To the Graduate Council:

I am submitting herewith a thesis written by Kristine Zellmer Ferrell entitled "A Comparison of Personality Characteristics Between Advanced Scuba Divers and Beginner Scuba Divers." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Recreation, Tourism and Hospitality.

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A Comparative Analysis of Personality Traits Between Advanced Scuba Divers and Beginner Scuba Divers

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Kristine Zellmer Ferrell

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Chapter 1

Introduction

"...diving is fulfilling an age-old dream, even if only briefly, of living underwater like such magical creatures as gods and mermaids/mermen. Divers can also achieve a special unity with one of the most ancient and powerful symbols, the ocean" (Heyman, 1985, p. 12).

The sport of recreation scuba diving has flourished in the past decade. It is reported that a $2.6 billion profit was earned within the scuba diving industry in 1996 (Palmeri, 1996). Today's diver does not necessarily conform to the stereotype of marine biologist or military personnel; rather, participants of this sport range in lifestyles from musician to computer analyst (Palmeri, 1996). Research indicates that many scuba divers seem to be searching for a novel experience or an activity that provides an escape from the everyday pressures of life (Palmeri, 1996). Diving gives individuals a chance to get away, and to engage in a special activity that puts them in touch with themselves and a very different world. It offers the chance to renew a sense of challenge and meaning (Heyman, 1985).

The scuba diving business has attracted a wide spectrum of service providers. For example, along with scuba diving instructors, scuba gear rental shops, boat rentals, and other direct service providers, recreation

managers, hotels, restaurants, and tourism businesses also profit indirectly from the growth of the scuba industry. A limited amount of research is currently available to explain the phenomenal growth in the popularity of scuba diving as it relates to the participants. Information on certain characteristics of scuba divers, such as level of commitment, may help service providers adequately prepare the market. This information is vital to decisions involving access and site development, both of which have important ramifications for the public (MacKay, 1988).

Volumes of research have become available on activities categorized as high risk recreation. Such activities include mountain climbing, skydiving, white water rafting, kayaking, caving, as well as scuba diving (Zuckerman, 1983; Kerr & Svebak, 1989; Farley, 1986; Straub, 1982). For many years, Marvin Zuckerman has made a significant impact in research on high risk activities, in an attempt to explain the motivation of high risk activity participants. A high risk activity participant was defined by Zuckerman (1983) as one who involves himself or herself in an activity with uncertain outcomes and some degree of unpredictable risk. Frequently, these activities are associated with an unpredictable setting such as the ocean or the side of a mountain, and involve the use of life dependent equipment such as air tanks, climbing ropes, or parachutes (Carpenter and Priest, 1989).

Zuckerman's Sensation Seeking Scale (SSS) has been commonly used in risk recreation studies. The SSS measures the following characteristics:

Thrill and Adventure Seeking, Disinhibition, Boredom Susceptibility, and Experience Seeking. Research involving Zuckerman's SSS has frequently used "sensation seeking" as a level of measuring an individual's motivation for thrill and adventure. The term "sensation seeking" is associated with participants of high risk activities whose motivation for involvement include varied, novel, complex sensation, and experience (Zuckerman, 1983). For example, an individual with interests in hang gliding would be considered a "high sensation seeker," while a person who prefers bowling would be considered a "low sensation seeker."

Zuckerman (1990) ascribes sensation seeking to biological traits instead of to secondary motivations of the individual. Based on the theory of Carl Jung, Heyman (1985) suggested motivational factors of risk recreation participants are related to the individuals' personality characteristics. These ideas have stimulated research on the personality characteristics of the risk recreation participants.

Zuckerman (1990) predicted that with increased specialization, elite groups in different sports would differ from each other with respect to sensation seeking characteristics. Additionally, it was reported that participants' activity preference lacks substantial value unless the meaning and intensity of involvement are equally balanced (Ewert and Hollenhorst, 1989). Therefore, the conclusion may be derived that a risk recreation

participant's degree of specialization must be known if high quality, safe opportunities are to be expected.

Current research on high risk sports often focused on the question of whether or not an individual will be inclined to participate in high risk recreation. For many years the research on risk recreation has categorized scuba diving as a high risk sport (Zuckerman, 1983; Potgieter & Bisschoff, 1990; Ball, 1984). However, few studies have specifically identified scuba divers as the primary subjects of their research. This study will attempt to compare beginner and advanced scuba diver subjects.

The reason for participation in risk recreation, specifically scuba diving, is not yet fully understood causing resource management and the public to speculate about why someone chooses a dangerous leisure activity (Priest, 1992). This lack of understanding is, in part, based on the belief that recreation choices are often based on anticipated rewards (Furnham, 1990). From a theoretical perspective, risk recreation offers an interesting array of research topics such as: What motivates people to gravitate toward dangerous or risky environments? Are certain types of people more prone to seek out dangerous environments through recreation than others? Is risk taking critical or incidental to the overall experience?

The pursuit of providing excellence for high risk activity participants continues to offer challenges for those associated with scuba diving services such as the recreation manager and scuba diving instructor. Specifically,

providers of scuba diving activities are faced with the ever-present dangers nature holds. The perception of an ocean setting with barracuda, electric eel, and shark becomes a high quality recreation experience for one participant and a death trap for another. What may be overlooked is that for many individuals, being in close contact with a natural environment while striving to accomplish a difficult and challenging goal may well be worth facing the danger (Iso-Ahola, LaVerde, & Graefe, 1988).

The participants' reactive skills become a matter of grave importance while involved in high risk activities. A "fight or flight" response defines the emotional response of scuba divers' survival skills. Griffith (1990) defines "fight or flight" as a reaction of either attacking or retreating from a given stressful situation. The agents producing stress may be physical or psychological. During a scuba diving situation, stress, anxiety and panic are volatile human reactions, which must be controlled in order to restore equilibrium. It is essential for the diver's survival that he or she controls these emotions.

Statement of the Problem

It seemed logical that similarities would exist among risk recreation participants regarding their ability to cope with stress and anxiety. These and other vital personality characteristics may determine a participant's success or survival in risk recreation. Beginner scuba divers and advanced

scuba divers may differ not only in experience, but also in personality characteristics. It was determined that the need exists for a measurement tool that will identify vital personality characteristics which differentiate between the advanced and beginner scuba divers. A valid measurement instrument may also be used as a screening test, to help instructors recognize individuals who may be likely to have problems with the training. This knowledge was expected to improve the understanding of scuba divers and the methods of training them. Also, results may allow generalizations to be made to the participants of other risk recreation sports that choose to advance or specialize their sport.

Purpose of the Study

The study of risk recreation participants is not a new concept. However, very little research has been done on the risk recreation sport of scuba diving. Also, the available research has neglected to compare different competency levels in a risk recreation activity. The increase in high risk recreation has generated the need for further studies of personality types rather than purely observing high risk behavior (Murphey, Beach & Tennant, 1990, Jackson & Wilson, 1993, Ware & Yokomoto, 1989). The purpose of this study was to conduct a comparison between advanced scuba divers' and beginner scuba divers' personality characteristics.

Hypotheses

The following null hypotheses were tested:

Null hypothesis 1: There were no significant differences in the scores of the beginner scuba divers and the advanced scuba divers on the Myers-Briggs Type Indicator (MBTI) as measured by a chi-square test.

Null hypothesis 2: There were no significant differences in the scores of the beginner scuba divers and the advanced scuba divers on the Edwards Personal Preference Schedule (EPPS) as measured by independent t-tests.

Significance of the Study

In the area of risk recreation research, the need exists for research on different levels of competency within the same risk recreation sport. While studies have been conducted to measure personality characteristics of either high risk or low risk recreation participants typically, the comparisons of these two groups have been neglected. Additionally, a common measurement tool capable of identifying vital personality characteristics among risk recreation participants has not been identified.

The information obtained from the current study is expected to benefit the area of risk recreation research by specifically focusing on the sport of scuba diving. Perhaps, the comparison of advanced and beginner scuba

divers personality characteristics will serve as a predictor of advanced and beginner participants of other risk recreation sports. Also, the results may be important to scuba diving instructors and service providers for the purpose of better preparing for the delivery of their service.

Limitations

1. The regional geographical location limited the number of scuba divers available as possible subjects.
2. The nature and popularity of scuba diving limited the number of scuba divers as possible subjects.

Delimitations

The delimitations of this study include:

1. Study results for the beginner scuba student were limited to a college class population as opposed to individuals who may take private diving lessons.
2. Advanced scuba divers chosen to participate in the study were scuba divers trained and affiliated with Current Interprises, a dive operation in Knoxville, Tennessee.

Basic Assumptions

The assumptions of this study were:

1. The subjects provided honest information during completion of measurement instruments.
2. The research defining scuba diving as a high risk activity was valid.

Definition of Terms

SCUBA (Self-Contained Underwater Breathing Apparatus) is a process in which a portable air supply permits a diver to breathe underwater (US Navy diving Manual, 1975).

Advanced scuba divers in this study were those who had met the following requirements:

A) advanced training from National Association for Underwater Instructors (NAUI) or Professional Association of Diver Instructors (PADI),

B) a minimum three years of diving experience,

C) a minimum of 25 logged dives, and

D) experience in both fresh and salt water.

Beginner scuba divers in this study were students enrolled in a university course leading to NAUI Openwater I certification.

High risk activity in this study described sports or activities that may expose the participant to physical dangers, serious injury and even death from performance failure. Examples of these types of activities are scuba diving, parachuting, free rock climbing, hang gliding, full-contact karate, and automobile racing (Zuckerman, 1979).

Adventure was the circumstance of an undertaking that included some element of uncertainty (Carpenter & Priest, 1989).

The Adventure Experience was a state of mind where uncertainty arose from the interplay of risk and competence (Carpenter & Priest, 1989).

Risk in this study was viewed as the potential to lose something of value (such as mental, social or physical injury) during an adventure (Carpenter & Priest, 1989).

Competence was the ability of individuals to influence uncertain outcomes (Carpenter & Priest, 1989).

Personality characteristic was used to define habitual patterns or qualities of behavior of any individual as expressed by physical or mental activities (Zuckerman, 1979).

Trait was defined as the tendency to experience the relevant state and behave in a specific a manner in many situations (Zuckerman, 1979).

Summary

The sport of scuba diving has been identified as a high risk activity due to the dangers and uncertainties its participants face while engaged in the sport. This study dealt with the comparison of scores on the MBTI and EPPS between the beginner scuba divers and advanced scuba diver. Definitions of terms associated with high risk activities and specific to this study were included. Also included was a brief discussion on the delimitations, limitations, and null hypotheses to be tested.

Chapter 2

Review of Related Literature

This study compared personality characteristics of beginner scuba divers and advanced scuba divers as measured by the Myers-Briggs Type Indicator (MBTI) and Edwards Personal Preference Schedule (EPPS). Factors related to this study are discussed in this chapter. The following review of related literature is divided into four categories: the origins and participants of risk recreation, Zuckerman's Sensation Seeking Scale, personality tests used with risk recreation, and research on scuba diving.

