motives are associated with different types of environmental setting attributes.

The testing of this hypothesis allows for a comparison of the relative predictive power of each of the five motives in explaining each of the thirty-eight environmental setting attributes. Secondly, it is possible to ascertain if the motive scores or the specialization index are better overall indicators of attribute importance. Pearson's product moment coefficients were computed to test the hypothesis. The five motives were utilized as independent variables and their relationships were determined to each of the thirty-eight attributes. The obtained correlation coefficients are reported in Table 30.

In general, the obtained correlation coefficients were relatively low; the highest correlation was .271. The nature motive exhibited the greatest success in explaining variation in environmental setting attributes, as it was significantly associated with seventeen of the

Table 30. Pearson correlation coefficients between individual motive scores and the importance of physical, social and managerial setting attributes

Attributes	Pearson's r				
	Exercise	Social	Nature	Automony	Achievement
Physical					
High mountain trails	.016	.024	.143**	.057	.063
Availability of Firewood	-.109*	.022	.029	-.058	-.038
No evidence of man-made structures	.088	.041	.223**	.104*	.139**
Open meadows	.017	.075	.250**	.044	-.014
Natural lakes and streams	.047	.095	.180**	-.004	.040
Availability of natural drinking water	-.062	-.008	.110*	-.038	-.037
Seeing wildlife	.052	.057	.271**	-.011	.084
Timber pine forest	.072	.005	.162**	-.059	.015
Rugged terrain	.172**	.019	.165**	.191**	.207**
Presence of bears	.004	-.084	.099*	.116*	.026
Natural swimmming areas	.076	.039	.129**	.110*	.061
Desert canyons	.139**	.006	.179**	.108*	.028
Social					
Seeing others near your campsite	.002	.047	-.133**	-.046	-.031
Other recreationists carrying firearms	-.092	-.042	-.007	.046	-.014
Seeing others on the trail	-.044	.142**	-.025	-.026	.012
Presence of commercial and organizational groups (outfitters, scouts, etc.)	-.112*	.010	-.134**	-.115*	-.079
Pets in the backcountry	.053	-.019	.000	-.032	.026
Seeing motorized recreationists	-.043	-.050	-.107*	.010	-.041
Hikers and horseriders using the same trails	-.032	-.070	-.023	.000	-.077
Loud recreationist	.022	.079	-.110*	-.038	-.032
Managerial					
Presence of logging	-.068	.077	-.036	.066	-.035
Trail quotas for high use periods	-.037	.042	.033	-.021	.016
Outhouse-type toilets at popular campsites	-.026	.027	-.033	-.043	-.077
Revegetating of over-used areas	.000	-.026	.095	-.015	.042
Required permits to day hike	-.035	.009	-.029	.054	.027
Well placed and accurate directional signs	-.006	.048	.035	-.113*	.006
Domestic livestock on trails	.000	-.054	-.027	.011	
Readily available information on regulations	-.060	.124*	.083	-.042	.018
Paved access roads	.041	.104*	-.020	-.059	.012
Fining of backcountry regulation violators	-.048	.088	.104*	-.043	.068
Fish stocking of backcountry lakes	-.037	.072	.046	.039	.000
Well maintained trails	-.024	.044	-.004	-.063	.049
A party size limit of 10 or less persons	.055	.043	.093	-.020	.057
A fee to use the backcountry ($1-$5)	-.010	-.048	-.034	.056	.040
Presence of mining	.005	.037	-.077	.002	.006
Required permits to backpack	.011	.034	.010	.060	.036
Absence of regulations	.000	.010	-.030	-.069	-.088
Readily available information on the natural history of an area	.053	.040	.156**	.051	.103*

*Significant at the .05 level of probability
**Significant at the .01 level of probability

items. The strongest of these relationships were with seeing wildlife ($r = .271$), open meadows ($r = .250$), no evidence of manmade structures ($r = .223$), natural lakes and streams ($r = .180$), desert canyons ($r = .179$), rugged terrain ($r = .165$) and timbered pine forests ($r = .162$). These are all attributes which are associated with the degree of naturalness at a particular setting. When compared with the results of Hypothesis 3, only the nature motive approaches the success of the specialization index variable in explaining variation within the attribute items (the specialization index was significantly related to twenty-one of the attributes, with the highest correlation coefficient at .376).

The next strongest motive was autonomy which exhibited a significant relationship with seven of the thirty-eight dependent variables. These relationships were positive with the no evidence of man-made structures ($r = .104$), rugged terrain ($r = .191$), presence of bears ($r = .116$), natural swimming areas ($r = .110$), and desert canyons ($r = .108$) attributes and negative with the well-placed and accurate directional signs ($r = -.113$) and presence of commercial and organizational groups ($r = -.134$) attributes.

The exercise, social and achievement motives were all relatively weak indicators of the importance of environmental setting attributes to the hikers. The exercise motive indicated a significant relationship with only four of the attributes including availability of firewood ($r = -.109$), presence of commercial and organizational groups ($r = -.112$), rugged terrain ($r = .172$), and desert canyons ($r = .139$). The social motive exhibited significant positive relationships with seeing others on the trail ($r = .142$), readily

available information on regulations (r = .124), and paved access roads (r = .104). The attributes which were significantly related to the achievement motive were also all positive, including: no evidence of manmade structures (r = .139), rugged terrain (r = .207), and readily available information on the natural history of an area (r = .103).

The attributes which were significantly related to the social motive were not accounted for by any of the other motives, suggesting that the social motive does indicate different types of attributes. Unfortunately, its ability to do so was of sufficient strength in only three of the attributes. For the most part, the other four motives exhibited relationships with the same attributes. The nature motive alone provides almost as much predictive power as a model which includes all five motives. All of the attributes which were significantly related to achievement were accounted for by the nature motive. Only one of the significant exercise attributes (availability of firewood) and one of the significant autonomy attributes (well placed and accurate directional signs) were not explained with the nature motive. When the environmental setting attributes are treated as ROS based groups reflecting the physical, social and managerial domains, some different patterns emerge. A great deal of the predictive ability of the nature motive is concentrated on the physical setting attributes. Only one of these attributes is not significantly related to nature, and that attribute, availability of firewood, exhibits a significant relationship with the exercise motive. Overall, each of the physical setting attributes can be explained to some degree by one of the motives. The social setting

attributes also exhibit the most significant relationships with the nature motive. One additional attribute is related significantly to the social motive; that is, seeing others on the trail. However, when each of the study motives are examined within the managerial attribute domain, no more than two significant relationships emerge for any single motive. At least within the context of the motives and attributes chosen for this study, the predictive power of the motives is extremely weak in the managerial domain. Overall, thirty-four of the 190 statistical tests were significant, indicating only partial support of the study hypothesis.

While the hypothesis is not fully supported, several key relationships were found between the study motives and environmental setting attributes. First, motives rarely operate independently of other motives, taken as a whole they exhibited relationships with twenty-two of the attributes. Secondly, the nature motive exhibited a large amount of the overall predictive power in explaining the environmental attributes. Finally, the weakest area in terms of significant relationships between motives and environmental setting attributes appeared within the managerial setting domain.

H4a. Persons with contrasting outcome profiles differ in the importance of their environmental setting attributes.

The outcome profiles utilized in Hypothesis 2a were again employed to group hikers into similar motive classes. Those profiles which were not sensitive to changes in the specialization level of hikers were eliminated to reduce the number of statistical tests for this analysis. Since specialization was associated with several management attributes, the utilization of specialization sensitive

motive packages might provide a better predictor of the unexplained attributes in the previous hypothesis. Again, three motives are represented in each outcome profile. Hikers who scored high for all three motives are contrasted with the opposing group who scored low for the same three motives. Students t-tests were computed to investigate whether the two groups differed significantly for each of the factor analyzed environmental setting attributes. The results of these tests are shown in Table 31. The attributes are organized into the groups that were derived from the previously discussed factor analysis procedure.

The all high achievement/nature/exercise profile hikers differed significantly from the contrasting all low group on only four of the thirty-two factored attributes. Two of the differences were found in the "natural setting" factor where the desert canyons ($t = -2.28$, $p = .005$) and readily available information on the natural history of an area ($t = -2.07$, $p = .040$) attributes were significant at the .05 level of probability. The third and forth significant difference was found on the no evidence of man-made structures attribute ($t = -3.30$, $p = .001$) and rugged terrain ($t = 3.13$, $p < .001$). Hikers who displayed high motives on the autonomy/nature/exercise profile exhibited more significant differences from their contrasting all low profile, than for any of the other profiles tested. All four of the attributes in the natural setting factor were significantly below the .05 level of significance. The other significant differences for the autonomy/nature/exercise profiles were found on the presence of commercial and organizational groups ($t = 2.83$, $p = .005$), a party size of ten or less persons ($t = -2.07$, $p = .040$), no evidence of man

Table 31. Student's t-tests of the difference in importance of factored environmental setting attributes between individuals with contrasting motive scores on five different motive packages

Factor name and attribute	AC/NA/EX	AU/NA/EX	AC/NA/AU	EX/AU/AC	SO/NA/AU
1: Management permission					
Required permits to backpack	-0.14(161)	0.41(160)	0.03(154)	0.03(186)	-0.41(126)
Required permits to dayhike	0.13(161)	0.41(160)	-0.19(154)	0.04(186)	0.11(126)
A fee to use the backcountry	-0.26(161)	-0.05(160)	-0.60(154	-0.38(186)	0.11(126)
2: Management support					
Well placed and accurate directional signs	-1.48(159)	0.44(158)	-0.87(152)	-0.17(184)	0.00(124)
Well maintained trails	-0.82(161)	0.04(160)	-0.95(154)	-0.97(186)	-0.36(126)
Paved access roads	-0.66(160)	-0.26(160)	-0.60(154)	-0.95(186)	-1.10(126)
Rugged terrain (27)	-3.13(159)**	-3.53(158)**	-3.15(152)**	-3.49(184)**	-2.75(124)**
3: Other users					
Hikers and horseriders using the same trails	1.46(160)	1.24(160)	1.01(154)	1.29(186)	1.03(126)
Domestic livestock on trails	0.46(161)	0.92(160)	0.21(154)	0.92(186)	1.49(125)
Pets in the backcountry	0.14(161)	0.01(160)	0.40(154)	0.08(186)	-0.21(126)
Presence of commercial and organizational groups (outfitters, scouts, etc.)	1.89(161)	2.83(160)**	1.93(154)	2.04(186)*	1.40(126)
4: Regulation support					
Fining of backcountry regulation violators	-1.13(160)	0.65(159)	-0.89(153)	-0.91(185)	-0.60(126)
Readily available information on regulations	-0.83(161)	-0.10(160)	-0.42(159)	-0.75(185)	-0.39(125)
Absence of regulations (37)	0.95(160)	0.81(159)	0.51(153)	1.19(185)	-0.30(126)
Revegetating of over-used areas (11)	-0.79(158)	-1.34(158)	-1.14(152)	-0.54(184)	-0.74(124)
5: Consumptive users					
Presence of mining	0.36(160)	0.44(159)	0.87(153)	-0.64(185)	0.81(124)
Presence of logging	0.52(160)	0.98(160)	0.86(154)	0.31(186)	0.53(125)
Other recreationist carrying firearms	0.48(161)	-0.36(160)	0.39(154)	0.21(185)	-0.36(126)
6: Natural setting					
Desert canyons	-2.28(159)**	-2.89(158)**	-2.53(151)	-2.20(184)*	-1.82(123)
Natural swimming areas	-1.81(159)	-2.20(158)*	-1.98(152)*	-1.82(184)	-2.47(125)*
Readily available information on the natural history of an area	-2.07(161)*	-2.52(160)*	-2.45(154)*	-2.70(186)**	-1.53(126)
Presence of bears (29)	-0.82(161)	-2.25(160)*	-1.446(154)	-1.15(186)	-0.94(126)
7: Other hikers					
Seeing others near your campsite	1.59(159)	1.84(158)	1.55(152)	1.42(184)	0.50(124)
Seeing others on the trail	.62(160)	0.79(158)	0.61(152)	0.90(185)	-0.91(123)
8: Capacity limits					
Trail quotas for high use periods	0.04(159)	0.41(159)	0.17(152)	0.79(185)	0.30(125)
A party size of 10 or less persons	-1.57(161)	-2.07(160)**	-1.49(154)	-0.78(186)	-1.97(126)
9: Natural amenities					
Fish stocking of backcountry lakes	0.19(160)	-0.27(160)	-0.13(154)	-0.37(185)	0.35(126)
Availability of firewood	1.50(160)	1.71(159)	1.68(153)	1.68(185)	1.16(125)
High mountain trails	1.81(161)	-1.10(160)	-1.77(154)	-1.66(186)	-0.12(126)
Timber pine forest	-1.40(161)	0.68(160)	-1.21(154)	-1.28(185)	-0.38(125)
10: Structure					
Outhouse-type toilets at popular campsites	0.53(161)	0.96(160)	0.44(154)	0.95(186)	1.01(126)
No evidence of man-made structures	-3.30(160)**	-2.55(159)*	-3.18(153)**	-3.17(185)**	-2.71(126)**

*Significant at the .05 level of probability
**Significant at the .01 level of probability

made structures ($t = -2.55$, $p = .012$), and rugged terrain ($r = -.353$, $p < .001$) attributes.

