# Sensation Seeking Among High- and Low-Risk Sports Participants

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# ABSTRACT

The purpose of the present study was to investigate the sensation seeking tendencies of select New Zealand athletes. A "sensation seeker" is thought to be a person who needs varied, complex, novel, and intense forms of stimulation and experience and who is thought to be capable of taking physical and social risks for such experiences (Zuckerman, 1994). According to Marvin Zuckerman (1994), 'Sensation Seeking' is integrated within a broader trait called Impulsive-Sensation Seeking (ImpSS). That is, the personality dimensions of 'impulsiveness' and 'sensation seeking' are thought to be interconnected. The main aim of the present study was to assess empirical support for Zuckerman's (1994) ImpSS theory and associated hypotheses, and to replicate and extend previous research findings in this area using high- and low-risk sport participants. The Sensation Seeking Scale-V (Zuckerman, Eysenck & Eysenck, 1978), the Impulsiveness Scale of the Impulsiveness-Ventureous-Empathy Scale (Eysenck & Eysenck, 1978), and a life span questionnaire of sports participation were administered to both male (n = 119), and female (n = 47) athletes currently engaged in one of eight sport disciplines - Hang-gliding; Mountaineering; Sky-diving; Automobile racing; Swimming; Marathon running; Aerobics; and Golf. Results provided support for the main hypothesis of Zuckerman's ImpSS theory -- (a) that sensation seeking is integrated within a broader trait called Impulsive-Sensation Seeking; and (b) that total sensation seeking can differentiate between high- and low-risk sport participants. Results provided a mixed level support for some more specific hypotheses derived from Zuckerman's ImpSS theory. Findings are discussed with respect to Zuckerman's (1994) Impulsive-Sensation Seeking model. Limitations of the present study and suggestions for future research are also discussed.

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*"Tell me what you play,*
*and I'll tell you who you are".*
*'Roger Caillois'*

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Chapter 1

# INTRODUCTION

## Defining Personality: General Overview

Human beings are both unique and similar; they posses a combination of physical, mental, and behavioral characteristics that identify them as human and endow them with an individual 'personality' (Aiken, 1993, 1996). However - what exactly is meant by the term "personality?". For the lay person, personality is often defined in terms of social attractiveness, a person's perceived ability to get along well with other people. For example, some may say that Angela has a "great" personality; or Henry has "no personality" (Ryckman, 1993).

One the other hand, those in the social scientific community do not always agree on a singular answer to this question (Burger, 1993). Defining personality appears to depends on one's theoretical perspective. The following definitions highlight the wide array of perspectives proposed by various personality theorists:

" ... that which permits a prediction of what a person will do in a given situation". (Cattell, 1950, p.2).

" ... a system of relatively enduring dispositions to experience, discriminate, or manipulate actual or perceived aspects of the individual's environment (including himself)". (Bronfenbrenner, 1951, p.158).

" ... the relatively enduring pattern of recurrent interpersonal situations which characterize a human life". (Sullivan, 1953, p. 11).

" ... a person's unique pattern of traits". (Guilford, 1959, p.5).

"...the dynamic organization within the individual of those psychophysical systems that determine his characteristic behaviour and thought." (Allport, 1961, p.28).

" ... the more or less stable and enduring organization of a person's character, temperament, intellect, and physique, which determines his unique adjustment to the environment". (Eysenck, 1970, p.2).

Despite a plethora of definitions, personality theorists generally agree that personality is an organized construct, albeit complex, that includes the person's unique composite of inborn and acquired mental abilities, attitudes, temperaments and other individual differences. This organized and integrated collection of cognitive, affective, and behavioral characteristics, as it exists for a particular individual, predisposes his or her responses to certain stimuli in the environment (Aiken, 1993; Rychman, 1993 ). In addition, most theorists agree that a theory of personality should be able to accommodate both commonalities and uniqueness across individuals (Fehr, 1983). Typically, recent reviews of personality theory (e.g., Aiken, 1993; Burger, 1993; Pervin, 1993), have concluded that personality refers to characteristics, originating from an individual, that account for consistent patterns of behaviour.

Given a commonly agreed upon working definition, the study of personality then can become more rigorously articulated and scientifically analysed. Personality psychologists recognize and acknowledge the importance of the fact that all people are similar in some ways. A primary focus of interest in this discipline is also to provide explanations, supported by empirical evidence, for each individual's unique ways of responding to his or her environment. Simply stated, they are concerned with the ways in which people's predispositional tendencies are similar and different (Aiken, 1993; Pervin, 1993; Rychman, 1993). Within sport, theory and research has begun to examine a role for personality factors that account for similarities and differences between sport participants.

## Sports and Personality

As articulated earlier, the interest in why individuals are consistently predisposed to behave as they do has had a lengthy history in psychology. One collective pattern of human behaviour is a pursuit of pleasurable activities. As a pleasurable pursuit, sporting activities have had a long history of their own. Up to the 15th century, the term 'sport' simply denoted a pleasant pastime or diversion. By the 16th century, however, sports denoted competitive athletic contests. Gradually, the term 'sport' has gained wider application. That is, 'sport' now encompasses a wide variety of activities that may be indulged in for either competition or recreational pleasure, such as mountaineering, swimming, motor-racing, running, parachuting, competitive team sports and so forth (Cuddon, 1979).

Historically, one of the most popular issues in sport psychology concerns the question of whether or not there is a relationship between personality factors (i.e., predispositional tendencies), and participation in various sports (Carron, 1980; Vealey, 1992). The extent to which personality and sports participation are related, however, is not straight forward. Morgan (1980) identifies two opposing positions:

> "There are basically two personology camps in contemporary sport psychology, and the members of those two camps espouse either a credulous or a sceptical viewpoint concerning the prediction of athletic success from psychological data. The credulous psychologist would lead us to believe that psychological data are extremely useful in predicting success, whereas the sceptical would argue that psychological data are of little or no value whatsoever" (P.330).

Between these poles, various theoretical positions have been articulated. Kroll (1970) listed five hypotheses which comprise various relationships between sport participation and personality (see Table 1).

**Table 1.** Models for the possible relationship of personality to involvement in sport and physical activity.

| MODEL | DESCRIPTION |
|---|---|
| Common Preliminary Core | Those individuals with specific personality traits select and participate in specific sports. An example of a popular stereotype reflecting this alternative is extroverts selecting team sports with introverts showing a preference for individual sports. |
| Modification and Attrition | No common personality characteristics initially but through a "survival of the fittest" process, only those individuals with suitable characteristics persist. In this alternative, sport beginners then would be dissimilar in personality profiles, and elite participants, similar. |
| Common Initial Interests/ Dissimilar Final Interests | There is a common personality pattern among beginners but through participation and attrition, elite athletes possess dissimilar personality characteristics. A situation which highlights this alternative is where all beginner karate participants might show high aggressiveness, a characteristics which is neither uniformly present nor absent in elite participants. |
| Neophytes Opposite to Elite | Elite athletes in a sport possess personality traits which are completely opposite to rookies. Kroll here takes into account the possibility that performance can result in dramatic changes in personality characteristics of an individual. A situation which reflects this alternative is when athletes attracted to a particular sport are introverted, |

| | |
|---|---|
| | but because of the specific task demands or performance requirements of that sport (e.g., high teamwork and interaction), all elite participants would come to reflect the same trait of extraversion. |
| No Relationship | Personality is unrelated to involvement in sport participation at any level. |

Note. From Kroll (1970) Current strategies and problems in personality assessment of athletes. In L.E. Smith (Ed.), Psychology of motor learning. Athletic Institute.

Within these various models, research has looked at the relationship between sport participation and personality. Specifically, three major hypotheses have been explored: (1) Athletes differ from non-athletes along unique and identifiable personality dimensions; (2) athletes in one sport differ from athletes in another sport; and (3) elite and non-elite athletes differ. Research focusing on these three primary areas have also provided varying levels of support for the models listed in Table 1 and are highlighted below.

Regarding the hypotheses that athletes differ from non-athletes, Kroll (1970) hypothesised that athletes possess unique and definable personality attributes different from non-athletes. Sack, (1975; cited Eysenck, Nias & Cox, 1982) found weak support for this idea. He found a small but significant contribution of personality factors differentiating between athletes from non-athletes, accounting for around 7% of the total variance. Schurr, Asley and Joy (1977) found that athletes tended to exhibited less abstract reasoning ability compared to non-athletes.

Morgan (1980b) reviewed 15 studies that addressed the question of personality differences between athletes and non- athletes. Although some tentative differences were found, no meaningful conclusions could be drawn. Despite such lack of strong support, more robust differences between athletes and non-athletes have been more recently noted. Notably, Eysenck, Nias and Cox (1982) in their comprehensive review of the area, concluded that sport participants differ from non-sport participants by being more

extroverted, and by having lower scores on Neuroticism and higher on Psychoticism. That is, sport participants are thought to be sociable, impulsive, and outgoing individuals, but who generally lack empathy and concern for the rights and welfare of other people and tend to have lower emotional reactions to situations (e.g., anxiety) compared to non-athletes.