The Origins and Participants of Risk Recreation

Recreation activity containing elements of risk or danger is defined as risk recreation. Examples of these types of activities include scuba diving, rock climbing, white-water rafting, mountain climbing, and wilderness backpacking. Although risk recreation can be distinguished from other endeavors by the deliberate seeking out of situations in which there is an element of danger, there is not a complete loss of control. Rather, risk recreation involves a process in which individual skills and abilities are weighed against projected requirements and possible negative outcomes. Additionally, actions and abilities of the risk recreation participant influence

the final outcome of the experience (Ewert & Hollenhorst, 1989). Kerr (1989) supported this argument, noting that in some recreational situations, players are control oriented. By virtue of their skills and behaviors, they display a substantial amount of control and influence over outcomes. As a consequence, risk taking per se may play a less central role in explaining why individuals choose to engage in those risk recreation activities and dangerous environments.

Risk recreation is a significant departure from traditional wilderness recreation activities, which have typically included hiking, camping, hunting, and horseback riding. In contrast, risk recreation is an expression of personal autonomy through physical and mental exercise in settings where competence and experience make the difference between safety and serious injury or death. In fact, death and crippling injuries are not uncommon in risk recreation activities. Straub (1982) conducted a study of 80 male athletes who participated in the sports of hang gliding, automobile racing, or bowling. It was predicted that a test might help athletes become aware of potential dangers of risk-taking behaviors. Straub reported that when typical low risk activity participants were convinced to engage in risk-taking sports, the potential for injury, and even death, was greater than for individuals attracted to high risk activities. As Straub acknowledged, the need exists for more studies focused on high and low risk sports other than hang gliding,

automobile racing, and bowling. Also, research using female athletes, as a subject, are essential to the testing of risk recreation.

Since most risky sports involve other people as partners or support groups, the impact of death on these groups was researched (Doka, Schwarz, & Schwarz, 1990). Doka et al. reported that risky sports include networks of people who are involved in a number of interrelated roles through shared activities, publications, and organizations. When death occurs during a risky sport, other people are involved. Despite popular belief, evidence does not indicate that involvement in risky sports signals either sub-intentional death wishes or phobic reactions. Instead, findings suggested most risk recreation participants were mentally healthy individuals who came from homes with positive attitudes toward risk taking (Huberman as cited in Doka et al., 1990). Results of this study indicated that the prime motivation of risky sport participation was to obtain a new, exciting experience, rather than risking death while demonstrating masculinity as some research has implied (Kastenbaun as cited in Doka, 1990). This study was tentative and needs to be broadened in the area of risky recreation.

Sarason, Sarason, and Pierce (1990) evaluated two concepts linked with perceived support that relate to skill development and performance: 1) the sense of support and 2) the sense of acceptance. These authors' research topics were "How are social ties related to health?" and "How are social ties related to stress coping?" Correlated features have emerged from previous

studies of the sense of acceptance: effective interpersonal skills, a sense of self-efficacy leading to effective coping skills, low levels of anxiety, positive self-image, and the willingness to explore and take reasonable risks (Sarason et al., 1990). According to Bandura (as cited in Sarason et al., 1990) a perception of a supporting world reduces the likelihood of experiencing high levels of anxiety thus creating an increase in exploration, new ventures, and persistence. Conclusions made from the investigation support the importance of a sense of support and acceptance in risk recreation activities. The pursuit of teamwork and team cohesion in sports continues to foster high levels of performance.

Potgieter and Bisschoff (1990) hypothesized that some individuals will be attracted to high-risk sports, whereas other individuals will have a predisposition to participate in low risk sports. Thirty-five participants of rugby considered a medium-risk sport, and 32 marathon runners, considered a low risk sport, were compared for tendencies to participate in sports involving different levels of risk. The participants with an increased specialization in different sports were expected to differ from others with a more general interest and ability in the sport. The results of the test administered among rugby players and general sport participants suggested risk taking behavior was a biological characteristic. The rugby players had a greater need than the marathon runners did specifically for thrill and adventure seeking. Further study is needed to distinguish the difference

between high risk participants and medium and low risk participants and their level of specialization in sports.

One hundred six students enrolled in the Program Outdoor Pursuits course at Ohio State University participated in Ewert and Hollenhorst's (1989) testing of the Adventure Model. The students completed a model analysis based on a 25 item questionnaire designed to elicit responses concerning experience and skill level, frequency of participation, preferred social and physical settings, preferred risk levels and motivations for adventure recreation participation. The dependent variable was the level of engagement in the general area of adventure recreation. The purpose of the study was to test the accuracy of the adventure model in predicting the personality and activity/setting attributes of adventure recreation participants. The prediction was made that as experience level increases, the participants would exhibit higher skill levels and have a greater tendency for risk-taking. It was also predicted that motivation factors would shift toward challenge, achievement, control, and risk taking. The Adventure Model attempts to predict a recreation participants' level of skill and the degree of risk taken. Ewert and Hollenhorst reported adventure recreation participants could be categorized by the Adventure Model variables that indicated individuals with a greater propensity for risk-taking behavior. Further investigation is needed to explore more specific types of adventure participants in respect to experience level and personality characteristics.

The National Association of Underwater Instructors (NAUI) holds the standard that it is essential for every scuba candidate to evaluate some of their key personality traits before involvement in the sport. According to NAUI text, some important traits to consider are: positive self-esteem, self-confidence, and controlled levels of anxiety (Griffiths, 1991). The relevance of reactive skills can be identified by response to stress and anxiety. Stress and anxiety are top causes of panic, which may lead to the loss of control for the scuba diver.

Risk recreation includes a range of dangerous sports, including scuba diving, rock climbing, and parachuting. Researchers have attempted to identify the motivation for participation and the type of individual attracted to such sports. The perception of danger involved in sports has been identified as a possible biological characteristic (Potgieter and Bischoff, 1990) and therefore an influence in the participant's interest in high, medium, or low risk recreation.

Zuckerman's Sensation Seeking Scale

For approximately 30 years, Marvin Zuckerman has conducted research in reference to the trait of sensation seeking. Sensation seeking is defined as both the motivation or need for a variety of sensations and the willingness to take physical and social risks in order to experience this range of sensations (Gerbing, Ahadi, & Patton, 1987). Sensation activities are

classified as the emotions, drugs, and physical activities such as scuba diving, free-fall sky diving, free rock climbing, and other activities involving speed and movement beyond an ordinary range (Zuckerman, 1979). Tastes in art and music, clothes, and friends may also depend on the capacity of sensory and social stimuli to produce novel sensations and experiences.

The majority of the research on risk recreation has been based on validating the sensation seeking scale developed by Zuckerman, Kolin, Price, and Zoob. Zuckerman's Sensation Seeking Scale (SSS), Form V is limited to four basic areas of measurement: Thrill and Adventure seeking, Experience seeking, Disinhibition, and Boredom susceptibility. These factors have been important in determining risk takers. Zuckerman believes that biological traits determine if an individual is a sensation seeker. Individuals are characterized as "sensation seekers" when their SSS scores are high in the area of thrill and adventure seeking. (Zuckerman, 1979; Potgieter and Bisschoff, 1990; Straub, 1982).

Individuals scoring high on the SSS tend to score high on Eysenck's extroversion scale (Gerbing, Ahadi, & Patton, 1987). Zuckerman and Myers (1983) reported that no apparent difference was found between sensation seeking heterosexual and homosexual males in the same population. It has been reported that many but not all of the activities preferred by high sensation seekers are risky. Consequently, most sensation seekers tend to minimize the risk to derive maximum enjoyment from the activity. Risk

seemed to add a significant arousal factor that is essential to the enjoyment (Edmonston, 1994). It was suggested that the inclination to engage in risk recreation was the outcome of expected pleasure from the activity.

Hymbaugh and Garrett (1974) administered the Sensation-Seeking Scale (SSS), Form V, to 21 skydivers and 21 non-skydivers. The groups were matched on age, sex, socio-economic, and occupational variables. It was predicted that skydivers would score significantly higher on the SSS than the non-skydivers. Results of the investigation were consistent with predictions of higher scores for the skydivers, offering support for the validity of the Zuckerman scale. Further research is need to understand differences not only between participants and non-participants of high risk sports but also the difference among those with different skill levels within the actual sport.

Bouter, Knipschild, Feij, and Volovics (1988) administered a validated Dutch version of Zuckerman's Sensation-Seeking Scale to Dutch downhill skiers. The study included 573 skiers who claimed medical costs because of a ski injury. These injuries prevented the skier from skiing or participating in other activities for one day or longer. The control group consisted of 576 Dutch downhill skiers who skied with no report of medical injuries from skiing. The SSS scores indicated males were higher Thrill and Adventure Seeker (TAS) and Disinhibition (DIS) compared to females. Results also suggested skiers who were more inclined to show risky behavior were injured less often. Consequently, skiers with a high TAS score were better at

handling the risk of several forms of physical exercise and therefore less prone to accidents and injury, compared with those with lower TAS scores. Validity may have been impaired by possible selection bias, information bias, and uncontrolled confounds such as possible inprecisions in a self-reporting measurement. Clearer distinctions are needed between participant groups.

Although most research validates the ability of the SSS to measure an individual with Thrill and Adventure Seeking (TAS) and Disinhibition (DIS), some studies have found the SSS does not clearly define the participant's choice of recreation activity or level of commitment. For example, Rowland, Ranken, and Harrison (1986) conducted a study using a life span inventory of sports participation and Zuckerman's SSS, Form V. Results suggested that there was no clear relationship between sensation seeking and participation in risky sports. The lack of relationship was due to the tendency of high sensation seekers to become involved in more sports overtime than do low sensation seekers. Therefore, the need for sensation seekers to participate in a broad range of activities has made the use of the SSS ineffective in some situations. However, both the need for new experiences and an attraction to high risk have been characterized by the high sensation seeker's participation in sporting activities. These data suggest Zuckerman's scale does not accurately measure participants of high risk activities who engage in only one type of risky sport opposed to several risky sports.

In summary, Zuckerman's Sensation Seeking Scale (SSS) has become a well-known measurement instrument used for the study of high risk participants. This instrument examines individuals' central motivational mechanisms, but lacks the ability to explain certain aspects of the personality of risk recreation participants. The analysis of high risk participants' personality traits has been conducted by different means of measurement and interpretation. The remainder of this review will focus on the direction that other researchers have taken to investigate the way an individual's personality relates with risk recreation.

Personality Tests used with Risk Recreation

Extensive literature exists on the connection between personality characteristics and recreational leisure/sports preference and performance, however, there are frequent complaints about the quality of research in this area (Ewert & Hollenhorst, 1989; Blenner, 1993; Levenson, 1990;Watson, 1985). Researchers have sought to explain what motivates people to seek risk-taking behavior in a recreation environment. One theory is that personality characteristics drive an individual to desire these types of activities (Potgieter & Bisscholff, 1990; Zuckerman, 1979; Straub, 1982; Heyman, 1986). Other theories suggest participation in the activity motivates the individual to desire high quality experiences, improved skill

level and perhaps, even risk taking behaviors (Ewert & Hollenhorst, 1989; Iso-Ahola, LaVerde, & Graefe, 1988).