The achievement/nature/autonomy profile showed three significant differences between the all high motive group of hikers and the contrasting all low group. Again, two of these attributes, natural swimming areas ($t = -1.98$, $p = .049$) and readily available information on the natural history of an area ($t = -2.45$, $p = .016$) were found in the natural setting factor. The no evidence of man-made structures, and rugged terrain attributes were also significantly different between the two groups.

The next outcome profile, exercise/autonomy/achievement exhibited significant differences between the two groups of hikers on five attributes. The desert canyons ($t = -2.20$, $p = .029$) and readily available information on the natural history of an area ($t = -2.70$, $p = .008$) attributes are contained in the natural setting factor. Additionally, presence of commercial and organizational groups ($t = 2.04$, $p = .042$), no evidence of man-made structures ($t = -3.17$, $p = .002$), and rugged terrain ($t = 3.49$, $p < .001$) displayed different attribute means for the two groups.

The social/nature/autonomy outcome profile exhibited three significant differences between the all high and all low motive groups. They were found in natural swimming areas ($t = -2.47$, $p = .015$), no evidence of man-made structures ($t = -2.71$, $p = .008$), and rugged terrain ($t = 2.75$, $p = .007$).

In general, the outcome profiles were most successful in accounting for differences in the natural setting factor. Each of the five profiles exhibited at least one significant difference on these

attributes. Contrasting this with the results of the high and low specialists t-tests from Hypothesis 3a, specialization was a relatively weak indicator of the natural setting attributes (only desert canyons was significant). The specialization groups were much more successful in accounting for differences on the management support (factor 2), other users (factor 3), consumptive users (factor 5) and capacity limits (factor 8) attributes. These patterns offer support for the argument that the specialization variable can be more useful in explaining different types of attributes than can be explained through the use of motives alone. The other attribute which consistently was related to all of the outcome profiles was no evidence of man-made structures. Hikers who score all high on any of the profiles find this attribute just as important, if not more so, than the natural setting attributes.

While significant differences were found between the contrasting outcome profiles, the occurrence of these differences was not of sufficient magnitude to support the stated hypothesis. As constructed in this study, the profiles are not strong indicators of differences in the importance of environmental setting attributes to backcountry hikers. While more differences were accounted for with categories established from the specialization index, there is evidence that motives may be useful in tapping differences in attribute values that the specialization index is not sensitive to.

H5. Specialization and desired outcome scales combined as independent variables will significantly explain the preferred environmental attributes of backcountry hikers.

Canonical correlation analysis was utilized to identify the relationship between multiple independent variables and multiple dependent variables. The independent variables entered into the analysis include the specialization index score along with the score of each of the five measured motives of the hikers. The dependent variables included each of the thirty-eight environmental setting attributes. Two separate canonical analyses were performed to assist in the interpretation of the results. The attributes which displayed an overall mean above neutral (4.0) on the seven point scale, referred to as contributing attributes were included in the first analysis. The second analysis included the remaining fifteen attributes whose overall means were below 4.0 on the scale. These attributes are referred to as the detracting attributes.

The first canonical correlation analysis identified six pairs of canonical variates between the set of independent variables and the set of dependent variables. The results from this analysis are presented in Table 32. Three of the pairs of canonical variates, referred to as roots, indicated a significant relationship ($p < .05$) for the generalized F test for significance.

The first significant root exhibited a canonical correlation of .586 between the independent canonical variate and the dependent canonical variate. The eigenvalue of .344 indicates that the first canonical variate accounts for 34.4 percent of the variance in the second variate representing the dependent variables. The second root exhibited a canonical correlation of .436 and its first canonical variate accounted for 19.0 percent of the variance of the canonical variate. The third and last significant root displayed a canonical

Table 32. Results of the canonical analysis on the contributing attributes

	1st canonical root	2nd canonical root	3rd canonical root	4th canonical root	5th canonical root	6th canonical root
Eigenvalue	.344	.190	.123	.103	.059	.046
Canonical correlation	.586	.436	.350	.321	.243	.215
F value	2.429	1.693	1.366	1.186	.929	.858
Degrees of freedom	138.0	110.0	84.0	60.0	38.0	18.0
Significance (p<)	< .001	< .001	.018	.162	.593	.630
Wilk's Lambda	.376	.572	.706	.805	.897	.954

correlation of .350 and an eigenvalue of .123. These three roots accounted for the only significant canonical relationships found in the analysis.

A brief discussion of the types of coefficients produced to characterize the relationship between the canonical variates and the original observed variables is needed to simplify the interpretation of each of the three significant roots. First, the canonical variate which is created to represent linearly the dependent variables will be referred to as the criterion variate. The variate which linearly describes the independent variables, will hereafter be referred to as the predictor variate. For each significant root on a canonical analysis, a criterion and a predictor variate are related in differing degrees to each of the original criterion and predictor variables.

This relationship is often described with the use of separate canonical coefficients describing how each original variable is correlated with its corresponding variate. An SPSS-X canonical correlation analysis produces three types of canonical coefficients: raw canonical coefficients, standardized canonical coefficients and correlations between the original variables and the canonical variates. The first two coefficients represent canonical weights, similar to beta weights. The raw coefficient are the multipliers of the original variables in their original units (Norusis 1985). The standardized canonical coefficients simply standardize the raw coefficients so that they have a mean of zero and a standard deviation of one. While these standardized canonical coefficients are important for indicating the contribution of each original variable, they have often been confused with another statistic called a canonical loading (Lambert and Durand 1975). The third coefficient represents the canonical loading statistic. As discussed by Lambert and Durand, these canonical loadings have the advantage of being largely free from the influence of multicollinearity; they are simply the direct relationship between the original variable and the canonical variate. Unlike the raw and standardized canonical coefficients, they are unaffected by suppression and the partialing out of variables.

A complete description of the standardized canonical coefficients and canonical loadings for the set of variates in the three significant roots are contained in Appendix C. Only those original variables displaying loadings of (.30) or higher will be reported in this section of the study. This tolerance level is consistent with other research and is often the criterion utilized above which loading

values are deemed important (Lambert and Durand 1975; Adams 1979; Christensen 1983; and Christensen 1985).

While the standardized canonical coefficients (weights) are useful indicators of how the predictor and criterion variables relate to the canonical variates, they are somewhat limited in depicting the direct relationship. Multicollinearity and shared correlations among the variables in either the predictor or criterion set can cause weight instability. As a consequence some variables which may be related to the derived variates can be partialed out or suppressed (Lambert and Durand 1975). For these reasons, canonical loadings, which show the direct correlation between the variables and variates can offer a more straightforward interpretation. Consequently, the canonical loading values will be used to interpret the relationships between the variables and their corresponding variates. Table 33 shows the canonical loading values of each of the criterion and predictor variables on their respective variates for each of the three significant canonical roots.

The first significant root loads most heavily on the predictor variable specialization index ($r = -.967$). While specialization dominates this predictor variate, autonomy exhibits the greatest secondary loading of -.251. Five important attributes emerge when the .30 standard is applied to the criterion variables. The presence of bears and rugged terrain exhibit positive relationships with the specialization index. The availability of firewood, well-placed and accurate directional signs, and well-maintained trails exhibit negative relationships, indicating these attributes contribute to the hiking experience as specialization decreases.

Table 33. Canonical loadings for predictor and criterion variables of the contributing attributes

Variable	1st Canonical Root	2nd Canonical Root	3rd Canonical Root
Predictor			
Specialization index	-.967*	.202	-.000
Exercise motive	-.051	.359*	.823*
Nature motive	-.004	.939*	-.136
Autonomy motive	-.251	.122	.570*
Achievement motive	-.030	.365*	.756*
Social motive	.104	.263	-.122
Criterion			
Availability of firewood	.311*	-.014	-.281
Well-placed and accurate directional signs	.630*	.143	-.007
Well-maintained trails	.532*	.032	.035
Presence of bears	-.309*	.174	.055
Rugged terrain	-.570*	.443*	.403*
No evidence of man-made structures	-.010	.480*	.041
Natural lakes and streams	.106	.468*	-.136
Timbered pine forests	.259	.394*	-.006
Desert canyons	-.187	.482*	.171
Readily available information on the natural history of an area	.228	.392*	.071
Open meadows	-.151	.518*	-.408*
Seeing wildlife	.169	.606*	-.290
Availability of natural drinking water	-.090	.230	-.403*
Readily available information on regulations	.075	.203	.408*

A positive correlation exists if a variable in the predictor set has the same sign as a variable in the criterion set. If the canonical loadings in the predictor and criterion sets have opposite signs the correlation is negative.

*denotes canonical loadings above .30

The second significant canonical root loaded most heavily on the predictor variable nature. While the exercise, achievement and social motives displayed secondary relationships with the predictor variate, only the first two exhibited canonical loadings in excess of .30. The criterion variate of the second root exhibited important loadings with eight of the predictor variables. Open meadows and seeing wildlife exhibited the strongest loadings of .518 and .606 respectively. The other important attributes included rugged terrain, no evidence of man-made structures, natural lakes and streams, timbered pine forest desert canyons and readily available information on the natural history of an area. All of the important criterion variables exhibited positive relationships with each predictor variable indicating an increasing contribution from these attributes as the associated motives increased.

The third and last significant root displayed three predictor variables with canonical loadings greater than .30. The most dominant predictor was exercise ($r = .823$), followed closely by achievement ($r = .756$) and autonomy ($r = .570$). In regards to underlying motivational orientations it is interesting to note that the specialization index, nature motive and social motive all decreased in importance when these variables emerged. The related criterion variate identified four important criterion variables. Two of these variables, open meadows and the availability of natural drinking water were negatively related to the predictor variables. Rugged terrain and readily available information on regulations were positively related to the predictor variables.

Overall, the significant canonical roots identified five of the six predictor variables as important indicators of the associated contributing environmental setting attributes. Fourteen of the attributes were important criterion variate indicators within one or more of these roots. The first canonical root loaded primarily on the predictor variable, specialization index. Two of the criterion attributes were positively related to the index and the remaining three exhibited negative relationships with the index of the important attributes (criterion variables) indicating that their contribution decreases with increased specialization. The second root, dominated most heavily by the nature motive, exhibited relationships with eight of the environmental setting attributes. All eight of these attributes are logically tied to natural occurring physical setting attributes or management actions which enhance nature awareness. The third and final significant root, which exhibited the lowest overall canonical correlation, loaded most heavily on exercise, with autonomy and achievement relatively important. Rugged terrain, and readily available information on regulations were identified as important environmental setting attributes as contributing positively to the canonical variates while open meadows and the availability of natural drinking water were related negatively.

On the second canonical correlation analysis, the fifteen environmental setting attributes which in general detracted from hiking satisfaction were included as dependent variables. Once again, the analysis identified six pairs of canonical variates, one of which exhibited a significant F value ($p < .05$). The results of the analysis are provided in Table 34.

Table 34. Results of the canonical analysis on the detracting attributes

	1st canonical root	2nd canonical root	3rd canonical root	4th canonical root	5th canonical root	6th canonical root
Eigenvalue	.200	.091	.067	.053	.023	.013
Canonical correlation	.447	.301	.258	.230	.151	.114
F value	1.915	1.295	1.087	.889	.578	.458
Degrees of freedom	90.0	70.0	52.0	36.0	22.0	10.0
Significance (p<)	<.001	.053	.314	.658	.939	.916
Wilk's Lambda	.621	.775	.853	.913	.965	.987

The first and only significant canonical root exhibited a canonical correlation of .447 between the predictor variate and the criterion variate. The eigenvalue of .200 indicates that the predictor variate accounted for 20.0 percent of the variance within the criterion variate. A description of the standardized canonical coefficients and canonical loadings for each significant set of variates is provided in Appendix C.

The canonical loadings for the criterion and predictors variables of the significant root are displayed in Table 35. Only the specialization index exhibited a standardized canonical loading above .30. As with the first canonical analysis, the specialization index is the dominant predictor variable for the first significant root. When the canonical loadings of the criterion variables are examined,

Table 35. Canonical loadings for predictor and criterion variables of the detracting attributes

Variable	1st canonical root (loadings)	2nd canonical root (loadings)
Predictor		
Specialization index	-.975*	-.089
Social motive	.160	-.816*
Autonomy motive	-.149	.323*
Criterion		
Presence of logging	.774*	-.085
Domestic livestock on trails	.512*	.456*
Paved access roads	.402*	-.299
Seeing motorized recreationists	.317*	.395*
Presence of mining	.531*	.176
Loud recreationists	.350*	-.191
Seeing others on the trail	.278	-.455*

An extremely detracting attribute is equal to a scale value of one. Hence the direction of extremely detracting scores is the opposite of the direction of extremely contributing scores, when the neutral value of the scale equals four. Consequently, the relationship between a variable in the predictor set that is negative and a variable in the criterion set that is positive means that a negative relationship exists (or the criterion variable is varying toward greater detraction as the predictor variable increases).