Other research has explored whether athletes in a given sport can be distinguished from athletes in other sports (Kroll, 1970). Many attempts have been made at assessing personality differences across different sports participants. However, in general, support for differences is mixed -- the most support for differences appears to be a function of team versus individual participation. Some illustrative findings are now briefly reviewed.

Administering the 16PF to 358 nationally ranked sportsmen, Kroll et al., (1978) found significant differences in personality among nationally ranked sportsmen in different sport disciplines. Surprisingly, however, Kroll et al., (1978) did not state what these differences were.

Cattell, Eber, and Tatzucka (1970) found that the swimmers and football players differed on personality factors. Football players were found to exhibit lower intelligence, and higher levels of tough-mindedness, practical concerns, and group adherence. Dowd and Innes (1981) found significant differences between squash and volleyball players. For example, the volley ball players were found to be less anxious and more forthright than the squash players. On the other hand, other studies have found no differences. For example, Sage (1976) found no significant personality differences between athletes in eight different sports - football, basketball, baseball, wrestling, gymnastics, swimming, track, and tennis.

Most of the studies designed to detect differences between sports participants have assessed team versus individual participation. Booth (1958) found extraversion to be more common in team than in individual sports. Similarly, Peterson et al., (1967) found that Cattell's factor of self-sufficiency - a subfactor of introversion - was more

evident in persons who engaged in individual versus team sports.

Schurr, Ashley and Joy (1977) found some clear relationships between personality and sports. They concluded that specific personality types can be shown to cluster in particular sports. For example, it was found that athletes participating in team sports (basketball, football, baseball, volleyball, soccer) were more anxious, dependent, less sensitive-imaginative, and showed greater ego-strength. They also tended to be more extroverted, while individual sport participants (track, wrestling, swimming, cross-country, golf, gymnastics, tennis), were found to be less anxious, more independent and objective.

To make further comparison between sport participants, Schurr et al., (1977) classified subjects into either 'direct' or 'parallel' sports. That is, sports which involved direct aggression against one's opponent (football, basketball, soccer and wrestling), were classified as Direct Sports. The remaining sports (golf, track, volleyball, baseball, tennis, swimming, gymnastics and cross country) were classified as Parallel (i.e., sports which involved no direct aggression against one's opponent). With sports classified as either direct or parallel, results suggested that direct sport participants were more independent, extroverted, objective, and tended to exhibit less ego-strength, while parallel sport participants were less anxious, independent and had greater ego-strength.

Findings also indicated that team-direct sport participants (i.e., basketball, football, soccer) were the most extroverted grouping and were additionally more extroverted than the non-athletes. Team-parallel sport participants (i.e., volleyball, baseball), exhibited the most dependence and ego-strength and also scored higher than non-athletes on both these characteristics. Individual-direct sport participants (i.e., wrestling) exhibited more objectivity and independence than non-athletes, while Individual-parallel participants (i.e., golf, tennis, track, swimming), showed less anxiety.

Apart from differentiation among athletes across different sports, investigators have also attempted to distinguish between elite and non-elite athletes within a given sport. Findings in this area have also afforded some general conclusions. For example, traits frequently found in the personality profiles of high level competitors, as compared with lower level competitors are greater levels of self-control, conscientiousness, intelligence, achievement, and extraversion. Such findings have been confirmed using different samples of elite athletes: with members of the U.S Olympic team (Peterson et al., 1967; Warbuton & Kane, 1966); elite swimmers (Ogilvie, 1968; Balazs & Nickerson, 1976); wrestlers (Kroll, 1967), hockey players (Bird, 1970) and elite distance runners (Morgan & Costill, 1972; Morgan & Pollock, 1977; Nagle, Morgan, Hellickson, Serfass, & Alexander, 1975).

Morgan and his associates (Morgan, 1980; Morgan and Johnson, 1977, 1978; Morgan and Pollock, 1977) investigated elite (world class), male athletes such as rowers, oarsmen, and distance runners. Findings demonstrated a remarkable amount of similarity across elite participants. For example, elite male athletes were found to be less anxious than their subelite counterparts. Following their investigation, Cattell et al., (1970) found that Olympic athletes showed higher ego-strength, dominance, low superego, an adventurous temperament, low proneness to guilt feelings and little sense of inadequacy, as compared with football players and swimmers.. These athletes were also found to be higher in extraversion, "cortertia" (i.e., tough-poise), and independence, and lower in anxiety. These Olympic athletes appear to be individuals who were outgoing, high in self-confidence and self-esteem, and who preferred to participate in individual sports.

Dowd and Innes (1981), utilizing the 16PF, studied 93 volley ball and squash players and compared scores of those ranked in the top 15 with those who were playing at a lower standard. Findings indicated that the better players had higher scores on measures of intelligence, experimentation, conscientiousness, and reduced scores on measures of anxiety and self-control.

Hypothesizing about this phenomenon, Silva (1984) provided an 'explanation' for the elite sport participants similarities in personality dispositions. Silva's hypotheses reflects Kroll's (1970) 'modification and attraction' typology (see Table 1). As the prospective elite athlete moves up the "athletic pyramid", athletic participants become more alike in their personality and psychological traits. At the base or entrance level of sport, athletes are very heterogeneous or have different personalities. However, through a process of "natural selection", certain personality traits will enhance an athletes likelihood of advancing to a higher level, while other personality traits will detract. At each higher level of the athletic personality pyramid, the athletes then become more alike or more homogeneous in their personality traits. When trying to differentiate between athletes of varying skill level in the middle and lower parts of the pyramid, the process of sorting will result in failure to find consistent differences. Elite athletes, however, will tend to exhibit similar profiles and will differ as a group from lesser-skilled groups. A study conducted by Rowland et al., (1986) supported this claim. They extended earlier descriptive studies of the construct 'sensation seeking' to demonstrate that sensation-seeking predicts not only choice of, but also degree of involvement in, various sports and physical activities. Sensation seeking will be addressed in more depth in Chapter two and three.

Unfortunately, frequent failure to replicate certain findings has led some researchers to conclude that there is no fundamental relationship between personality characteristics and level of sport participation (e.g., Singer, Harris, Kroll, Martens and Sechrest, 1977; Singer, 1969; Keogh, 1959). For example, using tennis and baseball players at varying levels of expertise, Singer (1969), found no relationship between levels of sport performance and personality characteristics. Davis and Mogk (1994) compared elite athletes, subelite athletes, recreational sport enthusiasts, and a non-athlete control group on a number of personality variable, including Sensation Seeking, Extroversion, Neuroticism, and Psychoticism. As with Singer's (1969) and Keogh (1959) findings, results provided no evidence that elite athletes could be distinguished from other groups on specific personality factors. Kane (1964) reported that introverts were as likely to be found as were extroverts among athletes at national and international levels.

One explanation put forward for the contradictory findings is that many studies fail to clearly report what criteria were used to identify high level sport performers (Ogilvie, 1968; Davis and Mogk (1994). For example, there are those who have chosen somewhat arbitrary criteria for selection (Robinson, 1885; Frazier, 1987). Some researchers have reserved the 'elite' classification for members of a national team (e.g., Miller & Miller, 1985), while still others have been more selective and included only Olympic competitors in this group (e.g., Silva, Shultz, Haslam, Martin, & Murray, 1985). As a result of this failure, results found across studies can not be directly compared or replicated by future investigators. In addition, just as there can often be considerable disagreement regarding how to classify or taxonomize personality, so too there appears to be disagreement about how to group expertise level of sports participants (Furnham, 1990).

Despite contradictory findings in the sport and personality literature reviewed in this section, some tentative conclusions can be drawn: (1) athletes may be differentiated from non-athletes on some personality attributes, for example, extraversion (Eysenck et al., 1982); (2) athletes in one sport may differ along some personality dimensions from athletes who participate in another sport. For example, team sport participants tend to be more extroverted (Booth, 1958), anxious and dependent (Schurr et al., 1977) whereas individual sport participants tend to be more introverted (Peterson et al., 1967), less anxious, and more independent (Schurr et al., 1977); (3) elite athletes may differ from subelite performers on some personality dimensions for example, anxiousness (Mogan & Johnson, 1977, 1978; Morgan, 1980; Dowd & Innes, 1981). Noting too, however, that there are some mixed findings in the area one must be aware of and consider methodological issues. Attention is now turned too relevant considerations.

## Methodological Considerations and Theory Revision:

As alluded to earlier, a great deal of the research in the area of personality and sports has been plagued by problems related to theory and methodology (Morgan, 1980a, 1980b; Vealey, 1992). Some representative viewpoints are as follows:

"The few theories adopted by sport psychologists have tended to be bad theories. They have been bad in the sense that they were not intended for use in sport psychology" (Morgan, 1980b, p.72).

"... the research in this area has largely been of the 'shot gun' variety. By that I mean that investigators grabbed the nearest and most convenient personality test, and the closest sport group, and with little or no theoretical basis for their selection fired into the air to see what they could bring down." (Ryan, 1968; quoted in Martens, 1975).