The terms "sensations-seeker" (Zuckerman, 1979) and "Big T" (thrill-seeking) personality (Farley, 1986) have been used in high risk recreation participants research. Kerr (1988) reported that past research suggested participants in high-risk activities, such as scuba diving, also have a strong need for dominance and control over events. Acceptance of these theories yields ideas such as risk, excitement, or a sense of control as motivating factor for participants.

Arousal concepts like extroversion, impulsivity and sensation-seeking have proved useful in understanding sport preference (Furnham, 1990). For example, Rowland, Franken and Harrison (1986) found high sensation seeking males preferred pool, snooker, water skiing and racquetball, whereas low sensation seeking males preferred running/jogging, weight lifting and hiking. Females high scoring in sensation seeking preferred white-water rafting, windsurfing, and kayaking, while those who scored low preferred sailing, handball and ballet. Similarly, Kerr and Svebak (1989) studied the role of impulsivity in sport preference and found clear and predictable differences supporting the idea that impulsively is associated with preference for explosive and sensational experiences as opposed to endurance sports.

Iso-Ahola, LaVerde, and Graefe (1989) conducted a study to investigate the relationship between participation in one risk sport (rock climbing) and

self-esteem. The subjects were rock climbers who completed a questionnaire the day before a climb, the day after a climb, and rock climbing club members. A control group consisted of non-rock climbers. Results of the questionnaires indicated no significant difference between pre-trip, post-trip and club members in their ratings of general perceived competence. None of the predicators contributed significantly to self-esteem. The greater number of years a participant climbed and the individuals general perceived competencies were reported as having a positive correlation. The results of this study suggested that it is not the number of experiences but rather the quality of experiences that determines whether risk sports raise participants' self-esteem. The climbers' level of perceived competence grew as the climbers gained experience. Iso-Ahola et al. suggests this information will be useful in the programming of sports and recreation activities. Additional research is needed to determine if the participants' sense of competence can be affected by familiarity with the activity. Also, generalizability of these results to participants in other risk sports is unknown.

Forty-four students in the 11th grade participated in the study conducted by Gal-or and Tenenbaum (1986) while enrolled in a military academy program. The students completed a battery of tests which included: The Assemble A Person Test, Self-Control Schedule, State-Trait Anxiety Inventory, and Cognitive Strategies. The purpose of the study was to assess the relationship between body image, self-control, and anxiety and how they

affect performance of parachuting, jumping skills, and the use of cognitive strategies prior to a real jump involving young novice parachutists. Gal-or and Tenebaum hypothesize that factors such as physical and emotional self-control and the ability to control psychomotor skills are necessary during high risk sports due the physical and environmental stress during these activities. Their findings suggested that a congruent body image was positively correlated with performance of psychomotor skills during the descent and the parachute roll. Further investigation is suggested to examine the relationship between anxiety and body image in other sports.

Kerr and Svebak (1989) conducted a study using the Telic Dominance Scale (TDS) and the Barratt Impulsiveness Scale (BIS) as investigative tools to examine the relationship between telic dominance and arousal avoidance, impulsivity and preference for and participation in 'risk' and 'safe' sports. One hundred eighty-one (181) undergraduate students volunteered to participate in the study. Results suggested a strong relationship between individuals' with a preference for risk sport and low scores on arousal avoidance. A lower score on the TDS serious minded subscale was also obtained for those subjects who participated in winter risky sports.

The Telic Dominance Scale (TDS) was administered to 106 rugby players from four different countries: Canada, Wales, England, and Australia. Kerr (1988) conducted the study to identify consistent patterns of motivation and personality by examining telic dominance in rugby players.

Results showed no significant difference in the telic dominance subscale scores, arousal avoidance, serious-mindedness, and planning orientation among rugby players in four different countries.

Booth-Kewley and Vickers (1994) conducted a study relating the five-factor model of personality (Neuroticism, Extroversion, Openness to Experience, Agreeableness, Conscientiousness) to a four-dimension model of health behavior (Wellness behaviors, Accident control, Traffic risk taking, Substance risk taking). The purpose of the study was to research any connection between Conscientiousness and Agreeableness as predictors of health behavior. Subjects of the study were U.S. Navy enlisted personnel (N = 103). Each subject completed the NEO Personality Inventory, which consisted of 181-item personality questions answered on a 5-point Likert Scale. Results suggested Extroversion was linked to wellness behavior and accident control. Also, Experience was related to substance risk taking. Further research in this area may provide evidence to predict a relationship between individuals involved in risky sports and their personality characteristics.

Another method of identifying high risk takers has been through the use of an Activity Preference Questionnaire. The Activity Preference Questionnaire measures fear of real, physical danger, and apprehensiveness in the face of social uncertainty. The rating of "fear IQ" was based on a scale in which a low fear IQ predicts those who were adventures, explorers,

astronauts, and often leaders (Lykkens, 1982). The term "Type T" has often been used to describe those who are high in stimulation-seeking and risk-taking behavior (Farley, 1986). These traits have contributed to creativity in our society. There has been limited advancement in the pursuit of an instrument which can assess the personality traits, then determine a level of commitment to the high risk activity. Further studies are needed to explore the personality and choices of risk recreation participants.

Those who are sensation seekers mainly in the physical domain are often involved in risky activities, such as adventurers and physical risk-takers. Depending on the personality theory or model adhered to, it possible theoretically that various physical and social consequences that occur in sport and leisure could change certain aspects of personality functioning (Furnham, 1990). This section has addressed several types of theories and models used in the study of risk recreation participants. The following selection of material reviews the purpose and use of the Myers-Briggs Type Indicator and Edwards Personal Preference Schedule.

Myers-Briggs Type Indicator

Research has been conducted in which the Myers-Briggs Type Indicator has been to examine personality characteristics in relation to risk taking behavior. Ware and Yokomoto (1989) administered the Myers-Briggs Type Indicator (MBTI) and the Activity Preference Questionnaire (APQ) to

an introductory psychology classes in an attempt to find a correlation between type/temperament theory and characteristics of risk takers. Results of this study indicated SPs (Sensing and Perception) reported higher riskiness than other types. The ESTP type reported both high physical and social riskiness, while the ISTP type only reported high physical riskiness. Ware and Yokomoto (1989) suggested additional research in riskiness and type might explore other measures and performance tasks. Also, further analysis of the MBTI may be useful in identifying personality characteristics among participants of specific risk recreation sports.

Persons in management to place individuals in jobs suited to their personality characteristics have frequently used the Myers-Briggs Type Indicator. This test has test-retest validity, indicating its success in evaluating prep school students, college students, and normal adult populations. The MBTI has been determined to measure how individuals perceive and judge (Wenrich, 1994). These qualities of the MBTI have offered reasonable cause to utilize the MBTI as an effective measurement tool for this study.

Edwards Personal Preference Schedule

The Edwards Personal Preference Schedule (EPPS) was also selected for this study as an experimental instrument that was to measure the needs or motives of scuba divers. The EPPS was designed specifically for normal

adults and college students. To date, research on risk recreation has not included the EPPS. The EPPS measures 15 needs and motives: abasement, achievement, affiliation, aggression, autonomy, change, deference, dominance, endurance, exhibition, heterosexuality, intraception, nurturance, order, and succorance. These 15 variables measured by the instrument offer broad range characteristics mentioned in other risk recreation studies. For example, results of Zuckerman's Sensation Seeking Scale have been compared with the following variables: autonomy, change, dominance, endurance, heterosexuality, and order (Edmonston, 1994). Kerr and Svebak (1989) used the Telic Dominance Scale to determine the level of dominance in risk recreation participants. Also, Doka et al. (1990) and Sarason et al. (1990) studied the relationship between affiliation, introception, succorance, and nurturance. The 15 variables measured by the EPPS were expected to offer a broad comparison of the personality characteristics identified by the beginner and advanced scuba diver.

The study of high risk sport participants has grown, demanding further studies of personality characteristics rather than purely observing the high risk behavior (Murphey et al., 1990; Jackson & Wilson, 1993; Ware & Yokomoto, 1989). Although the tests used for measurement of personality characteristics and Zuckerman's SSS have provided a variety of information on risk recreation participants, the need for reliable personality test still exists. The Myers-Briggs Type Indicator (MBTI) and the Edwards Personal

Preference Schedule (EPPS) are personality tests that have been selected as appropriate test for this study due to there ability to measure a range of vital personality characteristics in a normal college student and adult population.

Research on Scuba Diving

Dr. Steven Heyman (1984) conducted a study regarding the benefits of increased understanding among scuba divers and their instructors. Sport psychologists, such as Heyman, have continued efforts toward the understanding of the type of person who chooses scuba diving as a sport. Also, the participants' performance in stressful situations while scuba diving was evaluated for the purpose of developing the instructors' lesson plans. Heyman and Dr. Ken G. Rose administered several tests to 250 students over a three-year time period. The tests were administered to scuba students, students from the general population at Southwestern Oklahoma State University, and military trainees in underwater demolition programs. One test examined how anxious individuals are under normal circumstances. Another revealed different levels of stimulation individuals seek. To pursue the answers beyond personality patterns, Heyman and Rose also looked at sex-related traits and how they may impact students. Records of that completed the course, the number of dives each student made, and the depth and time of each dive measured scuba students' performance. Results found that higher sensation seekers spent more time underwater but did not dive

as deeply as lower sensation seekers. Successful persons in the high-risk situation were less anxious, felt more in control, and enjoyed stimulation and arousal. The study indicated personality patterns also appeared to influence open water behaviors: less sensation seeking, more outgoing individuals made deeper but quicker dives, accomplishing the task but perhaps not in a comfortable way. From the students involved in the study, Heyman concluded that people who learn to dive favor recreation with some risk. Sometimes people who may not wish to dive are urged into it, and should be given more attention by instructors. Further research is needed to develop a screening test to help instructors recognize the motives of scuba students and potential problems with students during training to improve how diving is taught.

Heyman (1986b) and Dr. Thomas J. Griffiths of Indiana State University at Terre Haute examined personality variables of scuba students. The variables examined included: anxiety, sensation seeking, experience seeking, thrill and adventure seeking, boredom susceptibility, sex role inventory, emotional variables affecting individuals, and control potential. Instructors rated scuba diving students on their pool performance and depth and bottom time during open water dives. Also, students completed an eight-question survey regarding the students' reason for taking the class. Results of the study showed those describing themselves as less anxious did better in pool performance. Students who rated themselves as more involved in

general activities at the beginning of the study and who rated themselves as sensation seeking were reported to have scored higher on the open water dive. Heyman concluded that this study confirmed the predictions regarding the relationship exists between anxiety and performance of scuba diving. Future studies on this topic may help identify people more likely to have problems and enable instructors to develop strategies for helping these individuals.