*Denotes canonical weights and loadings above .30

six of the environmental setting attributes display values above .30. The presence of logging displays the strongest loading value of .774. This non-recreation use along with the presence of mining (.531), and domestic livestock on trails, suggest that other multiple-use activities detract the most from specialized hikers. The remaining important criterion variables are paved access roads (r = .402), loud recreationists (r = .350) and seeing motorized recreationists (r = .317).

A second non-significant root is included on Table 35. While not significant, this canonical relationship merits discussion because of its relative proximity to the .05 level of probability (p = .053) and provides possible insights into the nature of the social motive. Two important predictor variables characterize the predictor variate with the social motive dominating with a loading of -.816. While important, the autonomy motive's direction is opposite with a .323 loading. Three predictor variables exhibit canonical loadings above the .30 standard, including domestic livestock on trails (r = .456), seeing motorized recreationists (r = .395) and seeing others on the trail (-.455). The negative value of the last attribute suggests that seeing others is less detracting for those with strong social motives, while more detracting for those with stronger autonomy motivations.

The variates dominated by the specialization index emerged as the strongest predictors of both the contributing and detracting attributes. However, the motive dominated predictor variates in the second and third roots of the canonical analysis on the contributing attributes were also significant in their accounting of the criterion variates. Overall, the specialization dominated variates established

important links with ten attributes. Together, the three significant contributing roots and one significant detracting root suggest that both the specialization and motive variables are important indicators of the types of environmental setting attributes preferred by backcountry hikers, providing support for the hypothesis. A further discussion of the implications of the results contained in this chapter will be addressed in the next chapter.

DISCUSSION AND CONCLUSIONS

The focus of this study was to investigate how the behavioral forces of recreation specialization and psychological motivations are related to the environmental setting attributes of backcountry hikers. The final chapter presents interpretations and discussion of the results of this study in three important areas. First, the study results are discussed with respect to the study objectives outlined in the first chapter. Next, implications are discussed for future research. The third area of discussion focuses on the implications for recreation resource management. The final section serves as a summary of the study conclusions.

Discussion of Study Results

The five research objectives presented in the first chapter of this study serve as a basis for discussing the descriptive and statistical results from the results chapter. These five objectives were: (1) to identify the environmental setting attributes that backcountry hikers perceive as important in defining a satisfying backcountry experience, (2) to explore how psychological outcomes differ within different levels of specialization among backcountry hikers, (3) to investigate how the principle of specialization will function as a predictor of the environmental setting attributes that contribute to a satisfying backcountry experience across different hikers, (4) to determine which psychological outcomes are important to backcountry hikers and how these outcomes related to environmental

setting attributes, (5) to integrate two theoretical approaches of recreation behavior and to investigate their value in predicting which environmental setting attributes are satisfying to different hikers.

The Importance of Environmental Setting Attributes

The environmental setting attributes were measured on a seven-point Likert-type scale ranging from "strongly detracts" to "strongly adds" from or to hiking satisfaction. Thirty-eight attributes were included on the mail questionnaire. Sixteen of these individual attributes exhibited an overall mean below the neutral value of four and twenty-two demonstrated means above the same neutral value. By categorizing the environmental setting attributes into sets based upon the physical, social and managerial setting, more clarity is attained in interpreting the importance of the attributes to backcountry hikers.

It is clear from the results of this study, that the most important type of attributes which contribute to overall hiking satisfaction are the physical setting attributes. It should be noted at this point that the universe of possible attributes to be measured is quite large. The attributes utilized in this study represent those attributes most commonly measured in similar research or identified most often by the pretest sample. All of the physical setting attributes contributed to some degree to hiking satisfaction. The nine most important attributes for the study were all in the physical setting category. The four most important physical setting attributes; natural lakes and streams, seeing wildlife, availability of natural drinking water, and open meadows indicate that many

dimensions of the physical environment are important. The geographical, botanical, zoological and ecological dimensions are all represented. The two least important physical attributes were presence of bears and availability of firewood. It is logical to suggest that the possibility of a bear encounter and the availability of lightweight backpacking stoves might influence the low importance of these two attributes.

The preferences for eight social setting attributes were measured in this study. All eight exhibited means which indicated these attributes detracted from overall hiking satisfaction. Some care should be taken in interpreting these results. It would be illogical to assume that social setting attributes always detract from the hiking experience. If there are "bad" social environments, there must also be "good" social environments or the contrast is moot. A simple "not" in front of many of the social setting items would no doubt have changed the importance of some of these attributes from detracting to contributing. The two most detracting attributes in the study, seeing motorized recreationists and loud recreationists suggest that social conflicts can arise within the group of backcountry hikers, as well as with other types of recreationists. The two least detractive social attributes were seeing others on the trail and pets in the backcountry.

The management setting attributes, eighteen in all, exhibited overall means which contributed and detracted from hiking satisfaction, making generalizations more difficult toward the entire set of attributes. Eight of these attributes detracted from the overall hiking experience. The most detracting included the presence

of logging and the presence of mining, indicating the importance of these other resource uses in determining the backcountry experience. Fourteen of the managerial setting attributes displayed means above four, indicating that they contributed to overall hiking satisfaction. Apparently the management environment can be an important positive force in the hiking experience. The revegetating of over-used areas, and well-placed and accurate directional signs were the two most important managerial setting attributes.

In summary, this study demonstrated a wide array of preferences for the thirty-eight environmental setting attributes. There is evidence that the most important type of attributes to backcountry hikers are the physical setting attributes. One explanation of this phenomenon might be the importance of the nature motive to this group of recreationists. While the social setting attributes were the most detracting items, some care is suggested in making major generalizations about the social category. Finally, the managerial attributes exhibited much more variation in their levels of importance to backcountry hikers.

The Specialization/ Psychological Outcome Linkage

A central objective of this study was to explore how the level of specialization of backcountry hikers affects their motivational states. Bryan (1979) suggested that as specialization increases a recreationist will value different aspects of the recreation experience as important. In the case of trout fishing, Bryan noted an apparent shift in what anglers valued in their fishing experiences over time. To explore this relationship within backcountry hiking,

Driver's desired outcome scales were utilized to represent different types of recreation experiences. The first and second sets of hypotheses (H1 to H2a) were designed to explore linkages between specialization and psychological outcomes.

Prior to the analysis of data, it was thought that certain motives would lose their importance and others would increase in importance as the level of specialization increased. Since only five motive domains were included in the analysis, it is possible that this may be the case when the complete array of psychological domains are tested. However, these results revealed that none of the desired psychological outcome domains valued by low specialized hikers significantly decreased in importance as the level of specialization increased.

The social motive was the only desired outcome which did not significantly change across specialization level when hikers were divided into groups of low, medium and high specialists. However, when the rankings of the social motive are examined, it is the second or third most important reason hikers engage in their backcountry pursuits for all levels of specialization. It would be misleading to suggest that sharing the hiking experience with one's family or friends is not important to highly specialized hikers. Rather, this motive displays a relatively stable degree of importance at all levels of specialization. The social motive is apparently independent of the level of specialization, at least in regards to the backcountry hikers sampled in this study. There is little evidence to suggest that backcountry hikers learn to value socializing as more or less important as the level of hiking specialization changes.

The remaining four study motives, exercise, nature, autonomy, and achievement, exhibited significant increases as the level of hiking specialization increased. Assuming that the specialization index employed in this study is sensitive to increased levels of hiking development, there is statistical evidence that this sample of backcountry hikers has learned to value these desired outcomes as more important as their level of specialization increased. While the enjoying nature domain is the most important desired outcome for the high specialists, it is not the most discriminating of the desired outcomes. In other words, a strong orientation toward enjoying nature characterizes the entire sample of backcountry hikers, regardless of their level of specialization. While this motive did become significantly more important as the level of hiking specialization increased, the remaining three motives exhibited a greater magnitude of increase across the three levels of specialization. The desire to feel free from society's restrictions and to do things on one's own, termed autonomy, accounted for the greatest value change between levels of specialization. This feeling of independence or freedom is the desired state which appears to be the "critical motive" in discriminating between low and high levels of specialization. This suggests that as hikers continue their development and commitment to backcountry hiking, they increasingly view and value the opportunities for autonomy as important.

While not as important as autonomy, the desired psychological outcomes of achievement and exercise both exhibited greater discriminating power than nature. The achievement motive, characterized by developing skills and abilities and learning to

develop one's capabilities, increased in importance as the hiker's level of specialization increased. While all of the significant motives may indicate the specialized hiker's learned ability to create specific types of experiences, the achievement motive suggests a direct conceptual link to Bryan's hypothesis that high specialists seek to "manipulate their environment so as to be able to tell the difference between luck and skill" (Bryan 1979, p. 50). As a hiker develops and refines skills and abilities, new accomplishments and limits are realized. Both realizations offer information to the hiker to be used in creating future experiences. Relatedly, the strong discriminating value of the exercise motive suggests that hikers increasingly value the physical challenge as well as the physical health benefits of hiking as the level of specialization increases.

Further evidence of the significant relationship between the level of specialization and the importance of desired outcomes was displayed when hikers were divided into groups based on outcome profiles. These profiles, indicating the combined effect of three motives operating simultaneously, suggested that the level of specialization changed significantly only when the nature, exercise, autonomy or achievement motives were combined. The one exception to this generalization occurred when the social motive was combined with nature and autonomy. Perhaps indicating that there is some interactive effect, the hikers who displayed low scores on their nature, autonomy and social motives exhibited significantly lower specialization values than those hikers who scored all high on the same motives. One objective of structuring the hikers into motive profiles was to explore the possibility that multiple orientations to

hiking might exist. For example, one group of specialized hikers may develop with an "enjoy nature" and "social group sharing" orientation, while another group might specialize within an "achievement" and "physical exercise" orientation. While the data indicated that both nature and autonomy were present in the profiles with the highest specialization levels, the results did not present clear evidence that more than one motive based orientation to specialization existed. This possibility is addressed again in the interpretation of the canonical results that follows.

In summary, the results of this study indicate that within the study population of backcountry hikers, there exists considerable evidence that as the level of specialization increases, hikers value different aspects of the recreation experience as important. There was a marked trend for the measured motives to increase in importance as specialization increased. Only the social motive remained relatively stable across all levels of specialization. None of the motives utilized in this study demonstrated a significant decrease in importance as the level of hiking specialization increased. This may reflect the limited array of outcome domains utilized in this study as much as it reflects the nature of specialization in backcountry hiking or recreation activation in general. Outcomes which might be explored for losing importance as specialization increases include meeting new people, security and social recognition. This suggestion assumes that specialized hikers enjoy the company of other specialized hikers and that the need for security decreases as hiking experience grows.

The Specialization/ Environmental Setting Linkage

The primary dependent variables utilized in this study were thirty-eight environmental setting attributes representing the Recreation Opportunity Spectrum (ROS) domains of physical, social and managerial setting. As suggested in the theoretical framework, it was expected that as the level of specialization increases and hikers learn to value different aspects of their hiking experience, they will subsequently value different types of environmental settings. This channeling of attention or preference for different types of settings is viewed as an increased ability on the part of the highly specialized hiker to create his/her own experience. Assuming that the importance of environmental setting attributes changes as the level of specialization changes, the third set of hypotheses (H3-H3a) were developed. The results indicate that there were significant relationships between the degree of specialization and the environmental setting attributes in twenty-one of the thirty-eight attributes. To further explore the nature of these relationships the attributes were divided into the physical, social and managerial setting domains.

Bryan contends that as specialization increases, the recreationist becomes more dependent on properties of the physical resource. The study results indicate a moderate degree of support for this hypothesis for this sample of backcountry hikers where six of the twelve physical setting attributes were significantly related to the level of hiking specialization. The influence of specialization can be characterized by decreasing the importance of the availability of

firewood or timbered pine forests. Conversely, the specialized hiker increasingly valued open meadows, rugged terrain, presence of bears and desert canyons. It should be noted that all of the physical setting attributes contributed to some degree to the hiking experience. One possible explanation of the non-significant attributes is that they represent reasons novices are attracted to the activity. As found in the social motive, they do not increase or decrease significantly as the level of specialization increases.

The social setting attributes exhibited significant relationships with three of the eight social setting attributes. All three were negatively related to the level of hiking specialization. As the hiker increases his/her level of specialization, he/she prefers not to see others on the trail, not to see motorized recreationists and prefers not to hear loud recreationists. Since all of the social attributes in the study exhibited negative impacts on the preferred recreation experience, the question of representation must be raised about the social setting domain. This question is addressed in the Implications for Research section that follows.

The final set of attributes offers insights into the relationship between hiking specialization and attributes which managers can more directly manipulate to affect hiking satisfaction. Bryan (1977) found that the management philosophy of specialized fishermen changed over time suggesting that low and high specialized recreationists would differ to some degree about preferred management actions. Eighteen managerial attributes were examined with specialization, and eleven exhibited significant relationships. Whereas the physical attributes all were found to contribute to hiking satisfaction and the social

attributes detracted from satisfaction, the hikers displayed much more variability toward the managerial attributes. The traditional non-recreation uses of grazing, logging and mining were all found to be significantly more detracting to hikers as their level of specialization increased. Additionally, many of the cost intensive management actions such as paving access roads, well-placed and accurate directional signs, and well maintained trails were significantly less important as hiking specialization increased. There is also evidence that higher levels of hiking specialization serve to sensitize hikers to management problems. The level of hiking specialization was positively related to trail quotas, revegetating, and party size limits. When the study attributes were factor-analyzed into conceptually defined groups based upon shared variance, the management related groups exhibited the most significant relationships between low and high specialized hikers.