"Many of the results reported are contradictory and difficult to interpret, particularly because of the small sample sizes often involved. There has been an alarming failure to consider the complexities of the topic, to allow for the weaknesses and deficiencies of many existing personality questionnaires, or to make distinctions which are absolutely crucial in this field, e.g., between outstanding and average practitioners or a given sport, or between different types of sports, such as individual versus group sports" (Eysenck, Nias & Cox, 1982; p.1).

In Morgan's (1980b) review of 15 studies assessing personality differences between athletes and non-athletes, he noted no consistency in the nature of the sample selected as well as great variability in the assessment procedures selected. Traditionally, most assessment instruments used to measure personality in sport research have been general and broad in nature (e.g., 16PF, EPI), rather than those used to test specific sport hypotheses or questions (e.g., 'Are there personality predictors that might be of use in promoting fitness and exercise adherence?'). In addition, some studies employed measures not designed for use with a normal population (e.g., MMPI).

Morgan (1978), commenting upon the Credulous-Sceptical debate, argued that the credulous and the sceptical perspectives are extreme, and neither one is scientifically viable. Morgan (1978) proposed that the credulous-sceptical argument in sport psychology stems from a variety of factors. Some of the more important being (1) a overall failure to adequately operationalize the dependent and independent variables, (2) atheoretical as apposed to theoretical inquiry, (3) use of first order factors alone in some investigations and higher order factors in others, and (4) a total disregard for consideration of self-reported response distortion (e.g., 'faking good'; 'faking bad').

It has been further suggested that some dimensions of personality (e.g., extroversion, neuroticism, and Psychoticism) are too broad to be applied to specific sporting or physical activities, or, alternatively, are mediated by a number of other sport specific personality and/or environmental factors. For example, the relation between extraversion and sports may be mediated by other factors including sensation seeking, assertiveness, competitiveness, impulsiveness, and high pain thresholds (Zuckerman, 1994; Eysenck & Zuckerman, 1978). If this is true, not all studies need to measure the main dimensions of personality; an investigator may instead study a particular theoretical concept (e.g., sensation seeking), that underlies a broader main personality dimension. For example, Zuckerman's (1979) concept of Sensation Seeking is said to be related to Eysenck's supertrait of Psychoticism (Zuckerman, 1994). Zuckerman (1979) has argued that narrow measures are more effective than broad assessment instruments in answering specific research questions.

Rushall (1975; cited Carron, 1980), suggested that if the studies with methodological and conceptual errors were removed, this would results in only a small number of studies remaining, and thus would not be sufficient to permit generalizations. In short, additional, more scientifically rigorous investigation is necessary. Morgan (1978) put forward the following recommendations for consideration for future research:

(1) It may be necessary to construct sport-specific inventories for use in sport psychology.

(2) The credulous-sceptical argument can best be regarded as a pseudo argument. It is time to set the argument aside and proceed with the task at hand - attempting to understand the psychological aspects of sport and physical activity.

(3) It is recommended that response distortion (e.g., social desirability), irrespective of the paradigm or theory employed be addressed.

(4) Aspiring sport psychologists should be trained in both a selected field of academic psychology as well as a sub-discipline (e.g., sport psychology or exercise physiology) within the exercise and sport sciences.

In addition to the above recommendations, it has been suggested that a necessary step in sport personality research is to look at more specific dimensions of sports participation (Zuckerman, 1994). For example, measuring Sensation Seeking might be more relevant for sports involving high levels of personal risk whereas assessing aggression might be more relevant for sports involving high levels of body-contact (Zuckerman, 1983). In methodological terms, this issue is really one of "biting off methodologically only as much as one can (theoretically) chew". In line with this view, attention is now turned to one of the more specific dimensions, Sensation Seeking, and an examination of its role in sport related personality research.

Chapter 2

# SENSATION SEEKING

## A Working Definition

The personality trait known as 'Sensation Seeking' (SS), is defined as "the seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experiences" (p.27, Zuckerman, 1994). The construct of sensation seeking emerged from an 'Optimal Level of Arousal' theory, and has evolved based on two decades of research. The history behind this theoretical development is now discussed.

## Theory Development

The personality trait, known today as 'Sensation Seeking', has had a lengthy history that began well over a century ago. Early studies of human behaviour grew out of Darwin's (1859) assumption that the human population is an extension of the animal population. It was assumed that human beings and animals shared biological, as well as behavioural continuity. Studying animal behaviour became a model for studying human behaviour.

In 1912, McDougall proposed that animals, including humans, behave as they do because of biologically-based 'instincts'. McDougall (1908, 1912) posited ten instincts that attempted to explain the spectrum of human behaviour, including purposive behaviour. He wrote that "instinctive impulses determine the ends of all activities and supply the driving power by which all mental activities are sustained (1912, p.44).

Others argued that the term instinct was an overused and underdefined term. Bernard (1924) argued that "instincts" were unable to adequately account for behaviour. He pointed out the instinct theorists themselves were often unable to agree on definitions, typologies, or even how many existed.

Following such criticisms, the 'drive' theory emerged. During the 1920's, several researchers put forward the notion that all behaviour was the result of internal tissue irritation referred to collectively as "drives". Five primary tissue-based drives were proposed accounting for hunger, thirst, pain, sexual arousal, and extreme bodily temperature variations (Carr, 1925). Based on observations and experiments with rats, Moss (1924) and Richter (1922, 1924), concluded that drives were internal, biologically driven disturbances. These disturbances "drive" the animal into specific activities that culminates in returning the level of internal arousal to a balanced, quiescent state. This state was considered rewarding, or pleasurable, and thus, reinforcing. The "drive" to return one's internal arousal level to a balanced, quiescent state became known as 'drive-reduction theory' (Hull, 1943).

The drive reduction theory began to lose favour when anomalous findings began to accrue. For example, experimenters observed random actions of their subjects in conditions hypothesized to provoke specific behaviour. Hebb (1923) documented that chimpanzees had fears that were manifested spontaneously in the absence of hypothesized stimuli, such as when a figure of a human head placed in their cages provoked a reaction that could only be labelled as fear. Harlow (1950, 1953) noticed that monkeys would manipulate puzzles in the absence of conditions assumed to be necessary (i.e., primary drives such as hunger). Additional research found that animals would manipulate objects with no other apparent motivation except the simple exploration of the object (Harlow, Harlow, and Meyer, 1950; Nissen, 1930). Nissen (1930) found that rats would venture across an electrified grid in order to explore a maze on the other side. In this experiment, no reinforcement was available other than what appeared to be intrinsic, simply being able to explore the maze. Such anomalous findings led to revisions in drive reduction theory. Notably, an "exploratory" drive was introduced that was both compatible with drive theory and accounted for the anomalous findings.

The concept of an exploratory drive elicited by external stimuli was criticized by those who believed that internal drives primarily motivated the animal into exploratory behaviour. This internal "drive" state was thought by these proponents to derive from a

lack of arousal, boredom, or satiation (Glanxer, 1953; Walker, Dember, Earl, Fawl and Karoly, 1955; Walker, Dember, Earl, Fliege and Karoly, 1955).

During this time, major advances in neurophysiology were also being made. Whereas drive reduction theory suggested that a decrease in stimulation was reinforcing or pleasurable, Leuba (1955) and Hebb (1955) argued that an organism will learn reactions which produce an increase in stimulation, that is, towards an optimal level of stimulation (OLS) or arousal (OLA) of its nervous system. These authors proposed that the organism will engage in activities that increase stimulation when the overall arousal level is low, and engage in behaviours which decrease stimulation when the overall arousal level is high. As a result of Leuba's and Hebb's thinking, the 'Optimal Level of Stimulation' theory emerged. Simply put, the 'Optimal Level of Stimulation' (OLS) theory postulates that both an increase or a decrease in arousal could be reinforcing, depending on particular conditions.

Related to underarousal is the concept of sensory deprivation. The OLA theory suggests that prolonged deviation from normal levels of arousal should produce emotional, cognitive, and behavioral disturbances (McCelland, Atkinson, Clark, and Lowell, 1953). Bulter and Alexander (1955) found that monkeys placed in a sensory deprivation box would press a bar to open a window, which enable them to look out, around 40% of the time. Using human subjects, Persky, Zuckerman, Basu, and Thornton (1966), found that when subjects were placed in an isolation chamber, in which access to a television was available, subjects kept the television on almost continually, thereby providing initial support for the idea of a need for an increase in arousal in situations where the overall arousal level is low.

In summary, the concept of an optimal level of stimulation, has been offered by Hebb (1955), Leuba (1955), and Persky et al., (1966), as a substitute for the more singular concept of drive reduction. Research supported the idea that too little stimulation, as in sensory deprivation, leads the organism to increase stimulation while too much stimulation, as in sensory overload or high drive states, leads to behaviour directed at

stimulus reduction. While this theory proposes an "optimal" level of stimulation it is obvious that individuals differ widely in what constitutes individually-specific "optimal" stimulation (Zuckerman, 1994).