Murphey, Beach, and Tennant (1990) conducted an analysis of personality type variability for a random sample of both cave divers and beginning scuba diving students using the Myers-Briggs Type Indicator (MBTI). Results indicated a difference between the personality types of beginning scuba students and cave divers. Due to considerable personality variance in the divers, it was unknown whether changes occurred in the personality after the individual became more proficient in diving. Murphey et al. (1990) reported cave divers four digit scores were most frequently ISTJ, INTP, and INTJ. Beginning scuba diving student's scores were more commonly classified as INTP, ESFP, and ESTJ. Another relevant finding was that cave divers were more likely to have a preference for Judgment. On the other hand, beginner scuba diving student's were overwhelming Perceiving. Results suggested that differences might exist in the personality characteristics of beginning scuba divers and cave divers. It was stated that successful cave diving requires a participant to use the personality trait

Judgment to make rapid decisions (Murphey et al., 1990). Alternatively, divers with certain personality traits may have naturally gravitated toward the activity with greater risk involved. Further research is needed to determine the selection process of risk recreation activities and advanced skills in scuba diving

Summary

Risk recreation is defined as the deliberative process in which individual skills and abilities are weighed against projected requirements and possible negative outcomes. High risk recreation participants with an increased specialization in different sports were expected to differ from others with a more general interest and ability in the sport. Kerr (1988) reported that past research suggested participants in high-risk activities, such as scuba diving, also have a strong need for dominance and control over events. The existing literature, in relation to this study, has indicated a strong correlation in selected personality traits for participants of high risk activities. However, current research lacks comparative studies of advanced and beginner participants of risk recreation activities.

Therefore, the need exists for a clearer understanding of personality characteristics of scuba divers. More specifically, the differences between advanced and beginner scuba diver needs to be identified and explained. With added information, possibly scuba diving trainers and risk recreation

managers can make more accurate decisions regarding their clients.

Results of this review provided a rationale for choosing the Myers-Briggs Type Indicator and the Edwards Personal Preference Schedule as suitable tests of personality characteristics in this study. The MBTI and EPPS offer a greater range of information regarding the scuba diver than the Activity Preference Scale, Adventure Model, Telic Dominance Scale, or Zuckerman's Sensation Seeking Scale, Form. Also, the function of these tests offer measurement among normal adults and college students for their motives and needs.

In conclusion, a wide range of measurement tools and personality tests have been used to study risk recreation participants. This seemed to have caused conflicting results and few answers to the questions regarding the vital personality characteristics of the participants. These vital personality characteristics are perhaps the answers to this studies question in reference to whether advanced and beginner scuba divers possess different personality characteristics.

Chapter 3

Methodology

This chapter identifies the subjects, instruments, and procedures used in this study. The Myers-Briggs Type Indicator (MBTI) and the Edwards Personal Preference Schedule (EPPS) were selected as the assessments for this study. The decision to use these tests was based on the wide spread availability of the tests, simplicity of administration, documentation of reliability and validity and the particular personality characteristics measured by these instruments (Carlyn, 1977; Short & Grasha, 1995; Ware & Yokomoto, 1989; Tzeng, Outcalt, Boyer, Ware, & Landis, 1984; Jackson & Wilson, 1983).

Study Variables

The variables identified in this study were:

Dependent Variables: Personality traits as measured by the MBTI and the EPPS.

Independent Variable: Experience level of scuba divers (Advanced and beginner scuba divers)

Subjects

Volunteer subjects for the study consisted of beginner scuba divers and advanced scuba divers. Beginner scuba divers (N=30) were enrolled in a course at The University of Tennessee leading to National Association for Underwater Instructors (NAUI) Openwater I certification. The beginner scuba divers' mean age was 21. Instructors for the course were two NAUI certified instructors. The total of 37 males and 13 females participated in the study. Advanced divers were selected from a list of referred advanced divers trained and associated with Current Interprise, Inc. located in Knoxville, Tennessee. The advanced scuba divers had a mean age of 38 years. The advanced scuba diver group (N=20) was required to have met four criteria before qualifying for participation in the study: advanced training from NAUI or PADI, a minimum three years of diving experience, a minimum of 25 logged dives, and experience in both fresh and salt water. Criteria were established as a means of differentiating between persons with advanced certification without dive experience outside of the swimming pool.

Setting

The setting for this study was The University of Tennessee, Knoxville campus. The data for this study were collected in a classroom setting on campus.

Instrumentation

Myers-Briggs Type Indicator

The Myers Briggs Type Indicator (MBTI) was based on Carl Jung's theory of human behavior. The MBTI consists of four scales each suggesting natural preferences that Jung's assumed everyone possesses. The four scales are bi-polar: Extroversion-Introversion (E-I), Sensation-Intuition (S-N), Thinking-Feeling (T-F), and Judgment-Perceiving (J-P).

- The E-I index was designed to measure the person's preferred orientation to life. Extroverted types are regarded as being primarily influenced by outer world persons, things, and experiences. Introverted types are regarded as having a greater orientation toward inward experiences.
- The S-N index was designed to measure the person's preferred way of perceiving things. The Sensing type perceives life through sensing organs, tending to notice concrete and practical details. The Intuitive type views things in a more vague or abstract manner.
- The T-F index was designed to measure the person's way of making decisions. Thinking types rely on logic to clarify a particular situation. They use objective measures to determine answers. Feeling types make decisions based more on their emotions and on subjective values.
- The J-P index was designed to measure the person's preferred way of dealing with the outer world. Judging types are organized and systematic; they preferred structure and plan, aiming to control life. The

Perceiving types are more open-minded, enjoying flexibility and spontaneity, aiming to adapt to life.

The MBTI is a self-report inventory with forced choice. Each answer is weighted toward one of the eight preferences. Two types of scores are obtained from the test. Scores are classified in the four dichotomous type categories, and also eight numerical scores are produced which can be transformed into four continuous scores. MBTI may therefore be regarded as producing either dichotomous or continuous data (Carlyn, 1977).

Carlyn (1977, p. 462) described the Type-Category Score that occurs after the data have been numerically figured such as:

> To determine the person's type, the points for each preference are totaled, yielding eight numerical scores. These eight scores are interpreted as four pairs of scores, with the larger of each pair indicating the preferred pole. For example, a person with an E score of 12 and an I score of 17 is typed as an Introvert. The final result is that a person is classified as one of the 16 possible types: ISTJ, ISFJ, INFJ, INTJ, ISTP, ISFP, INFP, INTP, ESTP, ESFP, ENFP, ENTP, ESTJ, ESFH, ENFJ, or ENTJ.

Further descriptions of personality characteristics for each of these bi-polar dimensions was given in Appendix A-1.

The underlying assumption was that every person will have a natural preference for one or the other pole (Carlyn, 1977). Sixteen possible combinations of the bipolar dimensions describe a unique and specific personality type. As defined by the MBTI manual (1962), a summary of the 16 combinations is given in Appendix A-2. Eight numerical scores are used

to establish the continuous scores for each dimension. One of each bipolar pair was keyed in to yield a total score in the proper direction.

Sex and college major base Norms for results of the instrument on college, noncollege, and high school prep students, with appropriate breakdowns. Approximately, 75% of the general population are Sensing type opposed to 25% Intuitive type and 75% are Extroverted type opposed to 25% Introverted type. Reliability ranges from 0.66 to 0.91 for males, and from 0.74 to 0.93 for females on six samples of 100 students each (Myers, 1962). Test-retest data for MBTI scores have appeared reasonably stable over a period of time for college students. Student's scores have either remained completely stable or a shift in only one of the four variables (Carlyn, 1977).

Edwards Personal Preference Schedule

The Edwards Personal Preference Schedule (EPPS) was designed primarily as an instrument for research and counseling purposes. It was used to provide quick and convenient measures of a number of relatively independent normal personality variables. The EPPS has been widely used in research studies due to its design for normal adults and college students. The EPPS forced-choice format requires the test taker to responds on the basis of the item content, the need or motive, rather than on the basis of the statement's social desirability. This format indicates the relative strengths of the various needs within the test taker (Urbina, 1994).

The statements in the EPPS and the 15 variables claim to measure their origin in a list of manifest needs presented by H.A. Murray (1939). The EPPS measures 15 needs and motives: abasement, achievement, affiliation, aggression, autonomy, change, deference, dominance, endurance, exhibition, heterosexuality, intraception, nurturance, order, and succorance. The manifest needs associated with each variables had been listed in (Edwards, 1959) Appendix A-3. In addition to the above mentioned 15 variables, the EPPS contains a measure of test consistency and a measure of profile stability.

Edwards (1959) Manual of the Edwards Personal Preference Schedule (EPPS) reported that scores on the consistency variable were based upon a comparison of the number of identical choices made in two sets of the same 15 items. There is a 1:4 chance the two sets of choices will be answered the same (e.g., the possible patterns of choices are AA, BB, AB, BA). Edwards observed the frequency of distribution consistency scores with N = 1509 and p = .5. Results indicated the probability of 9 or more identical choices occurring was .30. The probability of 10 or more identical choices was .15. Eleven or more identical choices were a .06 probability. It was then taken that 11 or more identical choices were a significant difference from chance expectancy. Although, 10 or more identical choices is acceptable as a more lenient standard.

Questions have been raised concerning the validity of the scale, and the interpretability of the type of scores generated, caution should be exercised when using the EPPS. Urbina (1994) reported problems in interpretation of scores and in validity. For example, two individuals can obtain the same score on a test but differ in their absolute strength of the need or motive. Test-retest stability coefficients with a one-week interval were based on a sample of 89 students and range from 0.55 to 0.87, with a median of .73 (Edwards, 1959).

Procedures

Each participant completed the MBTI and the EPPS. The purpose of the study was explained to the participants before they began the test. To provide confidentiality, a coding system was developed and implemented rather than the participants using their name on the tests.

Time was allotted for the subjects to ask questions. There was no time limit imposed on the subjects while taking the tests. The completion of both tests took approximately one hour and five minutes, roughly 45 minutes to complete the EPPS and 20 minutes to complete the MBTI. The beginner scuba divers were given the tests in their classroom setting. The advanced scuba divers completed a diver profile sheet before they began the test. The diver profile sheet consisted of four criteria the advanced diver must meet, Appendix B-1. The administration of the tests for the advanced divers took

place in a classroom setting. After the researcher received the tests, they were scored and coded.

Results

Answers to the MBTI and the EPPS were hand scored. Individual scores were compared to group norms. Data were analyzed and organized in order to address the null hypotheses of the study. The chi-square and independent t-test were determined to be reliable tests for the null hypotheses which stated there would be no significant difference between the beginner scuba divers and advanced divers at the alpha level = 0.05 for each test. The chi-square was to be used with the MBTI. The multiple independent t-tests were to be used for the EPPS. Due to a statistical flaw with using multiple t-test, the Bonferroni Correction Indicator would be used for the EPPS to adjust the alpha level. These statistical tests were determined appropriate since the purpose of the study was to assess differences between two groups where N was less than 40.