While the low specialized hikers do not differ significantly from the high specialized hikers on all of the environmental setting attributes examined in this study, significant differences do occur in over fifty percent of examined attributes. These findings suggest, as noted by Bryan (1979), that increased levels of hiking specialization serve to change the value of and preferences for certain types of physical, social and managerial settings. This relationship was the most pronounced within the physical and managerial setting domains.

The Psychological Outcome/ Environmental Setting Linkage

Given the success of past researchers in establishing empirical relationships between motives and environmental setting preferences,

it was expected that similar relationships would be found in this study. One problem in interpreting and comparing past motive studies is their reliance on cluster analyzed groupings of recreationists. While their motive-dependent clusters of users were often intuitively meaningful, no two studies yielded the same clusters. In order to simplify the comparison or the contribution of specialization and motives in explaining the environmental setting attributes, Hypothesis 4 explored the direct linear relationships of each of the study motives. Additionally, this analysis provided insight into the relative predictive ability of motives to explain environmental setting attributes within each of the ROS defined domains of physical, social and managerial attributes. Hypothesis 4a was designed to explore the possibility that more than one dominant motive orientation might exist.

The results of Hypothesis 4 indicate that the nature motive was the dominant indicator of environmental setting attributes. Nature demonstrated significant relationships with seventeen of the thirty-eight environmental setting attributes. The autonomy motive exhibited the second strongest relationship by accounting for seven significant relationships. The exercise motive was significantly related to four attributes and the social and achievement motives each exhibited three relationships. Taken as a group, these five motives displayed significant correlations with twenty-two different environmental setting attributes.

By dividing the attributes into groups based upon the ROS defined physical, social and managerial domains, a more precise interpretation of the nature of these relationships can be garnered. Preferences for

the twelve physical setting attributes were all explained by one or more motives. The nature motive alone accounted for eleven of the twelve attributes, underscoring the importance of the physical setting in realizing a natural experience. Hikers with strong exercise motives were negatively concerned with the availability of firewood, but attracted to rugged terrain and desert canyons. These types of environments all offer more opportunity for physical exercise. The autonomy motive displayed positive relationships with no evidence of man-made structures, rugged terrain, presence of bears, natural swimming areas and desert canyons. Intuitive interpretation suggests that these attributes best provide the feeling of freedom and independence within the physical setting. Those hikers with strong achievement motives exhibited strong relationships with no evidence of man-made structures and rugged terrain, suggesting that these attributes offer an environment which fosters personal achievement. In summary, the motives in general and more specifically the nature motive, are extremely sensitive to the physical setting attributes.

The social setting domain also exhibited its strongest link with the nature motive. However, only four of the eight attributes including, seeing others near your campsite, presence of commercial and organizational groups, seeing motorized recreationists and loud recreationists, exhibited significant relationships. These attributes negatively affect the attainment of a nature experience. The presence of commercial and organizational groups also exhibited significant negative relationships with the exercise and autonomy motives. The only positive relationship within the social setting domain was between the social motive and seeing others on the trail. This

attribute was viewed more favorably by hikers with a strong social orientation. Overall, five of the eight social setting attributes were accounted for by the five study motives.

When the relationship between motives and the managerial setting attributes are examined, the explanatory ability of the motives is extremely weak. No single motive accounts for more than two of the managerial setting attributes. Additionally, the strength of the significant correlations that do exist are relatively weak. The exercise motive exhibits no significant relationships, and achievement is only related to readily available information on the natural history of an area. Readily available information on regulations and paved access roads are both positively related to the social motive. Autonomy is negatively related to well-placed and accurate directional signs. The nature motive exhibits a positive relationship to the fining of backcountry regulation violators and information on the natural history of an area.

The use of the three motive profiles in the second hypothesis did not yield as many significant relationships as did the direct motive correlations. The major relationships with the environmental setting attributes were fewer and tended to appear within the physical setting domain.

The overall pattern of relationships between the motives and environmental setting attributes invite comparisons with the explanatory power of the specialization index on the same attributes. While both specialization and motives accounted for approximately the same number of attributes, each displayed some differences in explanatory ability between the three environmental domains. The

specialization index exhibited more parity in explaining attributes within all three domains. The five study motives were especially useful in explaining the physical setting attributes where all of the attributes were accounted for to some degree by at least one of the motives. The particularly strong relationships between the nature motive and these attributes suggest that there may be key or "critical" motives within any activity style which might act as important environmental setting indicators. The lack of predictive power of the motives in explaining preferences for managerial setting attributes suggests that the conceptual forces of specialization and motivations may complement each other. Overall these two frameworks exhibited significant relationships with thirty-one of the thirty-eight environmental setting attributes.

An Integrated Approach for Explaining Environmental Setting Attributes

The results from the two canonical analyses from the fifth and final hypothesis provide the foundation for the following discussion. The results from the previous hypotheses offer a more direct assessment of the relationships between the two conceptual frameworks that guide this study and their independent relationships with the recreation setting environment. The intent of the final hypothesis was to allow the specialization and motive variables to be combined as a set of independent variables, and to see which combinations of these variables emerge as important predictors.

The first canonical analysis included the twenty-two attributes which are characterized as "contributing attributes," because their

overall sample mean was above the neutral value of four on the seven-point Likert-type response scale. The initial root to emerge from a canonical analysis is the root which explains the greatest amount of variance between its predictor and criterion variates. The first root in the analysis produced a predictor variate which was strongly dominated by the specialization index ($r = -.967$). The high correlation suggests that the predictor variate represents to a large degree the specialization index. While not significant, the autonomy motive exhibited a moderate secondary loading, again suggesting that autonomy may be a critical motive in understanding hiking specialization. The significant criterion variables for this first root offer insight into attributes which contribute to a highly specialized hiking experience. The findings suggest that for highly specialized hikers, the availability of firewood, well-placed and accurate directional signs and well-maintained trails contribute less to their hiking experience than for low specialized hikers. However, the presence of bears and rugged terrain become more important or contribute more to their experience. One interpretation might be, "I want a rugged, wild environment, free of conveniences." Whereas the novice is saying, "I don't feel totally comfortable in a primitive environment" and "directional signs, available firewood and easy to follow trails contribute to my overall experience."

The second strongest root to emerge from the analysis loads significantly on three predictor variables rather than one. However, all three are now motives. Given the results of the fourth set of hypotheses, it should not be surprising that the dominant variable was the nature motive, with a correlation of .939. The exercise and

achievement motives displayed moderate loadings of .359 and .365 with the predictor variate. They can be interpreted as secondary benefits which result from a strong "nature" orientation. While not significant, the social motive exhibited a loading of .263 for this root, the strongest social loading within any of the three significant roots. Assuming that enjoying nature is the key to the predictor variate of this root, the significant criterion attributes make intuitive sense. The absence of man-made structures and the availability of information on natural history contribute to the experience. Other important attributes include rugged terrain, natural lakes and streams, timbered pine forests, desert canyons, open meadows and seeing wildlife. All of these attributes either come directly from the physical setting domain or are management attributes which foster the appreciation of nature.

The third and last significant root also exhibited significant relationships with three motives within the predictor set. The specialization index, nature motive and social motive assume insignificant roles, where the exercise ($r = .823$), achievement ($r = .756$) and autonomy ($r = .570$) motives emerge as important. Where the previous hypothesis results failed to establish the existence of multiple-motive orientations, this third root offers a second plausible motive based orientation to hiking. The predominance of the exercise, achievement and autonomy motives suggests a type of hiker who challenges and pushes himself/herself physically, away from the luxuries of modern life. The minor negative values placed on the social and nature motives suggest that neither scenic qualities nor other people, are important to this orientation. The important

criterion variables offer some additional insight. Readily available information on regulations and rugged terrain are the major contributing attributes, while open meadows and the availability of natural drinking water contribute significantly less. The general orientation seems to be, "I want physical exercise, achievement and a sense of autonomy." Rugged terrain offers opportunities for all three. The low importance placed on natural drinking water and open meadows suggests that these attributes do not add to the need for exercise or feelings of achievement or autonomy. The importance of information on regulations suggests, "I want to know the rules before I go in, so that my experience is not interfered with." While their interpretations may imply a narcissistic approach to hiking, they could just as easily imply the old "pioneer ethic," where the wilds were a place to test one's capabilities, and nature was to be used, rather than appreciated.

The final canonical analysis included the sixteen attributes which are characterized as "detracting attributes," reflecting an overall sample mean below the neutral value of 4.0. As in the first analysis, the specialization index emerged as the dominant predictor variable in the first and only significant root. The fact that specialization is the dominant and only significant predictor variable in this analysis may indicate that specialized hikers become much more discriminating against certain types of settings as they develop into the activity. Conversely, it might be very easy for the novice hiker to indicate which type of environments he/she prefers, but extremely difficult to cite environments which detract from hiking satisfaction. Three of the significant criterion variables reflect non-recreation

uses of wildlands, including presence of logging, domestic livestock on trails and presence of mining. Two social setting attributes, loud recreationists and seeing motorized recreationists detract to a greater degree as the level of specialization increases. Finally, paved access roads also emerges as a significant detracting attribute. As a person develops into backcountry hiking, he/she tends to develop a philosophy of, "I prefer hiking in environments where logging, mining and grazing do not occur; furthermore, I find paved access roads, motorized and loud recreationists a hindrance to the enjoyment of my hiking experience."

The combining of specialization with motives to determine their relationship with environmental setting attributes offers some unique insights into both conceptual frameworks. First, the specialization variable emerged in both analyses as the first and dominant indicator of the setting attributes. The predominance of the specialization index is not as easily recognized when both frameworks are analyzed independently. Secondly, specialization seems to be related positively to uncontrolled environments and negatively to management actions which simplify access or insulate hikers from inconvenience. Third, the specialization variable emerged as the best predictor of detracting environmental setting attributes, indicating that one result of specialized development may be the recreationists learning which settings are not preferred. Fourth, empirical results exist which suggest that two motive-based orientations to backcountry hiking exist. Some care must be exercised in interpreting these two orientations, since the analysis did not group hikers. However, an intuitive interpretation of the secondary roots suggests support for

such an argument. Assuming that more than one motive orientation does exist, these results indicate that each serves to narrow the types of attributes hikers prefer.

In conclusion, there were several unexpected relationships which were found in the study results. The popular myth of experienced backcountry hikers, being zealous nature lovers who expound on the values of aesthetics, did not mesh with the relative strength of the exercise, autonomy and achievement motives. The strength of these motives within the group of high specialized hikers indicates a different value orientation from just enjoying nature. The canonical results offered additional insights into this orientation where "rugged terrain" and "knowing the regulations" were much more important than aesthetic physical attributes.

Some of the relationships between the specialization variable and the environmental setting attributes were also surprising. It was expected that high specialists would exhibit a more homogeneous attitude toward their preferred setting. As a group they exhibited as much disagreement as the low specialized hikers. The possibility that different motive-based specializations are occurring might explain why high specialists do not agree as a group about their attribute preferences. The success of the specialization variable in explaining the managerial setting attributes of backcountry hikers was also unanticipated. Perhaps the knowledge that managers can exercise discretion evokes a focusing upon these attributes among the more experienced hikers. Greater experience might also sensitize hikers to impacts which managers can control to some degree.

The capacity for the motives utilized in this study to explain the physical setting attributes was unexpected. This was especially surprising when compared with their inability to explain the managerial attributes. This discrepancy is not easily explained and is reinforced in the canonical results where only two management attributes were linked with covarying motives. A plausible explanation might be that the types of motives which best explain these attributes were not included in the study.

Finally, the results of the canonical analysis were unexpected from two perspectives. It was expected that the specialization variable would load with other motive variables to explain certain setting attributes. In both analyses the specialization variable clearly dominated its variate suggesting an independence in interpretations. A second surprising result was the two motive-based orientations which emerged from the analysis on contributing attributes. One suggested a primary nature appreciation orientation while the second focused on the exercise, achievement and autonomy motives which suggest a more utilitarian focus toward the environment. The results from Hypothises 4 and 4a gave little indication that more than one motive orientation was operating. However, when the motives were allowed to covary, the results indicated that two different motive orientations may exist. These orientations made intuitive sense when their related attributes were examined.

Implications For Research

Theoretically, this study was conceptualized within the frameworks of Bryan's principle of recreation specialization and

Driver's model of recreation behavior. The operationalization of the specialization construct, as well as its relevance to the study's population of backcountry hikers can offer insight to researchers who seek to understand the developmental nature of leisure activity styles. The results of this study suggest that relationships exist between the level of hiking specialization and the desired motivational states of backcountry hikers. Researchers studying recreation motivation might find recreation specialization a useful developmental framework for explaining differences in motivational states over time. Additionally, this research offers insights into the types of environmental settings that are preferred by backcountry hikers and how those preferences are related to the level of hiking specialization and the motivations of backcountry hikers.