Against this backdrop, Zuckerman and Haber (1965) attempted to make a connection between the variability in levels of arousal to short term sensory deprivation. Subjects who became highly aroused in a sensory deprivation condition were found to make four times as many responses for auditory and visual stimuli as those who did not become aroused in the sensory deprivation condition. This type of experiment provided a link between arousal in sensory deprivation and a stimulus need, thus suggesting the possibility that the need for stimulation could be aroused by sensory deprivation in select individuals. This finding provided the initial foundation for the construct of the Sensation Seeking (SS) personality trait.

## Marvin Zuckerman's Conceptualization of Sensation Seeking

The first published theoretical statement on SS appeared in a chapter on optimal level of stimulation and arousal theory (Zuckerman, 1969). The theory hypothesised that: "every individual has characteristic optimal levels of stimulation (OLS) and arousal (OLA) for cognitive activity, motoric activity, and positive affective tone" (Zuckerman, 1969, p. 429). The concept of 'optimal level of stimulation' implied that for each individual in a particular situation there is a condition - somewhere between total absence of arousal and maximum physical and psychological activation - that is appealing, where comfort prevails (Pargman, 1993).

Interest in the personality implications of the "optimal stimulation" concept and its possible application to ongoing perceptual isolation experiments led Zuckerman and his colleagues (Zuckerman, Kolin, Price and Zoob, 1964) to quantify the construct "optimal stimulation level". They began by developing a self-report questionnaire - the Sensation Seeking Scale (SSS). It was hypothesized that a general factor (i.e., sensation seeking), would account for subjects preference responses to diverse items subsuming all sensory modalities.

Fifty-four items in the initial experimental form (SSS- I), generated from theory were written in a forced-choice form in an attempt to minimize the factor of social desirability. That is, by manipulating the item wording, an attempt was made to make both alternatives socially desirable. Fourteen items related to preference for extremes of sensation (e.g., heat, cold, noise, tastes, colours, musical sounds, etc), eight items pertained to preferences for the new and unfamiliar as opposed to the familiar; eight items related to preferences for irregularity as opposed to regularity and routine, 12 pertained to an enjoyment of danger, thrills, or 'kicks', as opposed to safety; six items pertained to social values based on the stimulation value of other persons as opposed to their reliability and predictability; four items contrasted preferences for security as opposed to adventure; and finally, two pertained to a need for general excitement. Form I was given to 268 male and 277 female undergraduates at Brooklyn College (Zuckerman et al., 1964).

Responses to the items were intercorrelated and subjected to factor analyses and item-to-total correlations were calculated. As hypothesised, one general factor (i.e., Sensation Seeking - SS) emerged for both males and females. However, at this time, the authors were not interested in other possible factors so no additional analyses were done to define factors beyond this general factor.

Items for form II were selected on the bases of their factor loadings on the first unrotated factor and correlations with the total score based on all items from Form I. Thirty four items which best defined the general factor were used to make the General Scale (form II, Zuckerman et al., (1964). Subsequent factor analyses showed that the General scale contained specific factors associated with Thrill and Adventure seeking, Experience Seeking, and Boredom Susceptibility in addition to the more general sensation seeking factor.

Further analyses of forms I (Zuckerman & Link, 1968) and II (Farley, 1967) confirmed that more than one factor could be identified to account for response variations. For example: thrill seeking, social sensation seeking, visual seeking, and antisocial sensation seeking. Form I did not however include enough items to define any but the first factor clearly. That is, only the Thrill and Adventure factor seemed to have enough items for clear identification. For this reason, it was decided to write new items in an attempt to define more precisely the dimensions of sensation seeking.

Additional force-choice items were written on the basis of the factors suggested by the preliminary results in the study by Zuckerman and Link (1968). Items were also written to tap another hypothesized factor not considered in Form I: sexual sensation seeking, and was constructed for a more ambitious factor analysis. Form III was a experimental form consisting of the original 50 items in Form I plus 63 new items, for a total of 113 forced-choice items. This form was given to 160 male and 172 female undergraduates.

The first unrotated factor was similar to that found in the first factor analysis (Zuckerman et al., 1964). Thus, the General score (SS) was carried over into the new form IV (Zuckerman, 1971). The General Score contained 64 items. Factor analyses of items yielded four factors which described different ways of seeking sensation and arousal - for example, through the mind and senses, through social interactions, or through risky sports and activities. The four factors were: Thrill and Adventure seeking (TAS); Experience Seeking (ES), Disinhibition (Dis), and Boredom Susceptibility (BS). The above four factors constituted the four subscales of the SSS-IV. The TAS scale contained 14 items, the ES scale, 18 items, the Dis scale, 14 items, and the BS scale contained 18 items.

In 1978 a new form of the SSS was developed - SSS-V (Zuckerman, Eysenck, & Eysenck, 1989). There were several reasons for the development of a new form. First, the General Scale, carried over from Form II, was thought to be an unsatisfactory measure of the overall Sensation-Seeking factor as represented in the subscales because it lacked any of the items of the Disinhibition subscale. A Total Score, based on the sum of the four ten-item subscales was developed to substitute the General Scale in Forms II and IV. Second, Zuckerman et al., (1978) wanted to be sure that the items in the scale had cross-cultural as well as cross-gender reliability. Thus, they factor analyzed the items in American and British populations, and selected items that had significant loadings on the same factor in both males and females in both populations. Finally, Zuckerman et al., (1978) wanted to reduce the length of the test from 72 items in form IV to 40 items (10 for each subscale).

Both British (254 males and females twins) and American (97 male and female undergraduates) samples were given the 72 items of the form IV and these were intercorrelated and factor analysed separately for males and females in both samples. The best items, in terms of highest loadings on the specific factors relative to loadings on other factors across all samples, were selected for the new scales comprising form V. The same four factors existing in form IV were found in all four sample in the study and a 40-item scale was formed with 10 items for each of the four factors. Some of the items in the

original form used colloquial expressions (e.g., "swingers", "jet setters") no longer familiar to the current generation were explained or reworded to make them understandable to current test takers. The items which make up the four subscales of the SSS are described below.

(1) Thrill and Adventure Seeking (TAS): Items in this scale indicate a desire to engage in sports or other activities that provide unusual sensations of speed or defiance of gravity, such as parachuting, scuba diving, or skiing. The basic theme is summarized in the item "I sometimes like to do things that are a little frightening". Zuckerman (1978) has stated that the TAS subscale reflects the more socially acceptable type of sensation seeking behaviour.

(2) Experience Seeking (ES): Items in this scale represent the seeking of stimulation through the mind and the senses, through music, art, travel, and psychedelic drugs. This scale also contains items which represent a desire to associate with unusual or unconventional persons (e.g., "I have tried marijuana or would like to".)

(3) Disinhibition (Dis): The items in this scale describe seeking sensation through social activities like parties, social drinking, gambling, and sexual variety. An item describing this factor is; "I like to have new and exciting experiences even if they are little unconventional or illegal".

(4) Boredom Susceptibility (BS): Items in this scale represent an intolerance for repetitive experience of any kind, including routine work, and boring social interchange. An item expressing the attitude is; "The worst social sin is to be a bore" (versus the forced-choice alternative: "The worst social sin is to be rude").

By 1979, based on an accumulation of findings including those described earlier, and in the next section, Zuckerman updated his definition of sensation seeking, as follows: "a trait defined by the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experience" (p.10).

Environment was thought to determine the particular forms of expression of the trait, but the amount of variation in stimulation received during infancy and early childhood was thought to be influential in the development of the trait (Zuckerman, 1994). The next section looks at this body of research.

## Sensation Seeking Research

Following Zuckerman's initial research and theoretically-based work, numerous other investigators began to provide empirically-based information that investigated the sensation-seeking construct. Early investigators investigated several topic areas in relation to sensation seeking including (1) symbol and figure preferences, (2) intelligence, (3) vocational interests, (4) sexual and marital preferences, and (5) behavioural preferences and (6) physiological correlates. Attention is now directed to this research.

First, high sensation seekers do not appear to be particularly sensitive to simple sensory stimuli (Kish, Frankel, Masters & Berry, 1976). However, they do seem to be able to recognize symbols and figures faster than low sensation seekers (Neary & Zuckerman, 1976). Zuckerman et al., (1970; cited in Zuckerman, 1972; 1994) found that high sensation seekers also appear to have a preference for complex designs. For example, designs preferred by low sensation seekers were found to be relatively simple and symmetrical, whereas those preferred by high sensation seekers were complex, asymmetrical, and suggested movement.

In line with these findings, high sensation seekers also seem to like nonsense humour in which the resolutions are more complex, incongruous, or absurd (Ruch, 1988). They also appear to prefer sexual humour. On the other hand, low sensation seekers, appear to prefer humour in which the punchline provides far more simple closure. Low sensation seekers tend to find sexual and nonsense humour more aversive than high-sensation seekers (Ruch, 1988). The preferences of high sensation seekers for unresolved incongruity may be related to their increased tolerance of ambiguity (Ruch, 1988), preference of complex designs (Zuckerman et al., 1972), and the more recent finding of a preference for nonrepresentational forms of art (Zuckerman, Ulrich, and McLaughlin, 1993).