Chapter 4

Analysis of Data

The purpose of this study was to conduct a comparison between advanced and beginner scuba divers' personality characteristics. To meet this purpose, the Myers-Briggs Type Indicator and the Edwards Personal Preference Schedule were used to assess the personality characteristics of advanced and beginner scuba divers. The beginner scuba diver participants of this research were students enrolled in an Openwater I Certification class at The University of Tennessee. The advanced scuba diver participants of this study were affiliated with Current Interprise, Inc. in Knoxville, Tennessee.

The data were analyzed using the SPSS Release 4.0 for Macintosh. A chi-square had been selected as the statistical test for the Myers Briggs Type Indicator (MBTI). Independent t-tests were used on the Edwards Personal Preference Schedule (EPPS). The preliminary hypotheses of the study stated there would be significant difference in the scores of the beginner scuba divers and the advanced scuba divers on the MBTI and the EPPS. The Bonferroni Corrections Indicator was conducted as a follow-up test to determine the alpha level range.

Myers Briggs Type Indicator

The chi-square was used to test the Null hypothesis that there were no significant differences between the personality types of beginner scuba divers and advanced scuba divers on the MBTI. Information collected was presented in the form of frequency and percentages. The chi-square test used on the MBTI indicated no significant difference between the expected outcome and the actual outcome in the Personality Types of beginner scuba divers and advanced scuba divers $x^2(16,50) = 20.66$, $p > .05$.

Tables* 1, 2, 3, 4, 5 and 6 present results for the Myers Briggs Type Indicator scores for the scuba divers of this study. Tables 1 and 2 describe the distribution among the MBTI scores of the total scuba diver population (N=50), including advanced and beginner scuba divers. Tables 3 and 4 describe results for the beginner scuba divers (n=30). Tables 5 and 6 show advanced scuba divers' (n=20) results on the MBTI. Scores were broken down in accordance with the Psychological Types as defined by the MBTI (Wenrich, 1994). These Psychological Type categories are: Extroversion (E), Introversion (I), Sensing (S), Intuition (I), Thinking (T), Feeling (F), Judgment (J), and Perceiving (P). Each table contains the Psychological Type as measured independently, in pairs, and, as the most commonly presented style, one continuous score of the four digit categories (e.g. ISTJ, ENFP, ESFJ, etc....).

* All tables may be found in the Appendix.

In Table 2, the results indicated that 64% of the total scuba divers were Extroverted verses 36% being Introverted. Sixty percent were Thinking verses 40% being Feeling type. Of the continuous scores, the most commonly found Psychological Types among the scuba divers included 16% ENTP and 10% ENFP. The two least commonly found Psychological Types were 0% INFJ and 2% ISFP.

Table 4 illustrates the results of the beginner scuba divers MBTI scores. Of the beginner scuba divers, 70% were Extroverted, Intuitive, and Perceiving verses 30% being Introverted, Sensing, and Judging. Of the paired scores, only 10% were Introverted-Sensing (IS). The continuous scores not found in any of the beginner scuba divers were ISTJ, ISFJ, and INFJ. The most common continuous scores were ENTP (23.3%) and ENFP (16.7%).

The advanced scuba diver's scores were shown in Table 6. Seventy percent of the advanced divers were Thinking verses 30% Feeling. The paired scores showed only 5% each were Intuitive-Feeling (NF) and Feeling-Perceiving (FP). The most commonly found Personality Types were 15% INTP and 15% ESTP. Several Personality Types were not found at all in the advanced diver group. These types were INFJ, ISTP, ISFP, INFP, and ENFP.

After the primary data analysis, additional subjects returned the MBTI to the test administrator. These late additions increased the study sample to 32 beginner and 26 advanced scuba divers. Each participant was

placed in one of two bipolar categories for each scale. A follow up analysis to test the differences between advanced and beginner scuba divers on these bipolar dimensions was then conducted. In Table 7, a summary table shows the proportions of advanced scuba divers and beginner scuba divers in categories.

A difference of proportions (e.g., P1 - P2) was tested to detect contrasts between the advanced group and beginner scuba divers as seen on Figure 1. Only the proportions of the first group in each scale were used since the pair of categories were mutually exclusive. For example, each participant was either introverted or extroverted. A confidence interval was calculated to place statistical bounds on the proportional difference. Table 8 illustrates if these bounds included zero then the proportions were not statistically different.

The confidence intervals revealed that two bipolar dimension proportions were statistically different in the advanced and beginner scuba diving groups. Results indicated that the advanced scuba divers tended to score higher on the Sensing dimension as opposed to the beginner scuba divers that scored higher on the Intuitive dimension. In addition, the negative difference estimates indicated that the advanced scuba divers were more likely to be Judging that the beginner scuba divers who scored higher on the Perceiving dimension.

Edwards Personal Preference Schedule

In order to analyze the Edward Personal Preference Schedule data, multiple independent t-tests were performed. Results indicate significance was found with the Achievement (ACH) scores ($M_{beginner}$ = 13.3; $M_{advanced}$ = 15.4), F(16,50) = 1.06, p<.05, and the Order (ORD) scores ($M_{beginner}$ = 8.2; $M_{advanced}$ = 11.6), F(16,50) = 1.69, p<.05. Advanced scuba divers scored higher than the beginner scuba divers on Achievement and Order scores on the Edwards Personal Preference Schedule.

The Bonferroni Correction Indicator was then used to adjust the alpha level. After using the Bonferroni Correction Indicator, there were no significant differences F(16,50) = p > .003. Table 9 gives the mean, standard deviation, and p value from EPPS results. The consistency scores for the beginner scuba divers was 10.73 and 11.50 for the advanced scuba divers.

Summary

Chapter 4 reviewed the analysis of the Myers-Briggs Type Indicator and the Edwards Personal Preference Schedule. The statistical procedures used for analysis were discussed and results were presented for subjects by advanced scuba divers or beginner scuba divers.

In conclusion, there were significant differences in the Myers-Briggs Type Indicator on the dimensions Sensing and Judging. There were no significant differences in the four digit continuous scores on the MBTI. There

were no significant differences in the Edwards Personal Preference Schedule scores.

Chapter 5

Summary, Conclusions, and Recommendations

This chapter presents a summary of this study and conclusions based on findings of the study. Recommendations for instructors of scuba diving courses, and for further research, are discussed.

Summary of the Study

The purpose of this study was to conduct a comparison between advanced and beginner scuba divers' personality characteristics. The comparison was made with results of the Myers-Briggs Type Indicator and the Edwards Personal Preference Schedule between advanced scuba divers and beginner scuba divers. This study was delimited to the regional geographical area in which the participants of the study were selected.

The design, implementation, and evaluation of risk recreation is diverse and lacks consistency. The literature review showed that, to date, most research on risk recreation has assumed participants of high risk recreation have "sensation seeking" characteristics. For example, the typical participant in these risk recreation activities score high on Zuckerman's Sensation Seeking Scale for the traits Thrill and Adventure Seeking (TAS) and Disinhibition (DIS). Also, current literature suggested that high risk

participants were extroverted and motivated by the need for change and novel experiences. The need existed for research comparing different levels of competency in the activities defined as risk recreation.

Case studies by Heyman (1984) revealed that personality characteristics often underlie participation in risk recreation and level of specialization an individual will seek. The present study focused on two levels of competency in the risk recreation sport of scuba diving. The advanced scuba divers consisted of a group who had proven commitment and competence in scuba diving by meeting certain criteria: (1) a minimum of 25 logged dives, (2) diving for a minimum of three years, (3) the experience of diving in different types of waters (e.g. fresh and salt water), and (4) obtaining an advanced certification through a professional scuba diving association. The beginner scuba divers were students enrolled in an Openwater I certification class. Certified members of a professional scuba diving association taught the class.

This study utilized the Myers-Briggs Type Indicator (MBTI) and the Edwards Personal Preference Schedule (EPPS) to assess the personality characteristics of the advanced scuba divers and the beginner scuba divers. MBTI and EPPS were completed by each scuba diver in a controlled setting. Statistical analysis of data centered on the relations between the advanced scuba divers and the beginner scuba divers on both the MBTI and EPPS.

Findings

Descriptive Data from the The Myers-Briggs Type Indicator

The chi-square analyses of the MBTI results were not statistically different. However, follow-up analysis revealed differences on the bipolar continua. The advanced scuba divers appeared in the Sensing category at a significantly different level than the beginner scuba divers, while the beginner scuba divers appeared more often on the opposing bipolar dimension of Intuition. Also, the advanced divers were significantly more often in the Judging category, as opposed the beginner scuba divers' Perceiving category placement.

According to the MBTI description (Myers, 1962), these dimensions reveal that the advanced divers more often were persons who are interested in what is real, immediate, practical, and observable by the senses and who enjoy organizing, planning, and moving quickly to a decision. These traits would be useful in several situations related to scuba diving. First, the diver must thoroughly plan each dive trip. This requires working with others to establish a dive site and preparing equipment. Diving is not an individual sport. Therefore, organizing dive trips and cooperating with other divers is a necessity. Additionally, reacting quickly and safely when faced with a dangerous situation while scuba diving is imperative to survival. Griffiths (1991) reported uncontrolled stress and anxiety leads to panic the foremost

cause of scuba diver's loss of control. The MBTI types Sensing and Judging are consistent with characteristics that would fit an advanced diver.

Despite a lack of statistical significance in the chi square analyses for the continuous scores, there were some interesting findings. Twenty-three percent of the beginner divers were ENTP as opposed to 5% of the advanced divers. The personality characteristics associated with ENTP, according to MBTI manual definition (Myers, 1962) was:

> ENTP: Quick, ingenious, good at many things. Stimulating company, alert and outspoken. May argue for fun on either side of a question. Resourceful in solving new and challenging problems, but may neglect routine assignments. Apt to turn to one new interest after another. Skillful in finding logical reasons for what they want.

Data also indicated the advanced divers most common Personality Types (15% each) were INTP and ESTP. MBTI manual definitions (Myers, 1962) of these types were:

> INTP: Quite and reserved. Especially enjoy theoretical or scientific pursuits. Like solving problems with logic and analysis. Usually interested mainly in ideas, with little liking for parties or small talk. Tend to have sharply defined interests. Need careers where some strong interest can be used and useful.
>
> ESTP: Good at on-the-spot problem solving. Do not worry, enjoy whatever comes along. Tend to like mechanical things and sports, with friends on the side. Adaptable, tolerant, generally conservative in values. Dislike long explanations. Are best with real things that can be worked, handled, taken apart, or put together.

In this study, the advanced and beginner scuba divers did not differ significantly on the Myers-Briggs Type Indicator continuous scores. This contrasts with the findings of Murphey, Beach, and Tennant (1990) who

successfully identified differences between beginner scuba diving students and cave divers using the MBTI. Murphey et al. (1990) reported the ISTJ category was most notably different, in that, only 7% of beginner scuba divers appeared in this category, while 27% of cave divers were matched this continuous score. This information may indicate that specialization in cave diving is another level of competency in risk recreation.