The limitations inherent in this study should be addressed, as they impact the capacity to generalize the results. Neither the hikers nor the study areas utilized in this investigation are representative of their respective universes. The sampling goal of this study was to represent a diverse set of hikers based upon the types of areas frequented. Cost and time constraints prevented a multiple-season sampling scheme. Additionally, hikers who utilized low-use trail heads and non-trail access points were under-represented in the final sample of hikers. It would be logical to assume that hikers who know about such access points and made the effort to reach them would be highly specialized.

The overall response rate for the mailed questionnaire used in this study was just over 68 percent. The non-respondents were subsequently contacted one additional time by mail. To the extent

that the non-respondents may differ from the respondents could represent a sampling bias. Finally, the methods used to operationalize recreation specialization, psychological outcomes and environmental setting attributes on the questionnaire present limitations. Each of these variables will be addressed in the discussion that follows, but it should be recognized that other dimensions of all three variables exist beyond those operationalized in this study.

The specialization index constructed for this study lends support for Bryan's argument that recreation specialization underlies a variety of recreation activities. The index was operationalized on a mailed questionnaire and included eleven questions concerning the respondents' past or current hiking lifestyles. Consistent with Bryan's conceptualization, these indicators addressed the respondents past hiking experience, current hiking experience, equipment and financial commitment, and the centrality of hiking to the overall lifestyle. Past hiking experience was measured by two items, while each of the other specialization dimensions were represented by three items. One methodological problem encountered was the difficulty in using a questionnaire to directly access the hikers' level of skill in backcountry hiking. In future specialization research, this problem needs to be addressed. Observation may provide a better method of determining general skill levels among backcountry hikers.

Within the sample of backcountry hikers surveyed in this study, several descriptive variables were found to be empirically related to the level of hiking specialization. While there is no basis to generalize these relationships to other activities or populations,

their occurrence may offer some insights for future specialization research. First, hikers with increased levels of specialization also exhibited greater amounts of formal education. Women comprise a significantly smaller percentage of the high specialized hikers in relation to their representation in the low specialized category of hikers. Highly specialized hikers, in general, reported significantly more previous hiking trips to the study area than low specialists. This variable would be easy to measure and could serve as an indicator of specialization level for field personnel if the same relationship holds in future studies. While not significant, it is interesting to note that age was independent of the level of specialization. Finally, the study area itself was found to be related to the level of hiking specialization. While this may be an important finding for managers, it also indicates that certain backcountry settings attract a higher percentage of high or low specialized users.

The results of this study offer support for agreement with Bryan (1979) and Graefe et al. (1985) that the types of experiences sought by recreationists are in part dependent on their level of recreation specialization. The low specialized backcountry hikers for this study valued the desired outcome scales differently than highly specialized hikers. Of the five outcome scales utilized, four demonstrated significant increases in importance as the level of specialization increased. Recreation specialization may offer a systematic framework for explaining how the motivations of recreationists change as their level of development within an activity changes. Within backcountry hiking, there is evidence that hiking specialization serves to intensify the importance of certain types of motivations. The extent

to which this pattern is generalizable to other recreation "specialists" can only be assessed if the complete array of motivational domains are tested in future research. Relatedly, Bryan's contention that recreationists evolve from a system of extrinsic rewards to intrinsic or extrinsic rewards presents interpretation problems when Driver's scales are utilized to represent the types of rewards sought by recreationists. Are the social or achievement motivations indicators of intrinsic or extrinsic reward systems? Additionally, is it possible that specialization, as conceptualized by Bryan, assumes specific types of motivations are present in highly specialized recreationists? Bryan's characterization of high specialists as seeking environments where they can determine the difference between luck and skill implies that competence testing is the ultimate specialized motivation. Only future specialization research which measures a broader array of motivations across a variety of activities can fully answer these questions.

The study results offer support for Bryan's (1979) argument that specialization can be utilized to construct typologies within activities. The motives of backcountry hikers offer a basis for constructing a typology scheme of backcountry hikers. Those hikers who exhibited overall specialization index scores in the lower third of the sample were characterized as low specialists. The low specialists' motive orientation was dominated by the desired state to enjoy nature. The second most important motive was the social motive, the desire to share their hiking experience with family and friends. The other measured motives were exercise, achievement and autonomy, in

order of importance. The middle third of the hikers, based on their specialization index scores, were classified as medium specialists. While the exercise motive did increase moderately for this group of hikers, neither it nor the social motive exhibited significant increases. The discriminatory motives for the medium specialists were the increased importance of the nature, autonomy and achievement motives. When the high specialized hikers are compared with the medium specialists, none of the motives exhibit significant increases. However, the exercise and autonomy motives continue to exhibit moderate increases, while the nature, social and achievement motives remain relatively stable. The most discriminatory difference between medium and high specialized hikers, in regard to motive orientation, seems to be the increased importance of the exercise and autonomy experience states among the high specialized hikers. This typology offers support for the argument that groups can be identified within activity styles based upon motivational orientations.

Recreation researchers have long sought to understand the importance of the recreation environment to recreation choice and resulting recreation behaviors. The results of this study suggest that both recreation specialization and the motivations of recreationists offer important indications of the meaning different types of environments hold for recreationists. Bryan (1979) suggested that the value changes associated with increased specialization are inextricably linked to preferences for specific properties in the resource, management and social world of the recreationist. The specialization variable was found to be significantly related to twenty-one of these environmental setting attributes. Subsequent

tests between low and high specialized hikers offer support for suggesting that high specialists find certain resource properties more important than low specialists. Secondly, high specialists prefer specific management attributes that differ significantly from the importance placed on these attributes by low specialists.

The motives measured in this study exhibited a greater ability to explain the physical attribute preferences of the hikers than demonstrated by the specialization index. More specifically, the nature motive was highly dependent on the characteristics of the physical resource where eleven of the twelve attributes were accounted for. These findings indicate that motives do offer additional information which can not be ascertained from the specialization index alone. Taken with the previously mentioned success of the specialization index in explaining the managerial setting preferences, this study suggests that recreation specialization offers a framework which can complement traditional motivation studies in explaining the importance of different environmental settings to the overall recreation experience. Each behavioral perspective reveals a part of the total process which explains why these environments are chosen by recreationists. Additionally, to the extent that motives vary with specialization and the extent that both frameworks explain the same attributes, suggest an interactive effect might be occurring between specialization and desired outcomes. Assuming that an interaction is occurring, the canonical results indicate that specialization may develop within more than one type of motive system.

The manner in which the social setting attributes were operationalized in this study appears too narrowly focused to capture

all of the social values implied in Bryan's conceptualization of social environments. These attributes focused on common intra-activity and inter-activity conflicts which were drawn from previous research and open ended questions to hikers. Assuming that Bryan's observation is correct that highly specialized recreationists seek the company of other recreationists who exhibit the same degree of skill development, attitudes and values, attributes which directly access these properties must be developed. For example, asking hikers if they prefer to hike with others who share the same appreciation of nature or have the same hiking abilities might better identify the types of social attributes which contribute to hiking satisfaction. In a similar fashion, low specialists may appreciate a more generalized social environment where specific types of comparisons are less important than just sharing the experience with others. This suggests that novice hikers may be less specific in the types of attributes they prefer when compared to high specialized hikers. In summary, future researchers need to develop more comprehensive indicators of the types of social environments that both high and low specialized recreationists find rewarding, as well as those social settings that detract from the overall experience.

Another research implication addresses the issue of determining which environmental settings are most preferred by recreationists. While the ROS framework offers a method of grouping specific setting attributes, the researcher is left with the task of determining the most appropriate attributes. The problem being that the universe of potential items is almost infinite, especially if better theoretical frameworks are not created to guide research efforts. Additionally,

methodological problems inherent in addressing such a large number of dependent variables virtually eliminate many of the more powerful multivariate statistical techniques which focus on one dependent variable. Canonical correlation analysis has been overlooked to a large degree by researchers who explore the relationship between recreation behavior and the environmental setting. While canonical analysis is complex, it is based upon the same conceptual framework as other multivariate tests and intuitive interpretation of it's results are relatively straightforward. The canonical technique offers the added advantage of combining several theoretical or predictor variables at once and simultaneously exploring how they covary with multiple dependent variables. The more popular factor analysis and cluster analysis techniques do not. The researcher is left to determine the meaning of the factors or clusters which are constructed without input from the other study variables. While this objectivity is desirable at times, the infant stage of our understanding of recreation environments suggests that canonical analysis might offer a valuable method for injecting theory into our constructs of environmental preferences. The canonical results also indicate a sensitivity for exploring different multiple motive orientations which are often the focus of cluster analysis applications in motive research.

Perhaps one of the more important research implications of this study is it's relative success in combining theoretic orientations to gain a more comprehensive picture of the recreation experience. While the results do not provide the "whole picture" of recreation behavior, they do speak to the value of integrating theoretical perspectives as

to increase our predictive capabilities. The work of Driver (1977), Knopf et al. (1983) and others who have completed extensive investigations into the motivational aspects of recreational behavior have provided important insights into preferred environmental settings and recreation decision making. Bryan's (1979) work on specialization offers a socialization oriented explanation of recreation behavior which incorporates the developmental, competency, and social group influences that occur over time. Assuming that Iso-Ahola's (1980) argument is correct, that leisure socialization is a life-long process, recreation specialization can offer a valuable framework for exploring within-activity socialization. The results from this study indicate that the specialization principle does offer insights not gained from information about motives alone, and visa versa. The complimentary nature of the two behavioral orientations in this investigation might suggest one direction for future outdoor recreation research. The larger picture, however, might suggest incorporating these behavioral forces with other social and psychological frameworks to expand our understanding of recreational and leisure behavior. Leisure socialization models (Iso-Ahola, 1980) which incorporate social agents, experience and social competence are compatible with the frameworks developed in this investigation. They, along with psychological models which go beyond motivation, offer a rich area for future research.

Implications for Management

From an applied perspective, this study offers important insights that can be utilized by recreation resource managers. First, the

results of this study indicate a framework for conceptualizing how activity styles evolve over time, implying that the products desired by recreationists change. Additionally, these changes were found to be associated with differences in the types of resources that are sought by recreationists. While the study areas for this research were chosen to maximize specialization diversity, the results do indicate that certain resources attract different clienteles of users based upon their level of hiking specialization. Finally, this study has implications for suggesting that the ROS framework now be utilized by the federal land management agencies may be too general to address the different markets found within this sample of backcountry hikers.

There is a strong tendency among resource managers, as well as researchers, to assume that all recreationists within a given activity type are homogeneous with respect to the types of experiences sought. The results of this study indicate support for differentiating recreationists into subgroups based upon their level of specialization in backcountry hiking. These subgroups, labeled low, medium and high specialists offer more homogeneous representations of hiker subtypes. The specialization principle is based on the notion that over time, ones orientation to his/her sport changes. This change is indicated by more experience, greater skill level, increased commitment and more sophisticated equipment utilization. One result of increased specialization is a refocusing on the types of experiences or outcomes which are desired. The results of this study suggest that low specialists primarily seek a nature and social oriented experience. High specialized hikers exhibit systematic changes where they increasingly value the nature, achievement, autonomy and exercise

dimensions of the hiking experience. From an applied perspective, the products desired by these high specialized hikers are different from the novice or low specialist. Since these experience dimensions are reflective of the types of satisfactions sought by recreationists, management actions which facilitate the attainment of such states are preferred. By being sensitive to the different "markets" within any given activity type, managers could better address the diversity of desired experience types that do exist.

As a result of specialization, these changes in desired experiences or outcomes affect the types of environmental settings which are preferred by the recreationist. To the degree that managers can influence the recreation setting or facilitate the accessibility of recreationists to certain resources, specialization-based groups provide a basis for such decisions. The study results indicate that there are important differences in the types of environments preferred by low and high specialized hikers. Based on the canonical results reported in the previous discussion, low specialized hikers are characterized as preferring environments which offer firewood, directional trail signs and maintained trails. Additionally, low specialists prefer rugged terrain, but the effect of specialization on this attribute is the opposite. As the level of hiking specialization increases, firewood, directional trail signs and maintained trails are preferred to a significantly lesser degree. Directional signs and maintained trails are costly management actions which might be utilized less intensively for high specialized hikers, providing they won't negatively impact the resource. Rugged terrain, on the other

hand, increased in importance as the level of specialization increases.

While information about which types of environments are preferred by hikers can aid management decision making, so also can information about the types of environments which are not preferred. The canonical analysis indicated that the specialization variable was the strongest indicator of detracting environmental attributes as compared with the hiking motivations. While both low and high specialized hikers find logging, mining and livestock grazing detracting, these other uses of resources are significantly more detracting to high specialized hikers. One resultant implication for management is that multiple use areas are more appropriate compromises for populations of lower specialized hikers. These findings would support the designation of certain areas as primitive or wilderness areas only where other consumptive uses of the resource are prohibited. Paved access roads is another attribute which exhibits increasing detractiveness for high specialized hikers. Again, the implementation of such management actions are costly while they detract from the overall hiking experience. Granted, such actions may be needed to protect the resource at high use areas. Both loud and motorized recreationists are detracting for all hikers. However, their negative influence increases significantly as the level of hiking specialization increases, suggesting to managers that highly specialized hikers may be more prone to conflict with other users. With the growth of inter-activity and intra-activity conflicts in recent years, the specialization principle might provide a theoretical framework in which managers can better understand these problems.