Second, low positive correlations between general intelligence and sensation seeking have been found (Carroll & Zuckerman, 1977; Kish & Donnenwerth, 1972; Waters, 1974). High sensation seekers, however, are not necessarily high achievers in an academic setting (Anderson, 1973; cited in Zuckerman, 1994; Pemberton, 1971; cited in Zuckerman, 1994). Although high sensation seekers may evidence an academic potential, these individuals at the same time may not utilize such potential. The academic atmosphere compared with the stimulations surrounding them in the outside environment may lead them away from what is perceived as a low stimulation environment (Babbitt, Rowland & Franken, 1990).

Third, in regard to vocations, many factors may determine the choice of vocation, for example, one's intelligence, education, and personality. In relation to risky vocations Musolino and Hershenson (1977) investigated male air traffic controllers (a vocation rated as a 'risky' occupation by personnel specialists) and male civil servants and college students (both ranked low risk occupations). The air traffic controllers scored significantly higher than the civil servants and college students on the General and all of the subscales of the SSS IV. One on the largest differences between the controllers and the civil servants was on the Thrill and Adventure seeking subscale, suggesting increased involvement in physical risk-taking activities.

Sport parachutists and sky-divers are hypothesized to be high sensation seekers. Parachutists in the military are usually a select group of volunteers. In an attempt to determine whether these professionals are also high sensation seekers, Breivik (1991; cited Zuckerman, 1994) compared Norwegian paratroopers with ordinary military recruits. The paratroopers scored higher than the ordinary recruits on Thrill and Adventure Seeking, Disinhibition, Boredom Susceptibility, and Total Sensation Seeking (SSS-V). These results suggest that individuals who volunteer to be paratroopers in the military tend to have a high desire to seek sensations compared to ordinary recruits.

Montag and Birenhaum (1986) compared male applicants for risky security-related jobs with applicants for less dangerous jobs. Those seeking the more dangerous jobs were found to score significantly higher on Total Sensation Seeking, and Thrill and Adventure Seeking, Experience Seeking, and Boredom Susceptibility subscales.

Zaleski (1984) found that a group of Polish men working in risky occupations such as the fire service, mountain rescue, and mining, scored higher than controls only on the Disinhibition scale. They also scored lower than men engaging in risky sports on the Thrill and Adventure Seeking subscale. Results suggested that civilians who had physically risky jobs were not attracted to the these jobs because of the physical risk but, rather, were more "disinhibited" types of sensation seekers. Goma, Perez, and Torrubia (1988; cited Zuckerman, 1994), compared fireman and students on a Spanish version of the SSS. In contrast to Zaleski's (1984) findings, Goma et al., (1988) found that the firemen scored higher on Total Sensation Seeking, Thrill and Adventure Seeking, and Experience Seeking scales of the SSS, but did not differ from students on the Disinhibition scale.

Some insights into the background, personal motivations, and personality of those who choose very risky occupations can be gleaned from an interview study by Piet (1987) of six of the then would's highest ranking "stunt people". Participants reported an early search for varied and risky experiences and for vigorous activity, a low boredom threshold, and weaker inhibitory effects of possible aversive consequences of one's own actions. Results suggest that sensation seeking tendencies may stem from childhood experiences.

In regard to nonrisky but stimulating occupations, Hirschowitz and Nell (1983) found that journalists tended to score higher than other types of professionals (classified occupationally as professional, middle-managerial, or white-collar workers), on Total Sensation Seeking, Experience Seeking, Disinhibition, and Boredom Susceptibility scales of the SSS-V. Umpathy and Suvarna (1988; cited in Zuckerman, 1994) found similar findings. Their journalists scored higher on the Total, Thrill and Adventure Seeking, and

Experience Seeking scales compared to a control group matched for age and sex. Taking the two studies together, journalists appear to have a high level of general sensation seeking with an emphasis on experience seeking.

Issues related to vocational preferences have also been investigated. The Strong Vocational Interest test measures the extent to which subjects' responses on the test compare with scales empirically derived by comparing test item responses of people actually in specific occupations. Each scale is named after the occupation of the particular vocational groups. Sensation seeking in males has been found to be positively correlated with scales derived from the "helping professions" (e.g., psychologist, social worker, psychiatrist), and negatively with vocations related to clerical and business professions (e.g., banker, accountancy) (Kish & Donnenwerth, 1969; 1972). One may assume that these results relate to the helping professions involving potentially more variety and more highly charged social interactions than the usual routine transactions of business professions (Zuckerman, 1994). Regarding females, there are some indications that high sensation seeking females have a reduced interest in traditional female occupations such as teaching, dietician, home economics teachers compared to low sensation seekers. Instead they tend to show a high interest in more non stereotypical female occupations (e.g., lawyer), (Kish & Donnenwerth, 1972).

Fourth, numerous researchers have focused on high sensation seekers sexual and marital preferences. For example, high sensation seeker has been shown to be more involved in a greater variety of heterosexual behaviours (e.g., kissing, petting, coitus in various positions, and oral-genital activities) with a greater number of partners compared with low sensation seekers (Zuckerman, Bone, Neary, Mangelsdorff, & Brustman, 1972; Zuckerman, Neary, & Brustman, 1970; cited in Zuckerman, 1994). Sensation seekers also appear to select partners who have a similar level of sensation seeking tendencies (Farley and Davis, 1977; cited in Zuckerman, 1994; Ficher, Zuckerman and Steinberg, 1988; Lesnik-Oberstein & Cohen, 1984). Furthermore, a lack of correspondence between levels of sensation seeking has been found in couples requesting marital therapy as compared to 'satisfied' couples (Ficher et al., 1988).

Fifth, a number of behavioural tendencies have been shown to correlate with sensation seeking. For example, drug use has been positively correlated with sensation seeking (Zuckerman et al., 1972). It also appears with high sensation seekers will use a variety of drugs which will provide a new experience (Carrol & Zuckerman, 1977; Segal & Singer, 1976). Furthermore, high sensation seekers are more likely to smoke than low sensation seekers (Zuckerman & Neeb, 1980; Golding, Harpur & Brent-Smith, 1983; Pederson et al., 1989). Unlike drug experience, which has been shown to correlate significantly with most Sensation Seeking scales (SSS) (Zuckerman et al., 1972), alcohol use tends to correlate only with the Disinhibition scale (Zuckerman et al., 1972) of the SSS.

Findings also suggest that sensation seekers are quite receptive to unusual internal experiences (e.g., hallucinations), and are not made overly anxious by them (Zuckerman et al., 1972). The seeking of unusual internal experiences may explain why sensation seekers tend to be drawn to drugs, and may also account for the high rate of sensation seekers volunteering for psychological experiments which offer novel kinds of experiences (e.g., hypnosis, sensory deprivation, drug, ESP) (Zuckerman, Schultz & Hopkins, 1967; Zuckerman et al., 1967; Bone et al., 1974), and tend not to volunteer for 'ordinary' psychological experiments (e.g., learning, and social psychology) (Bone et al., 1974).

Another preference of high sensation seekers appears to be relatively greater rates of risky driving and 'speed'. Zuckerman and Neeb (1980) found that high sensation seeking correlated significantly with driving speed. That is, as SSS increased so did reported driving speed. Numerous other researchers have replicated these findings (e.g., Clement & Jonah, 1984; Arnett, 1991; Furnham & Saipe, 1993). In addition, high sensation seekers are more likely to have had driving accidents and convictions for driving offences (e.g., alcohol related), than low sensation seekers (Heino et al., cited in Zuckerman, 1994; Hartman & Rawson, 1992).

Several other behavioural preferences have been associated with sensation seeking. For example, high sensation seekers are more ready to change locales and entertain the idea of travelling to exotic places (Jacobs & Koeppel, 1974; Zuckerman, 1979). They tend to be drawn to gambling, tend to prefer high odds, and bet more in some types of games (Zuckerman, 1974; Zuckerman & Kuhlman, 1978; cited in Zuckerman, 1994; Water & Kirk, 1968). Furthermore, high sensation seekers tend to prefer to engage in activities that are risky such as parachuting, and scuba diving (Bacon, 1974; Zuckerman, 1979; Hymbaugh & Garrett, 1974).

Sixth, several physiological correlates of sensation seeking have been found. Neary and Zuckerman, (1976) have shown that the 'orienting response or reflex' (i.e., a response that alters the organism's position with respect to the source of stimulation,) to the first presentation of auditory or visual stimuli is stronger in high sensation seekers than in low sensation seekers.

Sensation seekers with high Disinhibition scores on the SSS have been found to have higher levels of gonadal hormones (i.e., testosterone and estragon) than low sensation seekers (Daitzman, Zuckerman, Sammelwitz and Ganjam, 1978). Schooler, Zahn, Murphy and Buchsbaum (1978) evidenced that the SSS correlated negatively with blood platelet monoamine oxidase (MAO). In the brain, MAO degrades or regulates monamine neurotransmitters, such as norepinephrine, dopamine, and serotonin. Thus, the negative correlation indicates that high sensation seekers may have low MAO levels. These low levels of MAO have been associated with hyperactivity, sociability, and, in the extreme, mania (Zuckerman, Buchshaum & Murphy, 1980).