Results of the present study did reveal some similarities when compared with the Murphey et al. (1990) study of beginner scuba diving students and cave divers using the MBTI. For example, Murphey et al. found that cave divers preferred Judging, where beginner scuba diving students were overwhelmingly Perceiving. Advanced scuba divers in the present study responded with a significant difference for Judging as well. Murphey et al.. (p.55) noted that the Judging "alternative is clearly a cave diving mandate, as making many absolutely accurate and rapid decisions is necessary for survival in the sport." Therefore, the nature of the subaquatic cave environment is a probable deciding factor in the Judging preference among cave divers. It appears that scuba divers that need advanced skills also have this personality characteristic.

In general, the advanced and beginner scuba divers' Thinking - Feeling type scores and Extroversion - Introversion type scores did not statistically differ from the general population (Myers, 1962). However, results of this study indicated the beginner scuba divers' scores were significantly different

than the general population on the Sensing - Intuitive dimension. Results for the beginner scuba divers' reported 70% Intuitive type as opposed to 30% Sensing type and 45% Intuitive type as opposed to 55% Sensing type. The general population norm was 25% Intuitive type as opposed to 75% Sensing type. Therefore, the advanced divers were more similar the general population in regards to a higher proportion of Sensing than Intuitive type. Individuals with the Sensing type, as defined by Myers (1962), are identified as those who are interested in what is real, practical, and observable by the sense. These results may provide further probability that advanced skills in scuba diving has required or attracted individuals with certain personality characteristic.

Additional comparative findings were identified in the results of the study conducted by Ware and Yokomoto (1990). These results indicated that the individuals who were classified as the ESTP type reported themselves as both high in physical and in social riskiness, while the ISTP type only reported high physical riskiness. Similarly, the ESTP was the most common type for the advanced scuba divers in the present study.

Results of the MBTI may serve as an indicator regarding the amount or type of supervision and instruction the participant needs while learning to scuba dive. From this data, instructors may learn that beginner divers with the ENFP type typically do not like routine and do not plan well, but quickly improvise due to their imagination (Myers, 1962). Therefore, these students

may need special attention when preparing for a dive trip. Additionally, persons with the type ESFJ were reported as working best with encouragement and praise (Myers, 1962). The Personality Type ISTJ commonly indicates a well organized and responsible person. As indicated by other studies (Ware & Yokomoto, 1989), students with ESTP type may be more likely to enroll in the advanced scuba diving classes and have fewer instances of uncontrolled anxiety while diving.

Descriptive Data from the Edwards Personal Preference Schedule

The other hypothesis was that a significant difference between advanced scuba divers and beginner scuba divers would be found in the Edwards Personal Preference Schedule (EPPS) scores. Analysis of the data found no significant differences between the groups' scores after the Bonferroni Correction Indicator was performed. Results of the EPPS did indicate a possible trend in high scores for two variables, Achievement and Order, for the advanced scuba divers. Therefore, the following statements regarding Achievement and Order should be used with caution due to the lack of statistical significance.

The EPPS variable Achievement was defined (Edwards, 1959, p. 11) as, "to do one's best, to be successful, to accomplish task requiring skill and effort, to solve difficult problems and puzzles." The needs associated with Achievement may suggest a greater ability of the advanced divers to focus on

the task of diving without allowing distractions or adversity to prevent a successful dive.

The variable Order was defined (Edwards, 1959, p.11) as, "to make plans before starting on a difficult task, to keep things neat and orderly, to make advanced plans when taking a trip, to organize details of work, to have things arranged so that they run smoothly without change." Given this tendency to Order, advanced divers may be more inclined to plan a scuba diving trip in an orderly manner. These plans may include arranging logistics and transportation details, organizing equipment, and keeping a dive log of depth, time and events during each dive. These plans are all vital to the safety and survival of any scuba diver.

As reported by Urbina (1994), problems with the EPPS include the fact that two individuals can obtain the same score on a test but differ in their absolute strength of the need or motive. Critics of the EPPS have remarked that the technical quality of the test have been neglected due to attempts to control the factor of social desirability (Edwards, 1959). Additionally, Edwards reported many individuals become frustrated and bored when taking the test, due to the item repetition and to dislike of the forced choice format. Perhaps, these factors affected the results of this study, which found no significance in the comparison between advanced and beginner scuba diver groups.

Conclusions

As identified in the data analyses, the advanced scuba divers were more Sensing and Judging than the beginner scuba divers, as measured by the Myers-Briggs Type Indicator (MBTI). From these data it can be inferred that advanced scuba divers are more interested in what is real, practical, enjoy organizing, planning, and moving quickly to a decision (Myers, 1962).

Based on the findings of the four digit continuous score, it was determined a post hoc test was appropriate to compare the paired MBTI dimensions (e.g. Extroversion-Introversion, Sensing-Intuition, Thinking-Feeling, and Judging-Perceiving). The two-tailed t-test was selected as the post hoc test. Results of the two-tailed t-test revealed no significant difference between Extroversion-Introversion and Thinking-Feeling. However, two-tailed statistical significance was revealed for Sensing-Intuition (p=.0730) and Judging-Perceiving (p=.0730).

Within the limitations of this study, and based on the analyses of the data collected, the following explanation and implications are reported by the researcher.

Explanation

Perhaps, the limited number of participants in the study contributed to the lack of significant differences of the test scores. Also, the lack of significance in the scores of advanced and beginner scuba divers indicate the

Myers-Briggs Type Indicator and Edwards Personal Preference Schedule might not sensitive enough to uncover difference. The geographical region of Knoxville, Tennessee was identified as a limitation of the study due to the limited number of scuba divers, dive sites and varied diving experiences in the area. The possibility exists that scuba divers living in a location where scuba diving opportunities are abundant, may have a greater propensity to stay with scuba diving and work toward advanced scuba diving skills.

Implications

The ability to identify personality characteristics associated with advanced scuba divers may serve as a predictor for which beginner scuba divers will seek greater levels of competence in the sport. Also, scuba diving instructors may use this data as an indicator of which students may be likely to have problems with the training. Perhaps, the data analyses also imply similarities in the vital personality characteristics of advanced participants of risk recreation sports in general.

Recommendations for Further Research

Based on the findings of this study, several methodological concerns become evident for future research of an appropriate test for scuba students. Further studies should:

- Conduct with a larger and more representative sample of the general population, including the beginner scuba divers, advanced scuba divers and a non-scuba diving population.
- Seek information from a wider spectrum of divers with respect to age, motivation for diving, length and depth of dives and a comprehensive method for determining engagement level.
- Perform a follow up study to assess the test trends in the data analysis. (e.g. Compare the two dimensions of the Edwards Personal Preference Schedule, Achievement and Order, with an independent population.)
- Compare paired dimensions of the Myers-Briggs Type Indicator in addition to the four digit continuous scores.
- Compare different types of specialized scuba diving (e.g. cave diving, ice diving, and wreck diving).
- Incorporate a way to measure and report behaviors of the subjects, as well as, a self-assessment inventory.

References

References

Ball, Ian L., Farnill, Douglas, and Wangeman, John F. (1984). Sex and age differences in sensation seeking: Some national comparisons. *British Journal of Psychology, 75, 257-265.*

Blenner, Janet (1993). Visual Evoked Potential Stimulus Intensity Modulation and Sensation Seeking in Thrill-Seekers. *Personality Individual Differences, 14(3), 455-463.*

Booth -Kewley, Stephanie & Vickers, Ross R, Jr. (1994). Association between Major Domains of Personality and Health Behavior. *Journal of Personality, 62, 279-286.*

Bouter, Lex M., Knipschild, Paul G., Feij, Jan A. & Volovics, Alexander (1988). Sensation Seeking and Injury Risk in Downhill Skiing. *Personality and Individual Differences, 9(3), 667-673.*

Carlyn, Marcia (1977). An Assessment of the Myers-Briggs Type Indicator. *Journal of Personality Assessment, 41(5), 461-473.*

Carpenter, Gaylene & Priest, Simon (1989). The adventure experience paradigm and non-outdoor leisure pursuits. *Leisure Studies, 8, 65-75.*

Comrey, Andrew L. (1983). An Evaluation of the Myers-Briggs Type Indicator. *Academic Psychology Bulletin, 5, 115-129.*

Doka, Kenneth J., Schwarz, Eric E. & Schwarz, Catherine (1990). Risky business: Observations on the Nature of Death in Hazardous Sports. *Omega, 21(3), 215-223.*

Edmonston, William E. (1994). Encyclopedia of Psychology, 2nd Ed., Vol 3 Canada.

Edwards, A.L.. (1959) *Manual for the Edwards Personal Preference Schedule.* New York: The Psychological Corporation.

Elegant, Simon (1995). Outward Bound: Neither risks nor expense deter Asian thrill-seekers. *Far Eastern Economic Review, 60-61.*

Ewert, Alan & Hollenhorst, Steve (1989). Testing the Adventure Model: Empirical Support for a Model of Risk Recreation Participation. *Journal of Leisure Research, 21(2), 124-139.*

Ewert, Alan W. (1994). Playing the Edge: Motivation and Risk Taking in a High Altitude Wildernesslike Environment. *Environment and Behavior, 26 (1), 3-24.*

Farley, Frank (1986). The Big T in Personality. *Psychology Today, 20, 44-52.*

Furnham, Adrian (1990). Personality and Demographic Determinants of Leisure and Sports Preference and Performance. *International Journal of Sport Psychology, 21, 218-236.*

Gal-or, Yaacov & Tenebaum, Gershon (1986). Psychological Determinants of Performance Under Threat. *International Journal of Sport Psychology, 17(3), 199-214.*

Gerbing, David W., Ahadi, Stephan, and Patton, Jim (1987). Toward a Conceptualization of Impulsivity: Components Across the Behavioral and Self-Report Domains. *Multivariate Behavioral Research, 22(3), 357-379.*

Graver, Dennis (1991). Advanced Diving: Technology and Techniques. Montclair, California: National Association of Underwater Instructors (NAUI).

Griffiths, Tom, Ed.D. (1991). Sport Scuba Diving in Depth. Princeton Book Company: Princeton, N.J.

Heyman, Steve (1984). Personality Traits Linked to Scuba Success. *Underwater USA, May, 8.*

Heyman, Steve (1985). What Makes Divers Take the Plunge? *Underwater USA, April, 12.*

Heyman, Steve (1986a). U/W Psychology Can Affect Diving Enjoyment. *Underwater USA, March, 21.*

Heyman, Steve (1986b). Psychological Factors Affect Scuba Students. *Underwater USA, July, 29.*

Hymbaugh, Karen & Garrett, James (1974). Sensation Seeking Among Skydivers. *Perceptual and Motor Skills, 38, 118.*

Iso-Ahola, Seppo E., LaVerde, Donna & Graefe, Alan R. (1988). Perceived Competence as a Mediator of the Relationship Between High Risk Sports Participation and Self-Esteem. *Journal of Leisure Research, 21(1), 32-39.*

Jackson, Chris & Wilson, Glenn D. (1993). Mad, bad, or sad? The personality of bikers. *Personality and Individual Difference, 14(1), 241-242.*

Jung, C. G. Psychological types. New York: Harcourt, Brace and World, 1933.