The high overall importance of the physical setting attributes measured in this study suggest that backcountry hikers are highly dependent on natural features. Natural amenities like lakes, streams, wildlife and meadows are among the most important sources of satisfaction among hikers in general. Planning trails close to these amenities and protecting such features are important management actions which can contribute to the hiking experience. The management attribute measured in this study demonstrated a strong relationship with the level of hiking specialization. Over 60 percent of the management attributes exhibited significant relationships with the specialization variable, indicating that different subgroups of specialized hikers value different management actions to different degrees. From this perspective, the specialization principle may offer a meaningful framework for predicting the degree to which certain management actions will be preferred or not preferred by different "publics."

While the discussion has focused on different groups of hikers, an obvious management problem is how to identify and reach these activity subgroups. One convenient solution may lie in the observation that certain backcountry resources attract different percentages of high and low specialized clienteles. While the results of this study are not generalizable to all backcountry hiking areas, the results from the three study areas suggest such a relationship might exist. The Bridger Wilderness sample was made up of 56 percent high specialized hikers. The Uintas demonstrated an equal number of low and medium specialized hikers, but only 19 percent of the sample were high specialists. The Superstition Wilderness demonstrated its

largest grouping in the low specialized category, but still exhibited more high specialized hikers than the Uintas. Assuming similar patterns may emerge in other areas, these results offer insights for recreation managers. Uniform backcountry management practices would be antithetical to providing the optimal hiking experience since each area draws its own unique clientele. Not only would these differences suggest different management actions, but managers may want to create specific backcountry environments which cater to one or more levels of specialization.

In recent years, the Recreation Opportunity Spectrum (ROS) has emerged as the primary framework for managing our federal recreation resources. As a part of the ROS process, recreation managers inventory and classify their recreation resources into one of six land classification schemes ranging on a continuum from urban to primitive. It is assumed that these six classifications of resources will best provide the diversity desired by different clientele of recreationists. The results of this study suggest that recreationists within one (i.e., primitive) ROS classification seek a wide range of diversity with respect to recreation experiences and management preferences. To the extent that managers treat these resources and their related clientele as homogeneous, opportunities are lost for maximizing the diversity sought by these recreationists. The different types of motivations, and environmental setting preferences held by backcountry hikers are not addressed in the current ROS scheme.

Conclusions

The purpose of this study was to explore how the behavioral forces of recreation specialization and desired motivational states interact to affect the environmental setting preferences of backcountry hikers. Hobson Bryan's specialization principle was operationalized and measured on a diverse group of backcountry hikers. Additionally, the desired psychological outcomes of these hikers were measured by utilizing the motivational scales designed by Driver. Based upon Bryan's assertion that the values that recreationists hold toward their activity change over time, these motivational scales were selected for their ability to assess the types of experiences recreationists value as important. The remaining focus of this study was to determine the importance of thirty-eight environmental setting attributes to hiking satisfaction. These attributes were organized around the ROS based domains of physical, social and managerial settings. On this basis, the study sought to find systematic relationships between the specialization and motive variables, and the importance of these attributes.

This study demonstrated that there were significant relationships between the level of hiking specialization and the psychological states desired by backcountry hikers. As the level of hiking specialization increased from low to high, each of the nature, exercise, autonomy and achievement motives exhibited significant increases in importance. Only the importance of the social motive did not increase across the three specialization levels. These results suggest that the process of recreation specialization may serve to

change the way backcountry hikers value different aspects of the hiking experience. This is congruent with Bryan's hypothesis and suggests that specialization may provide a theoretical framework for explaining how motivations change or evolve over time.

The hiking specialization variable exhibited significant relationships with twenty-one of the thirty-eight environmental setting attributes. Fifty percent of the physical setting, thirty-seven percent of the social setting and sixty-one percent of the management setting attributes were accounted for by the specialization index. Similar tests with the five motivation variables indicated that motives best explain the physical setting preferences of the hikers studied. The nature motive alone accounted for significant relationships with eleven of the twelve physical attributes. Additionally, the nature motive accounted for more total attributes (seventeen) than any of the remaining motives tested. The autonomy, exercise, achievement and social motives accounted for fewer overall attributes in descending order of importance. When taken as a group, the five motives established significant relationships with twenty-two of the thirty-eight environmental setting attributes. However, all five motives emerged as relatively weak predictors of the management setting attributes.

When the specialization and motive variables were combined as predictor variables, the resulting canonical correlation analyses indicated that the specialization dominated variates were the major indicators of both the contributing and detracting attributes. Two additional significant variates emerged from the analysis of the contributing attributes which suggested two different motive

orientations were operating with respect to predictive ability. The first was dominated by the nature motive and displayed relationships with eight physical setting attributes. The second variate loaded on the exercise, achievement and autonomy motives. These results indicate that both the level of hiking specialization and motives associated with hiking offer explanatory frameworks which account for subsets of the environmental setting attributes that are valued by backcountry hikers.

The theoretical model and results of this exploratory investigation support the suggestion that backcountry hikers go through a developmental process of increasing their commitment to, experience in and equipment utilization within backcountry hiking. This specializing within backcountry hiking affects how the hikers value different dimensions of their recreation experiences. As a consequence of increased specialization and the associated activity value changes, the hikers learn to value or prefer different environmental settings in order to realize satisfying recreation experiences. This conceptualization of recreation behavior has numerous implications for future research and management which merit consideration across a broad range of recreation activities.

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APPENDIXES

Appendix A.

Mail Questionnaires and Cover Letters

UTAH STATE UNIVERSITY
DEPARTMENT OF FOREST RESOURCES

BACKCOUNTRY HIKING STUDY

PART 1 - QUESTIONS ABOUT YOUR HIKING EXPERIENCE, EQUIPMENT, AND LIFESTYLE

1. How many years have you been involved in backcountry hiking? _____

2. How many hiking trips have you gone on in the past year? _____

3. How many different places have you hiked over the past two years? _____

4. How would you evaluate your level of backcountry hiking experience on the following scale from one to five? (circle one)

   Beginner---1 2 3 4 5 ---Highly Experienced

5. What has been the average length of stay in the backcountry when you have gone hiking over the past two years? (check one)

   ___ 1 day or less ___2 days ___ 3 to 4 days ___ 5 to 7 days ___ over 7 days

6. Over the past two years, what is the longest distance you have hiked on one backcountry trip?

   _____ miles

7. Over the past two years, what is the longest one way distance you have traveled from your place of residence to reach a trail that you hiked?

   _____ miles

8. Approximately how much money do you have invested in hiking equipment? (check one)

   ___ less than $100 ___ $100 to $200 ___ $201 to $500 ___ $501 to $1000 ___ over $1000

9. Excluding your equipment, approximately how much money did you spend over the past year on hiking (e.g., transportation, food, permits, etc.)?

   _____

10. Which of the following hiking items do you own? (check as many as apply)

___ lightweight tent	___ Gore-Tex clothing	___ lightweight sleeping bag
___ backpack	___ daypack	___ hiking staff or ice axe
___ compass	___ down clothing	___ topographic maps
___ rain gear	___ hiking boots	___ cooking gear
___ gaiters	___ backpack stove	___ first aid kit

11. How would you rate backcountry hiking as compared with your other leisure pursuits? (check one)

   ___ Backcountry hiking is my favorite leisure interest.

   ___ Backcountry hiking is one of my favorite leisure interests.

   ___ I have other leisure pursuits that are preferred over backcountry hiking.

12. Please rank the following aspects of your life in order of importance on a scale from one to seven. (1 is most important)

____ work ____ religion ____ education ____ family ____ backcountry hiking ____ friends ____ other leisure activities

13. How much did local or regional backcountry hiking opportunities affect your decision to reside where you do? (check one)

_____ not at all _____ a little _____ very much

14. Do you: own any hiking books? _____ Yes _____ No
subscribe to any hiking or backpacking oriented magazines? _____ Yes _____ No
belong to any conservation organizations? _____ Yes _____ No
belong to any hiking organizations? _____ Yes _____ No

PART II - YOUR REASONS FOR HIKING IN THE BACKCOUNTRY

This section contains a list of statements that many people consider important reasons for going hiking. Please indicate how important each reason is when you decide to go hiking by checking the appropriate position on the continuum.

	Not at all important	Slightly important	Somewhat important	Important	Very important	Extremely important	Of utmost importance
1. To get a sense of accomplishment.	( )	( )	( )	( )	( )	( )	( )
2. To experience solitude.	( )	( )	( )	( )	( )	( )	( )
3. To feel free from society's restrictions.	( )	( )	( )	( )	( )	( )	( )
4. To travel where I desire.	( )	( )	( )	( )	( )	( )	( )
5. To be away from crowds.	( )	( )	( )	( )	( )	( )	( )
6. To challenge myself physically.	( )	( )	( )	( )	( )	( )	( )
7. To get away from the responsibilities of my everyday life for a while.	( )	( )	( )	( )	( )	( )	( )
8. To gain a greater appreciation of nature.	( )	( )	( )	( )	( )	( )	( )
9. To have a good time with my friends.	( )	( )	( )	( )	( )	( )	( )
10. To have a chance to relax.	( )	( )	( )	( )	( )	( )	( )
11. To learn what I am capable of.	( )	( )	( )	( )	( )	( )	( )
12. To enjoy the smells, sights, and sounds of nature.	( )	( )	( )	( )	( )	( )	( )
13. To enjoy an experience with my family or friends.	( )	( )	( )	( )	( )	( )	( )
14. For the exercise.	( )	( )	( )	( )	( )	( )	( )
15. To be at a place where I can make my own decisions.	( )	( )	( )	( )	( )	( )	( )
16. To do things on my own.	( )	( )	( )	( )	( )	( )	( )
17. To improve my physical health.	( )	( )	( )	( )	( )	( )	( )
18. To develop my skills and ability.	( )	( )	( )	( )	( )	( )	( )
19. To observe the beauty of nature.	( )	( )	( )	( )	( )	( )	( )
20. To be with others who enjoy the same things I do.	( )	( )	( )	( )	( )	( )	( )

PART III - QUESTIONS ABOUT ATTRIBUTES WHICH AFFECT YOUR SATISFACTION

For the following items, please indicate to what extent each attribute adds to or detracts from your satisfaction while hiking in the backcountry. Check one of the seven possible answers for each attribute.

	Strongly detracts	Detracts	Slightly detracts	Neutral	Slightly adds	Adds	Strongly adds
1. Absence of regulations	( )	( )	( )	( )	( )	( )	( )
2. Presence of bears	( )	( )	( )	( )	( )	( )	( )
3. Timbered pine forests	( )	( )	( )	( )	( )	( )	( )
4. Desert canyons	( )	( )	( )	( )	( )	( )	( )
5. Readily available information on the natural history of an area	( )	( )	( )	( )	( )	( )	( )
6. Required permits to backpack	( )	( )	( )	( )	( )	( )	( )
7. Hikers and horseriders using the same trail	( )	( )	( )	( )	( )	( )	( )
8. A party size limit of 10 or less persons	( )	( )	( )	( )	( )	( )	( )
9. Seeing motorized recreationists	( )	( )	( )	( )	( )	( )	( )
10. Pets in the backcountry	( )	( )	( )	( )	( )	( )	( )
11. Well-maintained trails	( )	( )	( )	( )	( )	( )	( )
12. Loud recreationists	( )	( )	( )	( )	( )	( )	( )
13. Rugged terrain	( )	( )	( )	( )	( )	( )	( )
14. A fee to use the backcountry ($1 - $5)	( )	( )	( )	( )	( )	( )	( )
15. Presence of commercial and organizational groups (outfitters, scouts, etc.)	( )	( )	( )	( )	( )	( )	( )
16. Presence of mining	( )	( )	( )	( )	( )	( )	( )
17. Fish stocking of backcountry lakes	( )	( )	( )	( )	( )	( )	( )
18. Fining of backcountry regulation violators	( )	( )	( )	( )	( )	( )	( )
19. Natural swimming areas	( )	( )	( )	( )	( )	( )	( )
20. Well-placed and accurate directional signs	( )	( )	( )	( )	( )	( )	( )
21. High mountain trails	( )	( )	( )	( )	( )	( )	( )
22. Seeing wildlife	( )	( )	( )	( )	( )	( )	( )
23. Availability of natural drinking water	( )	( )	( )	( )	( )	( )	( )
24. Outhouse-type toilets at popular campsites	( )	( )	( )	( )	( )	( )	( )
25. No evidence of man-made structures	( )	( )	( )	( )	( )	( )	( )
26. Natural lakes and streams	( )	( )	( )	( )	( )	( )	( )
27. Seeing others near your campsite	( )	( )	( )	( )	( )	( )	( )
28. Open meadows	( )	( )	( )	( )	( )	( )	( )
29. Seeing others on the trail	( )	( )	( )	( )	( )	( )	( )
30. Revegetating of over-used areas	( )	( )	( )	( )	( )	( )	( )
31. Paved access roads	( )	( )	( )	( )	( )	( )	( )
32. Availability of firewood	( )	( )	( )	( )	( )	( )	( )
33. Domestic livestock on trails	( )	( )	( )	( )	( )	( )	( )
34. Other recreationists carrying firearms	( )	( )	( )	( )	( )	( )	( )
35. Presence of logging	( )	( )	( )	( )	( )	( )	( )
36. Required permits to day hike	( )	( )	( )	( )	( )	( )	( )
37. Readily available information on regulations	( )	( )	( )	( )	( )	( )	( )
38. Trail quotas for high use periods	( )	( )	( )	( )	( )	( )	( )

PART IV - YOUR PRIORITIES CONCERNING BACKCOUNTRY HIKING

This part contains a list of motives often mentioned by backcountry hikers as reasons why they enjoy hiking. Please rank the following items in order of importance as reflected by your backcountry hiking experience from one to eight. Place a "one" (1) next to your most important reason and an "eight" (8) next to your least important.