Finally, Zuckerman (1969, 1979), and others (Blackburn, 1969; Kish, 1966; Kish & Busse 1968; Thorne, 1971) have suggested that sensation seeking increases with age until adolescence at which time it tends to fall with increasing age. Zuckerman, Eysenck, & Eysenck (1978) hypothesized that experience in life leads to increasing conservatism and a consequent decrease in risk taking.

In summary previous research has shown that high sensation seekers: (1) have a preference for complex designs; (2) like nonsense and sexual humour, and nonrepresentational forms of art; (3) are high in academic potential which may be under-utilized; (4) tend to have a interest in risky, socially based and interactive vocations; (5) tend to be involved in a variety of heterosexual behaviours, with a greater number of partners: (6) tend to select partners who have a similar level of sensation seeking tendencies; (7) appear to be more involved in drug use, smoking, and gambling; (8) like to volunteer for novel psychological experiments such as hypnosis, sensory deprivation, drug, and ESP; (9) tend to evidence risky driving behaviour and prefer fast driving speeds; (10) tend to engage in activities or vocations that are risky such as fire fighting, parachuting, and scuba diving, and (11) have high levels of gonadal hormones and low MAO levels. Based on these findings, high sensation seekers can be described as "thrill seekers": individuals who will engage in behaviours in an attempt to increase internal arousal.

The first Sensation-Seeking Scale was developed with the narrow goal of predicting responses to a specific experimental situation -- sensory deprivation. Subsequent research on the scale reported in this chapter extended it's use into a range of other areas. Sensation seeking now appeared to be a more basic personality dimension and predictive of a wide variety of life experiences, behaviours, preferences, and attitudes (Zuckerman, 1994). The next chapter provides information on sensation seeking theory revision in light of the array of accrued findings.

# SENSATION SEEKING

## An Overview of a New Theoretical Model

Based on an accumulation of research, such as that discussed in the previous section, Zuckerman (1994) revised his initial sensation seeking theoretical model. Sensation seeking was now integrated within a broader trait called impulsive-sensation seeking (ImpSS) (Zuckerman, Kuhlman, & Camac, 1988; Zuckerman, Kuhlman, Thornquist, & Kiers, 1991). That is, it was now believed that the personality dimensions of impulsiveness and sensation seeking were interconnected. Two constructs are hypothesized to underlie ImpSS; extraversion and a mechanism called 'approach'. That is, in obtaining food, mates, or personal goals, humans (as well as animals) must leave their familiar surroundings and 'approach' animate or inanimate objects in a potentially dangerous environment (Zuckerman, 1994).

Zuckerman (1994) hypothesized that the general 'approach disposition' involves three traits: Sensation Seeking; Impulsiveness, and Sociability. Sensation seeking represents the tendency to approach novel stimuli and explore the environment. Zuckerman describes Impulsivity as a style of rapid decision making, and sociability as the tendency to approach, rather than avoid, social objects.

Derived from this new theoretical model, several hypothesis were proposed. High sensation seekers are hypothesized to desire activities that are exciting and are inclined to avoid stimuli with little potential for risk-taking. They are thought to be impulsive and have a high susceptibility to boredom. Novel and intense stimuli are hypothesized to bring the high sensation seeker closer to their optimal levels of arousal. However, arousal produced by a stimulus is transient and the sensation seeker needs to search for new stimuli to reinstate heightened arousal. Put differently, high sensation seekers must continually seek out new stimuli to satisfy their arousal needs. When stimulation ceases or becomes constant for high sensation seekers, arousal would be thought to quickly decline (Zuckerman, 1994).

Zuckerman (1994) hypothesized that if parents are high sensation seekers themselves they are likely to encourage a type of sensation seeking exploration in their children (usually with appropriate risk management), but if, on the other hand, they are low sensation seekers they may be frightened by potential risks and likewise attempt to discourage sensation seeking in their children.

Furthermore, it has been hypothesized that high sensation seekers tend to underestimate risk, but risk is not the sole ingredient in producing optimal arousal (Zuckerman, 1994). That is, sensation seekers appear to enjoy many kinds of novel and variegated experiences that do not have an apparent risk element (e.g., music, arts, and media). When they do take risks, the point of the activity is thought not to be risk per se but new experience and its associated arousal. They may even seek to minimize the risk in certain instances. For example, expert mountain climbers and parachutists are often high sensation seekers, but at the same time will often take full advantage of any safety equipment and check their gear carefully before climbing or jumping (Breivik, 1991; cited in Zuckerman, 1994). On the other hand, when impulsivity is combined with sensation seeking it is hypothesised that there may be an insensitivity to the risk and its associated consequences (Zuckerman, 1994).

Zuckerman (1994) hypothesized that low sensation seekers risk aversion is based on conservative attitudes. He suggests that they simply do not see the sense or reward in the experiences engaged in by high sensation seekers. He also hypothesized that low sensation seekers have a tendency to see more risk in situations as compared with high sensation seekers.

Finally, the new theoretical model hypothesises that socioeconomic aspects of environment determine the range of possible sensation seeking expressions. For example, in middle - or upper-class environments, there is a greater range of capitalized possibilities available in sports, cars, and travel, whereas possibilities in the lower-class environments may be limited to sex, drugs, gambling, and crime (Zuckerman, 1994). Zuckerman is aware of exceptions, but he suggests that the vast majority of people will necessarily find

expressions of sensation seeking within the culture in which they live.

Based upon Zuckerman's sensation seeking theory and hypotheses, it seems plausible to suggest that various sports and physical activities provide risk and varied opportunities to satisfy the needs of high sensation seekers (Rowland, Franken, Harrison, 1989). Previous research which has investigated the sensation seeking tendencies of athletes is the focus of the next section.

## Research Relating Sensation Seeking to Sports

One implication of the sensation seeking construct is that the particular sport discipline one is more likely to participate in may be based on whether one is high or low on the sensation seeking trait. In addition, sensation seeking in the sport context is often synonymous with risk-taking (Zuckerman, 1982). Consequently, there is a substantial body of work investigating the relationship between sensation seeking and participation in risky sports.

Zuckerman (1982) classified sports according to the associated risks involved. At one end of the sport risk continuum are sports such as sky-diving, motor-car racing, and hang gliding. What characterizes these sports is the acute danger associated with accidents, (i.e., risk of fatal injury). At the other end of the classification are sports such as golf, swimming, and marathon running where injuries can occur but the probability of fatalities is fairly remote. Between these two groups (Medium-Risk sports) are the contact sports, such as rugby, wherein serious injuries are possible but the chances of death are remote.

In a summary of the early work, Zuckerman concluded, "The broad trait of SS is related to participation in specific kinds of sports, namely those that provide unusual sensations and novel experiences such as those involved in sky-diving, hang-gliding, skiing and scuba diving" (1983, p.290). For example, sky divers (Hymbaugh & Garrett, 1974), auto racers and hang gliders (Straub, 1982) have all been shown to evidence higher SS scores than do controls. Medium risk sports (e.g., body-contact sports) have also been associated with higher sensation seeking. More recent work has also replicated the relationship between higher levels of sensation seeking and participation in risk sports (e.g., Cronin, 1991; Freixanet, 1991).

Lower-risk sports, requiring intensive training and practice, such as running and gymnastics, were negatively related to sensation seeking. That is, these sports were found to be more commonly pursued by persons low in sensation seeking (McCutcheon, 1980).

Following these findings, Potgieter & Bisschoff (1990) concluded that the trait of sensation seeking serves as a possible underlying explanation for the motivation of many individuals to participate in high-risk versus low-risk sports. A comprehensive summary of research conducted in the area of sensation seeking and sport participation is given in Table 2.

**Table 2.** Research relating sensation seeking to sports.

| | Author(s) | Experimental (sex, n) | Control (sex, n) | Differences | Correlates |
|---|---|---|---|---|---|
| | | | High-Risk Sports | | |
| Parachuting | Hymbaugh Garrett (1974) | Sky-divers (M&F=21) | Non-sky-divers | Sky-divers higher on Gen.SSS (II) | |
| Hang-gliding Auto-racing | Straub (1982) | Hang-gliders (M=33); Auto-racers (M=22) | Bowlers (M=25) | Gliders > bowlers on Total TAS, ES (V); racers > bowlers on Total ES, Dis, BS | More injuries & appraised risk among auto-racers & hang-gliders |
| Misc; Parachut. racers, snow-mobilers, police, & firemen | Kusyszyn et al. (1974) | "Risk-takers" (M=85) | Civil servants & college students (M=70) | Risk-takers higher on Gen. TAS (IV) | |
| Scuba diving (novice) | Heyman & Ross (1980) | Novice divers (M=29; F=16) | Same-sex students | Divers higher on Total (V) Subscales not analysed | SS correlated + time length of 1st free dive - with depth of dive |
| Scuba salvage diving | Bacon (1974) | Volunteer Salvage divers | College students (matched) | Divers higher on Gen, TAS Dis, BS (IV) | |
| Skiing | Connolly (1981) | Skiers (M=27; F=18) | Non-skiers from health-spa (matched) | Skiers higher on Total, TAS. Ski-instructors > skiers Total TAS, ES | Skiers who had accidents higher than others on Total, TAS, Dis |
| Mountain Climbing | Fowler et al. (1980) | Climbers (M=11, F=7) & students interested in climbing (9) | Dental students not interested in climbing (32) | Climbers and interested higher on Gen. TAS (IV) | Climbers & interested have lower platelet MAO |
| | Cronin (1991) | Climbers (M & F=21) | College Students (M & F = 20) | Climbers > controls on Total, ES, TAS (V) | |