Kerr, John H. & Svebak, Sven (1989). Motivational aspects of preference for, and participation in, 'risk' and 'safe' sports. *Personality and Individual Difference, 10(7), 797-800.*

Kerr, John (1988). A Study of Motivation in Rugby. *The Journal of Social Psychology, 128(2), 269-270.*

Levenson, Michael R. (1990). Risk Taking and Personality. *Journal of Personality and Social Psychology, 58(6), 1073-1080.*

Lykken, David T. (1982). Fearlessness: It's Carefree Charm and Deadly Risks. *Psychology today, 16, 20-28.*

MacKay, S. (1988). Risk recreation in wilderness areas: Problems and alternatives. *Western Wildlands, 32-38.*

McCourt, William F., Gurrera, Ronald J. & Cutter, Henry S.G. (1993). Sensation Seeking and Novelty Seeking: Are They the Same? *The Journal of Nervous and Mental Disease, 181(5), 309-312.*

Morehouse, Richard E., Farely, Frank & Youngquist, James V. (1990). Type T Personality and the Jungian Classification System. *Journal of Personality Assessment, 54(1&2), 231-235.*

Murray, H.A. (1939). Explorations in Personality. New York: Oxford University Press.

Murphey, Milledge, Beach, Laura & Tennant, L. Keith (1990). An Analysis of Personality Type Variability Among Beginning Scuba Student Divers and Cave Divers. *Sources, September/October 1990, 52-56.*

Myers, I.B. (1962). *The Myers-Briggs Type Indicator manual.* Palo Alto, California: Consulting Psychologist Press, 1962.

Palmeri, Christopher (1996). Go scuba! *Forbes, (March 11), 132-134.*

Potgieter, Justus & Bisschoff, Fredrick (1990). Sensation Seeking Among Medium- and Low-Risk Sports Participants. *Perceptual and Motor Skills, 71,1203-1206.*

Priest, Simon (1992). Factor Exploration and Confirmation for the Dimensions of an Adventure Experience. *Journal of Leisure Research, 24(2), 127-139.*

Rowland, Guy L., Franken, Robert E. and Harrison, Kimerberley (1986) Sensation Seeking and Participation in Sporting Activities. *Journal of Sport Psychology, 8(3), 212-220.*

Sarason, Irwin G, Sarason, Barbara R & Pierce, Gregory R. (1990). Social Support, Personality, And Performance. *Applied Sport Psychology, 2, 117- 127.*

Short, Gola J. & Grasha, Anthony F. (1995). The Relationship of MBTI Dimensions to Perceptions of Stress and Coping Strategies in Managers. *Journal of Psychological Type, 32, 13-22.*

Straub, William F. (1982). Sensation Seeking Among High and Low-Risk Male Athletes. *Journal of Sport Psychology, 4, 246-253.*

Torki, Mostafa A. (1993). Dimensions of Sensation Seeking Scale Form VI: Cross-Cultural Comparison. *Perceptual and Motor Skills, 76, 567-570.*

Tzeng, Oliver C.S., Outcalt, Dennis, Boyer, Sara L., Ware, Roger & Landis, Dan (1984). Item Validity of the Myers-Briggs Type Indicator. *Journal of Personality Assessment, 48(3), 255-256.*

Urbina, Susana (1994). Encyclopedia of Psychology, 2nd Ed., Vol. 1. Canada.

U.S. Navy Diving Manual: Volume 1 Air Diving (1975). Washington, D.C. : Department of the Navy.

Ware, Roger & Yokomoto, Charles (1989). Taking Chances: An Excursion into Type Riskiness. APT-VIII Biennial International Conference: Boulder, Colorado.

Watson, John (1985). Volunteer and Risk-Taking Groups are more Homogeneous on Measures of Sensation Seeking than Control Groups. *Perceptual and Motor Skills, 61, 471-475.*

Wenrich, W.W. (1994). Encyclopedia of Psychology, 2nd Ed. (1) Canada.

Zuckerman, Marvin (1979). Sensation Seeking: Beyond the Optimal Level of Arousal. Erlbaum, Hillsdale, N.J.

Zuckerman, Marvin (1983). Sensation Seeking and Sports. *Personality and Individual Differences, 4(3), 285-292.*

Zuckerman, Marvin and Myers, Patricia (1983). Sensation Seeking in Homosexual and Heterosexual Males. *Archives of Sexual Behavior, 12(4), 347-356.*

Appendices

Appendix A

A-1

Myers-Briggs Type Indicator
Summary of Psychological Types

Extroversion (E): persons who seek engagement with the environment and give weight to events in the world around them.

Introversion (I): persons who seek engagement with their inner world and give weight to concepts and ideas in order to better understand events.

Sensing (S): persons who are interested in what is real, immediate, practical, and observable by the senses.

Intuitive (N): persons who are interested in future possibilities, implicit meanings, and symbolic or theoretical patterns.

Thinking (T): persons who rationally decide, through a process of logical analysis of cause and effect.

Feeling (F): persons who rationally decide by weighing the relative importance or value of competing alternatives.

Judging (J): persons who enjoy organizing, planning, and moving quickly to a decision.

Perceiving (P): persons who enjoy being curious and open to changes, preferring to keep options open in case something better turns up.

Myers-Briggs Type Indicator
Characteristics frequently associated with each type (Myers, 1962)

	Sensing Types		Intuitive Types	
Introverts	**ISTJ** Serious, quiet, earn success by concentration and thoroughness. Practical, orderly, matter-of-fact, logical, realistic, and dependable. See to it that everything is well organized. Take responsibility. Make up their own minds as to what should be accomplished and work toward it steadily, regardless of protests or distractions.	**ISFJ** Quiet, friendly, responsible, and conscientious. Work devotedly to meet their obligations. Lend stability to any project or group. Thorough, painstaking, accurate. Their interests are usually not technical. Can be patient with necessary detail. Loyal, considerate, perceptive, concerned with how other people feel.	**INFJ** Succeed by perseverance, originality, and desire to do whatever is needed or wanted. Put their best efforts into their work. Quietly forceful, conscientious, concerned for others. Respected for their firm principles. Likely to be honored and followed for their clear conviction as to how best to serve the common good.	**INTJ** usually have original minds and great drive for their own ideas and purposes. In fields that appeal to them, they have a fine power to organize a job and carry it through with or without help. Skeptical, critical, independent, determined, sometimes stubborn. Must learn to yield less important points in order to win the most important.
	ISTP Cool onlooker-quiet, reserved, observing and analyzing life with detached curiosity and unexpected flashes of original humor. Usually interested in cause and effect, how and why, mechanical things work, and in organizing facts using logical principles.	**ISFP** Retiring, quietly friendly, sensitive, kind, modest about their abilities. Shun disagreements, do not force their opinions or values on others. Usually do not care to lead but are often loyal followers. Often relaxed about getting things done, because they enjoy the present moment and do not want to spoil it by undue haste or extertion.	**INFP** Full of enthusiasms and loyalties, but seldom talk of these until they know you well. Care about learning, ideas, language, and independent projects of their own. Ten t undertake too much, then somehow get it done. Friendly, but often too absorbed in what they are doing to be sociable. Little concerned with possessions or physical surroundings.	**INTP** Quiet and reserved. Especially enjoy theoretical or scientific pursuits. Like solving problems with logic and analysis. Usually interested mainly in ideas, with little liking for parties or small talk. Tend to have sharply defined interests. Need careers where some strong interest can be used.
Extraverts	**ESTP** Good at on-the-spot problem solving. Do not worry, enjoy whatever comes along. Tend to like mechanical things and sports, with friends on the side. Adaptable, tolerant, generally conservative in values. Dislike long explanations. Are best with real things that can be worked, handled, taken apart or put together	**ESFP** Outgoing, easygoing, accepting, friendly, enjoy everything and make things more fun for others by their enjoyment. Like sports and making things happen. Know what's going on and join in eagerly. Find remembering facts easier than mastering theories. Are best in situations that need sound common sense and practical ability with people as well as things.	**ENFP** Warmly enthusiastic, high-spirited, ingenious, imaginative. Able to do almost anything that interests them. Quick with a solution for any difficulty and ready to help anyone with a problem. Often rely on their ability to improvise instead of preparing in advance. Can usually find compelling reasons for whatever they want.	**ENTP** Quick, ingenious, good at many things. Stimulating company, alert and outspoken. May argue for fun n either side of a question. Resourceful in solving new and challenging problems, but may neglect routine assignments. Apt to turn to one new interest after another. Skillful in finding logical reasons for what they want.
	ESTJ Practical, realistic, matter-of-fact, with a natural head for business or mechanics. Not interested in subjects they see no use for, but can apply themselves when necessary. Like to organize and fun activities. May make good administrators, especially if they remember to consider others' feelings and points of view	**ESFJ** Warm-hearted, talkative, popular, conscientious, born cooperators, active committee members. Need harmony and may be good at creating it. Always doing something nice for someone. Work best with encouragement and praise. Main interest is in things that directly and visibility affect people's lives.	**ENFJ** Responsive and responsible. Generally feel real concern for what others think or want, and try to handle things with due regard for the other person's feelings. Can present a proposal or lead a group discussion with ease and fact. Sociable, popular, sympathetic. Responsive to praise and criticism.	**ENTJ** Hearty, frank, decisive, leaders in activities. Usually good in anything that requires reasoning and intelligent talk, such as public speaking. Are usually well informed and enjoy adding to their fund of knowledge May sometimes appear more positive and confident than their experience in an area warrants.

A-3

The Manifest needs associated with each of the 15 EPPS variables are:

1. ach Achievement: To do one's best, to be successful, to accomplish tasks requiring skill and effort, to be a recognized authority, to accomplish something of great significance, to do a difficult job well, to solve difficult problems and puzzles, to be able to do things better than others, to write a great novel or play.

2. def Deference: To get suggestions from others, to find out what others think, to follow instructions and do what is expected, to praise others, to tell others that they have done a good job, to accept the leadership of others, to read about great men, to conform to custom and avoid the unconventional, to let others make decisions.

3. ord Order: To have written work neat and organized, to make plans before starting on a difficult task, to have things organized, to keep things neat and orderly, to make advance plans when taking a trip, to organize details of work, to keep letters and files according to some system, to have meals organized and a definite time for eating, to have things arranged so that they run smoothly without change.

4. exh Exhibition: To say witty and clever things, to tell amusing jokes and stories, to talk about personal adventures and experiences, to have others notice and comment upon one's appearance, to say things just to see what effect it will have on others, to talk about personal achievements, to be the center of attention, to use words that others do not know the meaning of, to ask questions others cannot answer.

5. aut Autonomy: To be able to come and go as desired, to say what one thinks about things, to be independent of others in making decisions, to feel free to do what one wants, to do things that are unconventional, to avoid situations where one is expected to conform, to do things without regard to what others may think, to criticize those in positions of authority, to avoid responsibilities and obligations.