_____ Escape (getting rejuvinated, getting away for a while)

_____ Pursuit of other activities (photography, rock climbing, fishing, etc.)

_____ Social experience (sharing the experience, being with friends or family)

_____ Achievement (a sense of accomplishment, developing skills and abilities)

_____ Exercise - physical fitness (keeping in shape, physically challenging)

_____ Experiencing nature (enjoying scenery, wildlife, trees)

_____ Reflection on personal values (contemplation, thinking about your life)

_____ Autonomy (freedom, traveling where you desire)

PART V - FINALLY, A FEW PERSONAL QUESTIONS

Remember, you will not be identified with your answers, so please be frank.

1. What is your present age? _____

2. Sex: _____ Male _____ Female

3. What is the highest level of education you have completed so far? (circle one number)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 16+

Elementary High School College

PLEASE PLACE YOUR COMPLETED QUESTIONNAIRE IN THE STAMPED, SELF-ADDRESSED ENVELOPE PROVIDED AND DROP IN ANY CONVENIENT MAILBOX.

Thank you for your help!

Department of Forest Resources
Utah State University
Logan, Utah 84322

UTAH STATE UNIVERSITY
DEPARTMENT OF FOREST RESOURCES

BACKCOUNTRY HIKING STUDY

PART 1 - QUESTIONS ABOUT YOUR HIKING EXPERIENCE, EQUIPMENT, AND LIFESTYLE

1. How many years have you been involved in backcountry hiking? _____

2. How many hiking trips have you gone on in the past year? _____

3. How many different places have you hiked over the past two years? _____

4. How would you evaluate your level of backcountry hiking experience on the following scale from one to five? (circle one)

   Beginner---1 2 3 4 5 ---Highly Experienced

5. What has been the average length of stay in the backcountry when you have gone hiking over the past two years? (check one)

   ____ 1 day or less ____2 days ____ 3 to 4 days ____ 5 to 7 days ____ over 7 days

6. Over the past two years, what is the longest distance you have hiked on one backcountry trip?

   _____ miles

7. Over the past two years, what is the longest one way distance you have traveled from your place of residence to reach a trail that you hiked?

   _____ miles

8. Approximately how much money do you have invested in hiking equipment? (check one)

   ____ less than $100 ____ $100 to $200 ____ $201 to $500 ____ $501 to $1000 ____ over $1000

9. Excluding your equipment, approximately how much money did you spend over the past year on hiking (e.g., transportation, food, permits, etc.)?

   _____

10. Which of the following hiking items do you own? (check as many as apply)

____ lightweight tent	____ Gore-Tex clothing	____ lightweight sleeping bag
____ backpack	____ daypack	____ hiking staff or ice axe
____ compass	____ down clothing	____ topographic maps
____ rain gear	____ hiking boots	____ cooking gear
____ gaiters	____ backpack stove	____ first aid kit

11. How would you rate backcountry hiking as compared with your other leisure pursuits? (check one)

   ____ Backcountry hiking is my favorite leisure interest.

   ____ Backcountry hiking is one of my favorite leisure interests.

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12. Please rank the following aspects of your life in order of importance on a scale from one to seven. (1 is most important)

___ work ___ religion ___ education ___ family ___ backcountry hiking ___ friends ___ other leisure activities

13. How much did local or regional backcountry hiking opportunities affect your decision to reside where you do? (check one)

_____ not at all _____ a little _____ very much

14. Do you: own any hiking books? _____ Yes _____ No
subscribe to any hiking or backpacking oriented magazines? _____ Yes _____ No
belong to any conservation organizations? _____ Yes _____ No
belong to any hiking organizations? _____ Yes _____ No

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This section contains a list of statements that many people consider important reasons for going hiking. Please indicate how important each reason is when you decide to go hiking by checking the appropriate position on the continuum.

	Not at all important	Slightly important	Somewhat important	Important	Very important	Extremely important	Of utmost importance
1. To get away from the responsibilities of my everyday life for a while.	( )	( )	( )	( )	( )	( )	( )
2. To challenge myself physically.	( )	( )	( )	( )	( )	( )	( )
3. To be with others who enjoy the same things I do.	( )	( )	( )	( )	( )	( )	( )
4. To observe the beauty of nature.	( )	( )	( )	( )	( )	( )	( )
5. To do things on my own.	( )	( )	( )	( )	( )	( )	( )
6. To be away from crowds.	( )	( )	( )	( )	( )	( )	( )
7. To develop my skills and ability.	( )	( )	( )	( )	( )	( )	( )
8. To learn what I am capable of.	( )	( )	( )	( )	( )	( )	( )
9. To enjoy the smells, sights, and sounds of nature.	( )	( )	( )	( )	( )	( )	( )
10. To be at a place where I can make my own decisions.	( )	( )	( )	( )	( )	( )	( )
11. To travel where I desire.	( )	( )	( )	( )	( )	( )	( )
12. For the exercise.	( )	( )	( )	( )	( )	( )	( )
13. To have a good time with my friends.	( )	( )	( )	( )	( )	( )	( )
14. To get a sense of accomplishment.	( )	( )	( )	( )	( )	( )	( )
15. To have a chance to relax.	( )	( )	( )	( )	( )	( )	( )
16. To gain a greater appreciation of nature.	( )	( )	( )	( )	( )	( )	( )
17. To improve my physical health.	( )	( )	( )	( )	( )	( )	( )
18. To experience solitude.	( )	( )	( )	( )	( )	( )	( )
19. To enjoy an experience with my family or friends.	( )	( )	( )	( )	( )	( )	( )
20. To feel free from society's restrictions.	( )	( )	( )	( )	( )	( )	( )

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For the following items, please indicate to what extent each attribute adds to or detracts from your satisfaction while hiking in the backcountry. Check one of the seven possible answers for each attribute.

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2. Presence of logging	( )	( )	( )	( )	( )	( )	( )
3. Availability of firewood	( )	( )	( )	( )	( )	( )	( )
4. No evidence of man-made structures	( )	( )	( )	( )	( )	( )	( )
5. Seeing others near your campsite	( )	( )	( )	( )	( )	( )	( )
6. Trail quotas for high use periods	( )	( )	( )	( )	( )	( )	( )
7. Outhouse-type toilets at popular campsites	( )	( )	( )	( )	( )	( )	( )
8. Open meadows	( )	( )	( )	( )	( )	( )	( )
9. Other recreationists carrying firearms	( )	( )	( )	( )	( )	( )	( )
10. Natural lakes and streams	( )	( )	( )	( )	( )	( )	( )
11. Revegetating of over-used areas	( )	( )	( )	( )	( )	( )	( )
12. Required permits to day hike	( )	( )	( )	( )	( )	( )	( )
13. Well-placed and accurate directional signs	( )	( )	( )	( )	( )	( )	( )
14. Availability of natural drinking water	( )	( )	( )	( )	( )	( )	( )
15. Domestic livestock on trails	( )	( )	( )	( )	( )	( )	( )
16. Seeing others on the trail	( )	( )	( )	( )	( )	( )	( )
17. Seeing wildlife	( )	( )	( )	( )	( )	( )	( )
18. Readily available information on regulations	( )	( )	( )	( )	( )	( )	( )
19. Paved access roads	( )	( )	( )	( )	( )	( )	( )
20. Fining of backcountry regulation violators	( )	( )	( )	( )	( )	( )	( )
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23. Timbered pine forests	( )	( )	( )	( )	( )	( )	( )
24. Presence of commercial and organizational groups (outfitters, scouts, etc.)	( )	( )	( )	( )	( )	( )	( )
25. Pets in the backcountry	( )	( )	( )	( )	( )	( )	( )
26. A party size limit of 10 or less persons	( )	( )	( )	( )	( )	( )	( )
27. Rugged terrain	( )	( )	( )	( )	( )	( )	( )
28. Seeing motorized recreationists	( )	( )	( )	( )	( )	( )	( )
29. Presence of bears	( )	( )	( )	( )	( )	( )	( )
30. A fee to use the backcountry ($1 - $5)	( )	( )	( )	( )	( )	( )	( )
31. Natural swimming areas	( )	( )	( )	( )	( )	( )	( )
32. Hikers and horseriders using the same trail	( )	( )	( )	( )	( )	( )	( )
33. Desert canyons	( )	( )	( )	( )	( )	( )	( )
34. Presence of mining	( )	( )	( )	( )	( )	( )	( )
35. Required permits to backpack	( )	( )	( )	( )	( )	( )	( )
36. Loud recreationists	( )	( )	( )	( )	( )	( )	( )
37. Absence of regulations	( )	( )	( )	( )	( )	( )	( )
38. Readily available information on the natural history of an area	( )	( )	( )	( )	( )	( )	( )

PART IV - YOUR PRIORITIES CONCERNING BACKCOUNTRY HIKING

This part contains a list of motives often mentioned by backcountry hikers as reasons why they enjoy hiking. Please rank the following items in order of importance as reflected by your backcountry hiking experience from one to eight. Place a "one" (1) next to your most important reason and an "eight" (8) next to your least important.

_____ Reflection on personal values (contemplation, thinking about your life)

_____ Exercise - physical fitness (keeping in shape, physically challenging)

_____ Achievement (a sense of accomplishment, developing skills and abilities)

_____ Autonomy (freedom, traveling where you desire)

_____ Social experience (sharing the experience, being with friends or family)

_____ Escape (getting rejuvinated, getting away for a while)

_____ Experiencing nature (enjoying scenery, wildlife, trees)

_____ Pursuit of other activities (photography, rock climbing, fishing, etc.)

PART V - FINALLY, A FEW PERSONAL QUESTIONS

Remember, you will not be identified with your answers, so please be frank.

1. What is your present age? _____

2. Sex: _____ Male _____ Female

3. What is the highest level of education you have completed so far? (circle one number)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 16+

Elementary High School College

PLEASE PLACE YOUR COMPLETED QUESTIONNAIRE IN THE STAMPED, SELF-ADDRESSED ENVELOPE PROVIDED AND DROP IN ANY CONVENIENT MAILBOX.

Thank you for your help!

Department of Forest Resources
Utah State University
Logan, Utah 84322

DEPARTMENT OF FORESTRY AND OUTDOOR RECREATION
College of Natural Resources
UMC 52
Utah State University
Logan, Utah 84322

(801) 750-2455
(801) 750-2456

November 8, 1982

Dear Backcountry Hiker:

Enclosed you will find a questionnaire asking some simple queries concerning your backcountry hiking experience. Would you please take a few minutes to help us by completing it? We prepared the questionnaire in conjunction with the Forest Resources Department at Utah State University. A representative from our department contacted you at one of three Intermountain backcountry areas this past summer (i.e. High Uintas, Superstitions or Wind River Range). The distribution of this form to you is the result of your cooperation in providing your name and address at that time.

This questionnaire has been designed to generate information about the physical, social and management attributes that affect the satisfaction of people who hike backcountry trails. Your responses will help us better understand the needs of hikers so that these needs can be more adequately met.

The questionnaire is of reasonable length (it should take approximately 20 to 30 minutes to answer); all of the questions can be answered with a number, a circle or a check mark. If you would, please take your time and respond as thoroughly as possible to these questions. The questions are not directed toward one specific hiking area, instead they refer to your past hiking experience in general. Please feel assured that any responses you give will be kept strictly confidential; no names will be associated with any of the responses.

We wish to thank you for your time and your cooperation. If you are interested in the results of this study, please indicate this on the completed questionnaire, and we will be happy to send you a research summary when the project is finished.

Sincerely

Kent B. Downing
Associate Professor

Randy J. Virden
Graduate Research Assistant

DEPARTMENT OF FORESTRY AND OUTDOOR RECREATION
College of Natural Resources
UMC 52
Utah State University
Logan, Utah 84322

(801) 750-2455
(801) 750-2456

December 3, 1982

Hello Again,

We wanted to remind you about completing and returning the backcountry use questionnaire we mailed to you on November 8. It is important to us that we receive as many completed questionnaires as possible. Additionally, it offers you the opportunity for your views on backcountry management to be represented.

Due to the current political climate, backcountry recreation research is not receiving much financial assistance. This research is not being sponsored by any Federal or State agency (though the results will be passed along); it is being conducted as a dissertation project solely for discovering factors that influence the satisfaction of people who hike backcountry areas.