Table 2 (Cont.)

| | Author(s) | Experimental (sex, n) | Control (sex, n) | Differences | Correlates |
|---|---|---|---|---|---|
| Alpinists, Mountainee-ring, high-risk sports-men | Freixanet (1991) | Alpinists (M=29) Mountaineers (M=72), Sports-men (M = 221) | Subjects not engaged in any risk activities (M & F = 54) | Alpinists, Mountaineers Sports-men > contols on TAS, ES, Total (V) | |
| Hang-gliders | Wagher & Houlihan (1994) | Glider pilots (M & F = 170) | Golfers (M & F = 90) | Gilder pilots > golfers on all four subscales & Total (V) | |
| White-water padders | Campbell et al. (1993) | Canoe & Kayak paddlers (M = 34; F = 54) | Normative scale | Paddlers higher on TAS (V) | |
| | | | Medium-Risk Sports | | |
| Body-contact sports | Stirling (1977) | Body-contact sports (m = 14) | Non-contact sports (M = 11) Non-athletes (M = 11) | Contact > non-athletes on Gen. TAS Dis (IV) | Reducing Dis correlated with Dis |
| Football | Cellini (1982) | Criminal offenders on probation or parole (M = 65) | | Total, TAS ES (V), correlated with participation in football Little correlation with non-contact sports | Violent impulsive criminals higher than others on TAS, ES. Football related to violent premeditated crime |
| Rugby | Potgieter & Bisschoff (1990) | Rugby players (M = 35) | Marathon runners (M & F = 32) | Rubgy players higher on Total & TAS (V) | |

Table 2 (Cont.)

| | Author(s) | Experimental (sex, n) | Control (sex, n) | Differences | Correlates |
|---|---|---|---|---|---|
| | | | Low-Risk Sports | | |
| Running | McCutcheon (1980) | Runners (M = 42); (F = 20) | Non-runners matched | Male runners lower on Dis, Female runners lower on Total, TAS | No Correlations of SSS with order of finish in race |
| Gymanastics | Straub (1982) | Gymnasts (F = 28) | Bowlers (F = 31) | No differences on any SSS (V) scales | |
| Physical Ed. Majors | Wickoff (1982) | Physical Ed. (M =52) (F = 60) | SSS norm group | No differences on any SSS (V) Scales | |

One might conclude from the studies presented in Table 2 that sensation seekers are attracted to the risk that the sport provides. However, Rowland, Franken, & Harrison (1986) suggested that such a conclusion may be premature. If, as Zuckerman (1979) has hypothesized, the continuing need for new experiences is an important aspect of SS, one would expect high sensation seekers to demonstrate interest and participation in a wide variety of sporting activities during their life time, Moreover, the high susceptibility to boredom these individuals are hypothesized to show (Schalling, Edman, & Asberg, 1983), might shorten their span of participation in any given sporting activity. Consequently, if high sensation seekers are motivated by the need for new activities and are susceptible to boredom, they would soon exhaust popular and readily available activities and then turn to activities that are less conventional and more risky to maintain their interest and provide optimal arousal (Zuckerman, 1994).

In order to test such a hypotheses, Rowland et al., (1986) investigated a large sample of undergraduate college students. They administered a life-span inventory of sports participation (i.e., past and present sporting involvement) and the Sensation Seeking Scale, Form V (SSS V). They found that high sensation seekers among college

students had tried a greater number of sports, including low risk sports such as bicycle riding or swimming or were currently engaged in a greater number of sports. The results showed that over time, low sensation seekers tended to remain involved with any one sport for longer periods of time; high sensation seekers tended to become involved in more sports than did low sensation seekers.

Although Rowland et al., (1986) found support for the hypothesis concerning the need for new and varied experiences, they also hypothesized that simple attraction to risk may also be a determinant in the selection of a potential sport. Their results also supported this hypotheses. From a list of 72 sporting activities, they asked participants to indicate which six new activities they would like to try. The list of the six activities that male high sensation seekers would like to try were all high-risk activities (e.g., flying conventional and ultra light aircraft, white water rafting). The corresponding list for low sensation seeking males consisted of three high-risk activities and three activities of moderate risk. As with the males, the list of most desired new activities for high sensation seeking females were primarily high-risk activities (e.g., white water rafting, kayaking). In contrast, the corresponding list for low sensation seeking females were moderate to low risk activities (e.g., handball, sailing). Rowland et al., (1986) finding are consistent with the high sensation seeker's hypothesized desire for increased arousal and a variety of novel stimuli.

Rowland et al., (1986) results appear to suggest that an attraction to high risk characterize the high sensation seeker's desire to participate in high risk sporting activities. However, on examination, one may suggest that although the perceived risk may initially attract an individual to a particular type of sport (i.e., high-risk), it is, as Zuckerman (1994) hypothesized, the newness of the experience that also produce optimal arousal.

Research has generally shown that athletes who are currently active in risky sports, such as mountain athletes (i.e., mountain - rock climbing, alpinists, speleology, skiing) (Fowler, Von Knorring, & Oreland, 1980; Cronin, 1991; Rossi & Cereatti, 1993; Robinson, 1985), skiing (Connolly, 1981), parachuting, scuba diving (Heyman & Rose,

1980), sky-diving (Hymbaugh & Garrett, 1974), water skiing, gliding, hang-gliding (Straub, 1982), and motor car racing (Straub, 1982; Frexianet, 1991; Zaleski, 1984; Kerr & Svebak, 1989), typically score significantly higher than control groups on the SSS and the following subscales: Thrill and Adventure Seeking and Experience Seeking.

Zuckerman (1994) hypothesized that high sensation seekers tend to underestimate risk the risk involved in their chosen sport. Support for this hypotheses has been mixed. For example, many (e.g., Heyman & Rose, 1980; Zuckerman, 1979b; Potgieter & Bisschoff, 1990; Brannigan & McDougall, 1983) have found that those high in sensation seeking tended to underestimate risk. On the other hand, Straub (1982) found that the majority of participants in both hang-gliding and automobile racing rated their sport as a high-risk enterprise.

While Zuckerman (1994) hypothesized that high sensation seekers tend to underestimate the risk involved in their sport, he further hypothesized that they do not solely take risks for the sake of risk itself. Using a group of scuba divers, Heyman & Rose (1980) showed that this group did not take risks for the sake of risk alone, there had to be some kind of reward (e.g., a novel experience) to justify the risk.

As Mentioned, Brannigan & McDougall (1983) found that hang gliders generally believed that hang gliding is not a dangerous sport per se. Most were well aware of the risks of flight, and virtually all were either directly or indirectly familiar with cases of death and injury. However, there was a widespread belief among these hang-gliders that "good flyers" are exempt from the dangers by virtue of their expertise.

Another hypothesis put forward by Zuckerman (1994) discussed in the previous section was that high sensation seekers tend to associate with peers or partners who have similar sensation seeking tendencies. In discussing with hang gliders their first exposure to the sport, Brannigan & McDougall (1983) found that the majority first saw a kite or learned about the sport through a close friend, family member, or partner. The finding that the majority of hang-gliders first exposure to the sport of hang gliding was typically

through a friend seems to provide at least partial support for Zuckerman's hypothesis that high sensation seekers associate with peers who have similar sensation seeking tendencies.

The new theoretical model of sensation seeking hypothesized that sensation seeking is embedded in a broader trait called ImpSS. Like Zuckerman (1994), Eysenck and Eysenck (1978) believe that "these two concepts -- sensation seeking and impulsiveness -- seem to overlap considerably" (pp, 1248). However, findings regarding this hypotheses have been mixed. For example, Kerr and Svebak (1989) using the risk classifications of Zuckerman (1983) compared those engaging in risky and non-risky sports across the following dimensions: impulsiveness, arousal avoidance, planning orientation, and serious mindedness. The only consistently significant difference between those engaging in risky versus safe sports was on the arousal avoidance scale. Those practising safe sports were higher on arousal avoidance. Arousal avoidance is inversely related to sensation seeking (i.e., low arousal avoidance is a feature of high sensation seeking) No differences were found on the other dimensions. Importantly, the lack of finding on the impulsiveness dimension did not provide support for the ImpSS construct.