6. aff Affiliation: To be loyal to friends, to participate in friendly groups, to do things for friends, to form new friendships, to make as many friends as possible, to share things with friends, to do things with friends rather than alone, to form strong attachments, to write letters to friends.

7. int Intraception: To analyze one's motives and feelings, to observe others, to understand how others feel about problems, to put one's self in another's place, to judge people by why they do things rather than by what they do, to analyze the behavior of others, to analyze the motives of others, to predict how others will act.

8. suc Succorance: To have others provide help when in trouble, to seek encouragement from others, to have others be kindly, to have others be sympathetic and understanding about personal problems, to receive a great deal of affection from others, to have others do favors cheerfully, to be helped by others when depressed, to have others feel sorry when one is sick, to have a fuss made over one when hurt.

9. dom Dominance: To argue for one's point of view, to be a leader in groups to which one belongs, to be regarded by others as a leader, to be elected or appointed chairman of committees, to make group decisions, to settle arguments and disputes between others, to persuade and influence others to do what one wants, to supervise and direct the actions of others, to tell others how to do their jobs.

10. aba Abasement: To feel guilty when one does something wrong, to accept blame when things do not go right, to feel that personal pain and misery suffered does more good than harm, to feel the need for punishment for wrong doing, to feel better when giving in and avoiding a fight than when having one's own way, to feel the need for confession of errors, to feel depressed by inability to handle situations, to feel timid in the presence of superiors, to feel inferior to others in most respects.

11. nur Nurturance: To help friends when they are in trouble, to assist others less fortunate, to treat others with kindness and sympathy, to forgive others, to do small favors for others, to be generous with others, to sympathize with others who are hurt of sick, to show a great deal of affection toward others, to have others confide in one about personal problems.

12. chg Change: To do new and different things, to travel, to meet new people, to experience novelty and change in daily routine, to experiment and try new things, to eat in new and different places, to try new and different jobs, to move about the country and live in different places, to participate in new fads and fashions.

13. end Endurance: To keep at a job until it is finished, to complete any job undertaken, to work hard at a task, to keep at a puzzle or problem until it is solved, to work at a single job before taking on others, to stay up late working in order to get a job done, to put in long hours of work without distraction, to stick at a problem even though it may seem as if no progress is being made, to avoid being interrupted while at work.

14. het Heterosexuality: To go out with members of the opposite sex, to engage in social activities with the opposite sex, to be in love with someone of the opposite sex, to kiss those of the opposite sex, to be regarded as physically attractive by those of the opposite sex, to participate in discussions about sex, to read books and plays involving sex, to listen to or to tell jokes involving sex, to become sexually excited.

15. agg Aggression: To attack contrary points of view, to tell others what one thinks about them, to criticize others publicly, to make fun of others, to tell others off when disagreeing with them, to get revenge for insults, to become angry, to blame others when things go wrong, to read newspaper accounts of violence.

Appendix B

B-1

Please use the same code number on both tests and this form

code number _____

Scuba diving information

number of year(s) diving _____

number of logged dives _____

level of certification _____

_____

Complete this information ONLY if you would like your results mailed to you.

name _____

address _____

_____

Your results are confidential.

If you have any questions or concerns regarding the nature of this study, please feel free to contact me, Kristy Zellmer, at 974-2067 or Dr. Gene Hayes at 974-1288.

Thank you for your assistance in this research study.

Appendix C

Table 1: Myers-Briggs Type Indicator Four Digit Continuous Scores for Advanced Scuba Divers and Beginner Scuba Divers (N=50)

ISTJ	ISFJ	INFJ	INTJ
N=2	N=2	N=0	N=4
%=4	%=4	%=0	%=8
ISTP	ISFP	INFP	INTP
N=2	N=1	N=3	N=4
%=4	%=2	%=6	%=8
ESTP	ESFP	ENFP	ENTP
N=4	N=2	N=5	N=8
%=8	%=4	%=10	%=16
ESTJ	ESFJ	ENFJ	ENTJ
N=4	N=4	N=3	N=2
%=8	%=8	%=6	%=4

Table 2: Myers-Briggs Type Indicator Personal Dimensions and Percentage for Advanced Scuba Divers and Beginner Scuba Divers (N=50)

	N	%
E	32	64
I	18	36
S	21	42
N	29	58
T	30	60
F	20	40
J	21	42
P	29	58
IJ	8	16
IP	10	20
EP	19	38
EJ	13	26
ST	12	24
SF	9	18
NF	8	16
NT	18	36
SJ	9	18
SP	9	18
NP	20	40
NJ	9	18
TJ	12	24
TP	18	36
FP	11	22
FJ	9	18
IN	11	22
EN	18	36
IS	7	14
ES	14	28

Table 3: Myers-Briggs Type Indicator Four Digit Continuous Scores for Beginner Scuba Divers (n=30)

ISTJ	ISFJ	INFJ	INTJ
N=0	N=0	N=0	N=2
%=0	%=0	%=0	%=6.7
ISTP	ISFP	INFP	INTP
N=2	N=1	N=3	N=1
%=6.7	%=3.3	%=10	%=3.3
ESTP	ESFP	ENFP	ENTP
N=1	N=1	N=5	N=7
%=3.3	%=3.3	%=16.7	%=23.3
ESTJ	ESFJ	ENFJ	ENTJ
N=2	N=2	N=2	N=1
%=6.7	%=6.7	%=6.7	%=3.3

Table 4: Myers-Briggs Type Indicator Personal Dimensions and Percentage for Beginner Scuba Divers (n=30)

	N	%
E	21	70
I	9	30
S	9	30
N	21	70
T	16	53
F	14	46
J	9	30
P	21	70
IJ	2	7
IP	7	23
EP	14	46
EJ	7	23
ST	5	23
SF	4	13
NF	7	23
NT	11	36
SJ	4	13
SP	5	17
NP	16	53
NJ	5	17
TJ	5	17
TP	11	36
FP	10	33
FJ	4	13
IN	6	20
EN	15	50
IS	3	10
ES	6	20

Table 5: Myers-Briggs Type Indicator Four Digit Continuous Scores for Advanced Scuba Divers (n=20)

ISTJ	ISFJ	INFJ	INTJ
N=2	N=2	N=0	N=2
%=10	%=10	%=0	%=10
ISTP	ISFP	INFP	INTP
N=0	N=0	N=0	N=3
%=0	%=0	%=0	%=15
ESTP	ESFP	ENFP	ENTP
N=3	N=1	N=0	N=1
%=15	%=5	%=0	%=5
ESTJ	ESFJ	ENFJ	ENTJ
N=2	N=2	N=1	N=1
%=10	%=10	%=5	%=5

Table 6: Myers-Briggs Type Indicator Personal Dimensions and Percentage for Advanced Scuba Divers (n=20)

	N	%
E	11	55
I	9	45
S	12	60
N	8	40
T	14	70
F	6	30
J	12	60
P	8	40
IJ	6	30
IP	3	15
EP	5	25
EJ	6	30
ST	7	35
SF	5	25
NF	1	5
NT	7	35
SJ	5	25
SP	4	20
NP	4	20
NJ	4	20
TJ	7	35
TP	7	35
FP	1	5
FJ	5	25
IN	5	25
EN	3	15
IS	4	20
ES	8	40

Table 7: Advanced Scuba Divers and Beginner Scuba Students Myers-Briggs Type Indicator Data

			Beginner Scuba Students (n=32)		Advanced Scuba Divers (n=26)	
Scale	Bipolar Category	Code	n1	P1	n2	P2
1	Extroversion	E	23	0.719	13	0.5
	Introversion	I	9	0.281	13	0.5
2	Sensing	S	10	0.313	17	0.65
	Intuition	N	22	0.688	9	0.35
3	Thinking	T	17	0.531	18	0.69
	Feeling	F	15	0.469	8	0.31
4	Judging	J	9	0.281	16	0.62
	Perceiving	P	23	0.719	10	0.38

Table 8: Myers-Briggs Type Indicator Proportion Difference Confidence Intervals

	Difference	UCL	LCL
E	.219	.543	-.106
S*	-.341	.-022	-.660
T	-.161	.164	-.486
J*	-.334	-.015	-.653

$\propto$ experiment wise = .04
$\propto$ individual = .04/4 intervals
= .01
* significant difference

Table 9: Edwards Personal Preference Schedule Mean, Standard Deviation, and p value

	Beginner Scuba Divers (n=30)		Advanced Scuba Divers (n=20)		
15 Variables	Mean	Standard Deviation	Mean	Standard Deviation	p value
ACH (Achievement)	13.33	3.689	15.45	3.591	.050
DEF (Deference)	11.00	3.017	12.10	2.919	.295
ORD (Order)	8.16	4.052	11.60	5.062	.016
EXH (Exhibition)	14.46	3.839	12.90	3.323	.132
AUT (Autonomy)	13.60	4.561	14.30	4.612	.600
AFF (Affiliation)	16.43	2.897	15.65	4.511	.497
INT (Introception)	14.83	3.425	13.00	3.866	.094
SUC (Succorance)	11.86	3.721	12.35	4.043	.671
DOM (Dominance)	16.15	4.434	14.35	4.694	.541
ABA (Abasement)	13.16	5.440	12.35	4.694	.575
NUR (Nurturance)	15.96	4.867	15.20	5.454	.614
CHG (Change)	17.90	4.270	16.95	4.286	.446
END (Endurance)	13.00	4.152	13.45	5.404	.754
HET (Heterosexuality)	17.46	4.485	18.40	5.215	.517
AGG (Aggression)	12.80	4.930	11.00	4.668	.199
CON (Consistency)	10.73	1.856	11.50	2.039	.185

VITA

Kristine Zellmer Ferrell

Thesis: A comparative analysis of personality traits between advanced scuba divers and beginner scuba divers.

Date: May 1998

Background

Personal: Kristine was born in Lombard, Illinois in May 1969, she is the daughter of Gary and Marie Zellmer.

Education: She attended The University of Tennessee, Knoxville where she received a Bachelor of Arts Degree in December 1991 with a major in Psychology and a minor in General Business.

In the fall of 1991, Kristine accepted a graduate research assistantship at the University of Tennessee, Knoxville and began studies toward a Master of Science Degree in Recreation and Leisure Studies with an emphasis in Therapeutic Recreation. All requirements for this degree were met in May 1998.

Experience: The author worked in a long-term wilderness treatment center for adolescents in Louisville Tennessee as a part-time psychological assistant. She worked in Olive Branch, Mississippi for four years with adults, adolescents, and pre-adolescence in a short-term treatment private psychiatric hospital. While working at this facility, her positions included Director of Recreation Therapy, Coordinator of Experiential Services, and Recreation Therapist. She was responsible for managing the recreation therapy department staff, budget, and program development and leading recreation therapy groups. Additionally, she managed a high and low element ropes course that was used by hospital patients, as well as, national corporations, church groups, and schools.

Currently, Kristine works as an independent contractor on the ropes course at Oklahoma State University. Also, she is the Executive Officer of the Stillwater Board of REALTORS® in which her duties include overseeing all Board programs, services, committees, and special activities.