If you need another copy of the questionnaire, just write your name and address on the back side of this letter and return it in the self-addressed envelope provided. If you are interested in the results of this study, please indicate this on your completed questionnaire, and we will be happy to send you a research summary when the project is finished. If you have already mailed the questionnaire back, thank you very much for your time and effort.

Sincerely,

Kent B. Downing
Associate Professor

Randy J. Virden
Graduate Research Assistant

encl.

DEPARTMENT OF FORESTRY AND OUTDOOR RECREATION
College of Natural Resources
UMC 52
Utah State University
Logan, Utah 84322

(801) 750-2455
(801) 750-2456

January 10, 1983

Dear Backcountry Hiker:

Enclosed you will find a questionnaire asking some simple queries concerning your backcountry hiking experience. Would you please take a few minutes to help us by completing it? We prepared the questionnaire in conjunction with the Forest Resources Department at Utah State University. A representative from our department contacted you at one of three Intermountain backcountry areas this past fall (i.e. High Uintas, Superstitions or Wind River Range). The distribution of this form to you is the result of your cooperation in providing your name and address at that time.

This questionnaire has been designed to generate information about the physical, social and management attributes that affect the satisfaction of people who hike backcountry trails. Your responses will help us better understand the needs of hikers so that these needs can be more adequately met.

The questionnaire is of reasonable length (it should take approximately 20 to 30 minutes to answer); all of the questions can be answered with a number, a circle or a check mark. If you would, please take your time and respond as thoroughly as possible to these questions. The questions are not directed toward one specific hiking area, instead they refer to your past hiking experience in general. Please feel assured that any responses you give will be kept strictly confidential; no names will be associated with any of the responses.

We wish to thank you for your time and your cooperation. If you are interested in the results of this study, please indicate this on the completed questionnaire, and we will be happy to send you a research summary when the project is finished.

Sincerely,

Kent B. Downing
Associate Professor

Randy J. Virden
Graduate Research Assistant

encl.

DEPARTMENT OF FOREST RESOURCES
College of Natural Resources
UMC 52
Utah State University
Logan, Utah 84322

(801) 750-2455
(801) 750-2456

February 4, 1983

Hello Again,

We wanted to remind you about completing and returning the backcountry use questionnaire we mailed to you on January 10. It is important to us that we receive as many completed questionnaires as possible. Additionally, it offers you the opportunity for your views on backcountry management to be represented.

Due to the current political climate, backcountry recreation research is not receiving much financial assistance. This research is not being sponsored by any federal or state agency (though the results will be passed along); it is being conducted as a dissertation project solely for discovering factors that influence the satisfaction of people who hike backcountry areas.

If you need another copy of the questionnaire, just write your name and address on the back side of this letter and return it in the self-addressed envelope provided. If you are interested in the results of this study, please indicate this on your completed questionnaire, and we will be happy to send you a research summary when the project is finished. If you have already mailed the questionnaire back, thank you very much for your time and effort.

Sincerely,

Kent B. Downing
Associate Professor

Randy J. Virden
Graduate Research Assistant

encl.

Appendix B.

Environmental Attribute Preferences by Study Area and Level of Specialization

Table 36. Mean attribute preferences by each of the three study areas

Attributes	Bridger	Uintas	Superstitions
Physical			
High mountain trails	5.85	5.85	5.80
Availability of firewood	4.58	5.18	4.92
No evidence of man-made structures	5.89	6.01	5.56
Open meadows	6.19	6.18	5.90
Natural lakes and streams	6.67	6.73	6.71
Availability of natural drinking water	6.43	6.49	6.10
Seeing wildlife	6.66	6.64	6.70
Timber pine forest	5.79	6.09	5.74
Rugged terrain	6.07	5.71	5.82
Presence of bears	4.45	4.18	3.92
Natural swimming areas	5.63	5.31	5.86
Desert canyons	5.77	5.65	6.24
Social			
Seeing others near your campsite	2.51	2.45	2.73
Other recreationists carrying firearms	2.23	2.18	2.30
Seeing other on the trail	3.58	3.82	3.91
Presence of commercial and organizational groups (outfitters, scouts, etc.)	2.68	2.80	2.88
Pets in the backcountry	2.94	3.10	3.39
Seeing motorized recreationists	1.21	1.49	1.47
Hikers and horseriders using the same trail	2.72	2.96	3.15
Loud recreationist	1.44	1.49	1.42
Managerial			
Presence of logging	1.83	2.34	2.40
Trail quotas for high use periods	4.63	4.32	4.82
Outhouse-type toilets at popular campsites	4.18	4.10	4.33
Revegetating of over-used areas	5.68	5.65	5.65
Required permits to day hike	2.82	2.68	3.04
Well placed and accurate directional signs	5.29	5.70	5.55
Domestic livestock on trails	2.26	2.30	3.09
Readily available information on regulations	4.98	5.25	5.11
Paved access roads	3.78	3.92	3.61
Fining of backcountry regulation violators	5.24	5.56	5.79
Fish stocking of backcountry lakes	4.97	5.59	4.92
Well maintained trails	5.01	5.38	5.32
A party size limit of 10 or less persons	5.46	4.66	4.79
A fee to use the backcountry (1$-$5)	3.51	3.00	3.41
Presence of mining	1.76	2.21	2.55
Required permits to backpack	3.31	2.79	3.43
Absence of regulations	4.01	3.79	3.81
Readily available information on the natural history of an area	5.37	5.43	5.61

Table 37. Mean attribute preferences by level of hiking specialization

Attributes	Low	Medium	High
Physical			
High mountain trails	5.75	5.89	5.91
Availability of firewood	5.07	4.84	4.75
No evidence of man-made structures	5.69	5.83	5.85
Open meadows	5.93	6.14	6.14
Natural lakes and streams	6.64	6.75	6.71
Availability of natural drinking water	6.24	6.30	6.41
Seeing Wildlife	6.65	6.68	6.66
Timber pine forest	6.01	5.93	5.68
Rugged terrain	5.38	5.81	6.44
Presence of bears	3.75	4.35	4.43
Natural swimming areas	5.54	5.67	5.56
Desert canyons	5.77	5.74	6.14
Social			
Seeing others near your campsite	2.71	2.58	2.44
Other recreationists carrying firearms	2.31	2.26	2.16
Seeing others on the trail	3.93	3.71	3.64
Presence of commercial and organizational groups (outfitters, scouts, etc.)	2.95	2.79	2.60
Pets in the backcountry	3.09	3.38	2.92
Seeing motorized recreationists	1.51	1.48	1.18
Hikers and horseriders using the same trail	3.05	3.04	2.65
Loud recreationist	1.54	1.42	1.38
Managerial			
Presence of logging	2.64	2.21	1.70
Trail quotas for high use periods	4.36	4.69	4.71
Outhouse-type toilets at popular campsites	4.48	3.95	4.10
Revegetating of over-used areas	5.37	5.69	5.87
Required permits to day hike	2.99	2.98	2.64
Well placed and accurate directional signs	5.84	5.76	4.93
Domestic livestock on trails	2.99	2.44	2.18
Readily available information on regulations	5.16	5.12	4.99
Paved access roads	3.95	3.86	3.49
Fining of backcountry regulation violators	5.56	5.55	5.52
Fish stocking of backcountry lakes	5.27	5.20	4.98
Well maintained trails	5.61	5.35	4.74
A party size limit of 10 or less persons	4.58	5.18	5.23
A fee to use the backcountry ($1-$5)	3.36	3.42	3.21
Presence of mining	2.43	2.21	1.81
Required permits to backpack	3.14	3.17	3.26
Absence of regulations	3.68	3.98	4.12
Readily available information on the natural history of an area	5.52	5.41	5.35

Appendix C.

Canonical Correlation Analysis

Table 38. Standardized canonical coefficients (weights) for predictor and criterion variables of the contributing attributes

Variable	1st canonical root	2nd canonical root	3rd canonical root
Predictor			
Specialization index	-.973	.072	-.122
Exercise motive	.051	.121	.629*
Nature motive	.151	.930*	-.327*
Autonomy motive	-.258	-.354*	.205
Achievement motive	.169	.303*	.387*
Social motive	.024	.002	-.230
Criterion			
Availability of firewood	.173	-.075	-.171
Well-placed and accurate directional signs	.438*	.082	.259
Well-maintained trails	.154	.051	.096
Presence of bears	-.152	.006	-.006
Rugged terrain	-.342*	.257	.521*
No evidence of man-made structures	.076	.338*	.106
Natural lakes and streams	.245	.042	.119
Timbered pine forests	.176	.303*	.203
Desert canyons	-.115	.207	.010
Readily available information on the natural history of an area	.180	.179	.092
Open meadows	-.207	.254	-.406*
Seeing wildlife	.232	.345*	-.356*
Availability of natural drinking water	-.252	-.073	-.287
Readily available information on regulations	-.120	.038	-.395*
Natural swimming areas	.097	.023	.309*
High mountain trails	-.117	.013	.076
Trail quotas for high use periods	-.082	-.107	-.086
Outhouse-type toilets at popular campsites	.160	.040	-.003
Revegetating of over-used areas	-.254	-.012	.055
Fining of backcountry regulation violators	-.254	-.012	.055
Fish stocking of backcountry lakes	.016	-.127	-.040
A party size limit of 10 or less persons	-.004	.173	.049
Absence of regulations	-.054	.014	-.294

*Denotes weights above .30

Table 39. Canonical loadings for predictor and criterion variables of the contributing attributes

Variable	1st canonical root	2nd canonical root	3rd canonical root
Predictor			
Specialization index	-.967*	.202	-.000
Exercise motive	-.051	.359*	.823*
Nature motive	-.004	.939*	-.136
Autonomy motive	-.251	.122	.570*
Achievement motive	-.030	.365*	.756*
Social motive	.104	.263	-.122
Criterion			
Availability of firewood	.311*	-.014	-.281
Well-placed and accurate directional signs	.630*	.143	-.007
Well-maintained trails	.532*	.032	.035
Presence of bears	-.309*	.174	.055
Rugged terrain	-.570*	.443*	.403*
No evidence of man-made structures	-.010	.480*	.041
Natural lakes and streams	.106	.468*	-.136
Timbered pine forests	.259	.394*	-.006
Desert Canyons	-.187	.482*	.171
Readily available information on the natural history of an area	.228	.392*	.071
Open meadows	-.151	.518*	-.408*
Seeing wildlife	.169	.606*	-.290
Availability of natural drinking water	-.090	.230	-.403*
Readily available information on regulations	.075	.203	.408*
High mountain trails	.044	.216	-.059
Trail quotas for high use periods	-.184	.057	-.164
Outhouse-type toilets at popular campsites	.194	-.046	-.069
Revegetating of over-used areas	-.226	.239	-.092
Fining of backcountry regulation violators	.035	.241	-.284
Fish stocking of backcountry lakes	.148	.002	-.151
A part size limit of 10 or less persons	-.180	.277	-.011
Natural swimming areas	.074	.251	.218
Absence of regulations	-.184	-.038	-.199

*Denotes canonical loadings above .30

Table 40. Standardized canonical coefficients (weights) for predictor and criterion variables of the detracting attributes

Variable	1st canonical root	2nd canonical root
Predictor		
Specialization index	-.969*	-.192
Exercise motive	.150	.414*
Nature motive	-.140	-.036
Autonomy motive	-.001	.509*
Achievement motive	-.075	-.360*
Social motive	.172	-.868*
Criterion		
Presence of logging	.586*	-.411*
Domestic livestock on trails	.308*	.576*
Paved access roads	.339*	-.251
Seeing motorized recreationists	-.004	.490*
Presence of mining	.108	.222
Loud recreationists	.250	-.142
Seeing others on the trail	.077	-.499*
Seeing others near your campsite	-.071	.088
Other recreationists carrying firearms	-.080	.011
Required permits to dayhike	.336*	.071
Presence of commercial and organizational groups	-.020	-.295
Pets in the backcountry	-.002	.059
A fee to use the backcountry ($1-$5)	.218	.300*
Hikers and horseriders using the same trail	.000	.094
Required permits to backpack	-.337*	-.290

*Denotes loadings above .30

Table 41. Canonical loadings for predictor and criterion variables of the detracting attributes

Variable	1st canonical root	2nd canonical root
Predictor		
Specialization index	-.975	-.089
Exercise motive	-.056	.237
Nature motive	-.190	-.123
Autonomy motive	-.149	.323
Achievement motive	-.123	-.021
Social motive	.160	-.816
Criterion		
Presence of logging	.774*	-.085
Domestic livestock on trails	.512*	.456*
Paved access roads	.402*	-.299
Seeing motorized recreationists	.317*	.395*
Presence of mining	.531*	.176
Loud recreationists	.350*	-.191
Seeing others on the trail	.278	-.455*
Seeing others near your campsite	.238	-.089
Other recreationists carrying firearms	.093	.099
Required permits to dayhike	.211	.017
Presence of commercial and organizational groups	.282	-.115
Pets in the backcountry	.126	.101
A fee to use the backcountry ($1-$5)	.138	.193
Hikers and horseriders using the same trail	.238	.260
Required permits to backpack	-.049	-.081

*Denotes loadings above .30

VITA

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