Like Kerr and Svebak (1989), Freixanet (1991) found that alpinists, mountaineering related sportsmen, and other sportsmen not engaged in mountaineering did not differ from controls on impulsiveness. Although no significant differences were found between these sport groups, Freixanet (1991) did find positive correlations between impulsiveness and the SS subscales and Total scale. Fowler, von Knorring, and Oreland (1980) found that a group consisting of experienced mountaineers, and those with an interest in mountaineering, were higher on monotony avoidance, impulsive extraversion, and other impulsiveness scales than students not interested in mountaineering. The above studies appear to provide partial support for Zuckerman's hypotheses that impulsiveness and sensation seeking are related dimensions. One must note, however, that these are only preliminary studies supportive of Zuckerman's ImpSS theory, and until further research is conducted that clarifies the negative findings, general conclusions can not yet be drawn.

In summary, it currently appears to be an overgeneralization to conclude that all high-risk sports participants are sensation seekers. However, in looking at it from the other direction it does appear that this disposition is associated with engaging in high-risk sports. The studies reviewed in this chapter have shown that the trait of Sensation Seeking is related to participation in specific kinds of sport disciplines, namely those that provide unusual sensations, novel experiences, and those which provide physical risk taking such as hang gliding, skiing, and sky diving. Thus, evidence to date appears to provide initial support for hypotheses related to high sensation seekers being more likely to try a greater range of activities and risky sports.

However, further study in this area is warranted to clarify findings through research aimed at replication and extension. An area which requires clarification concerns Zuckerman's 'impulsive-sensation seeking' hypotheses. As just discussed, findings in this area have been mixed (e.g., Kerr & Svebak, 1989; Fowler et al., 1980). Thus, future research needs to address the issue of whether or not there exists a positive relationship between impulsiveness and sensation seeking tendencies.

Several other previous research findings provide a basis for replication and extension. For example, although past research has found that high sensation seekers tend to underestimate the risk involved in their chosen sport, previous studies have typically not addressed the question of why these sensation seekers might do so. Future research needs to investigate this area in a more comprehensive fashion.

As there is currently a dearth of research which focuses on current sensation seeking behaviour and present socioeconomic status, past childhood experiences and influences (e.g., parental), and the possible differences that may exist between elite and other levels of sport participation (e.g., club, novice), further research in theses areas are also warranted. The current study was designed to address the issues raised in this section. The current study is described in the next chapter.

Chapter 3

# THE PRESENT STUDY

## Rationale and Goals of the Study

The present study had three primary goals: (1) to test Zuckerman's ImpSS theory with New Zealand athletes, and to (2) to replicate and (3) extend previous research which has examined the relationship between sensation seeking and participation in a variety of sporting activities. The aim of the present thesis was to study the personality profile of a group of subjects engaged in high physical risk sport activities and to compare them with a group of subjects who are currently engaged in lower physical risk sport activities. Specific sports of interest include: (1) High-Risk Sports - skydiving; mountaineering; hang-gliding; motor-car racing; and (2) Low-Risk Sports- marathon running; aerobics; swimming; golf. Comparisons between and within each sporting group will be made along the sensation seeking and related dimensions that speck to research questions discussed in the previous chapter.

## The Hypotheses

### Main Hypotheses:

Two main hypotheses were the focus of the present study:

(1) Sensation seeking is hypothesized to be part of a broader trait, namely - impulsive-sensation seeking (Zuckerman et al., 1988, 1991). As discussed earlier, findings in this area have been mixed. Kerr and Svebak (1989), found no relation between sensation seeking and impulsiveness. On the other hand, Fowler et al., (1980) did find a positive relationship. Based on Zuckerman's (1994) theory, it was hypothesized that the personality dimensions of sensation seeking and impulsiveness would be interconnected -- that is, significant differences would be found between high- and low-sensation seekers on impulsiveness and that sensation seeking total score would correlate significantly with impulsiveness total score.

(2) Based on Zuckerman's ImpSS theory, and previous research findings, the present study hypothesized that individuals with a strong tendency to seek sensation would be attracted to high-risk sports, whereas, individuals with weaker sensation seeking dispositions would tend to participate in low-risk sports. Thus, it was hypothesized that Sensation seeking would differentiate high from low-risk sport participants.

**Specific Hypotheses:**

On the basis of the above foregoing goals, the areas for replication addressed by the present study are associated with the following five specific hypotheses derived from Zuckerman's ImpSS theory:

(1) It was hypothesized that individuals who participate in high-risk sports would score higher not only on total sensation seeking (see main hypothesis) but also on the specific subscales of the SSS then those subjects who participate in the low-risk sports. It was further hypothesized that individuals who participate in the high-risk sports would score higher on impulsiveness than those subjects who participated in the low-risk sports.

(2) High sensation seekers were hypothesized to score significantly higher on impulsiveness (see main hypothesis). Additionally, they were also hypothesized to score higher on Boredom Susceptibility compared to low sensation seekers. Thus, positive correlations were predicted between the sensation seeking subscales and impulsiveness, and between sensation seeking total score and Boredom Susceptibility.

(3) As previous studies has been mixed regarding of issues of whether high sensation seeker tend to underestimate the risk involved in their chosen sporting activity, further research in this area was deemed warranted. Based on Zuckerman's (1994) theory and previous research findings, the present study predicted that high sensation seekers would have a tendency to underestimate the risk involved in their chosen sporting activity.

(4) In contrast to low sensation seekers, high sensation seekers with their hypothesized need for change and varied experiences (Zuckerman, 1994) were predicted to be currently involved in more than one sporting activity.

(5) Based on previous research findings, positive correlations were expected between sensation seeking and an individual's stated desire to try new sporting activities. That is, in contrast to low sensation seekers, high sensation seekers with their hypothesized need for new experiences and attraction to risk were expected to indicate a desire to engage in more new sporting activities. Also, it was expected that high sensation seekers would have tried more sporting activities compared to low sensation seekers.

Other areas not yet addressed by previous research, as discussed in the previous chapter, are addressed by the following four specific hypotheses:

(6) Within each sporting group, comparisons will be made between elite, club, novice and recreational (i.e., novice) athletes along the sensation seeking and related dimensions as there currently is a dearth of sensation seeking research in the area of elite versus novice sport participants (Potgieter & Bisschoff, 1990). It was predicted that elite sport participants will score higher on total sensation seeking and the other four subscales of the SSS, as well as on the impulsiveness dimension, compared to the other sporting levels (i.e., club, novice and social/recreational levels).

(7) Previous studies have not adequately addressed the question of why high sensation seekers tend to underestimate risk. Thus, the present study was designed to extend earlier research to determine reasons underlying some high sensation seekers tendency to underestimate risk. It was predicted that the high sensation seekers who engaged in low risk appraisal would have higher levels of 'trust' in their equipment, knowledge, and skills. It was further predicted that high sensation seekers are aware of, but simply accept, the risks involved in their chosen sport.

(8) Within the available sport and sensation seeking literature, there is a lack of research which focuses on current sensation seeking behaviour and past childhood experiences and influences. The present study was designed to investigate the possibility that childhood experiences and influences (i.e., parental) play a role in shaping the sensation seeking disposition. It was predicted that high sensation seekers would have engaged in more high-risk behaviour as children compared with the low sensation seekers. In line with this prediction, it was expected that high sensation seekers would 'rate' their parents as more adventurous than would low sensation seekers.. It was further hypothesized that high sensation seekers would rate their parents as less 'protective' than would the low sensation seekers.

(9) Derived from Zuckerman's (1994) theory that socioeconomic aspects of a individuals environment determine the range of possible sensation seeking expressions, it was predicted that subjects who were engaged in high-risk sports would have a higher socioeconomic status compared to those engaged in low-risk sports. Due to the number of hypotheses, a summary is warranted at this time.

| Hypotheses | Description |
|---|---|
| **Main** | |
| 1 | The personality dimensions of sensation seeking and impulsiveness would be significantly related. That is, significant differences would be found between high- and low-sensation seekers on impulsiveness and that sensation seeking total score would correlate significantly with impulsiveness total score. |
| 2 | Total sensation seeking score would differentiate high- and low-risk sport participants. |

**Specific**

1 High-risk sport participants would score significantly higher on the sensation seeking subscales than low-risk sport participants.

2 High-risk sport groups would score significantly higher on impulsiveness than low-risk sport groups.

3 Elite sport participants would score significantly higher on the sensation seeking subscales and impulsiveness compared to other sporting levels (i.e., club, novice, recreational).

4 High sensation seekers were hypothesized to score significantly higher on Boredom Susceptibility (and impulsiveness, see main hypothesis) compared to low sensation seekers. Consequently, positive and significant correlations are predicted between Boredom Susceptibility and Total Sensation Seeking and between sensation seeking subscales and impulsiveness

5 High sensation seekers would have a tendency to underestimate the risk involved in their chosen sport compared to low sensation seekers.

6 High sensation seekers would be aware of potential risks involved in their chosen sport but simply accept these risks as part of the sport. As such, high sensation seekers accept the risks involved in their sport as they have a high need for experience seeking. First, positive and significant correlations were expected between Total Sensation Seeking and Experience Seeking. Furthermore, it was predicted that high sensation seekers who engaged in low risk appraisal would have higher levels of trust in their equipment, knowledge and skills.

7 In contrast to low sensation seekers, high sensation seekers were predicted to be currently involved in more sporting activities.

8 Positive correlations were predicted between the sensation seeking scales and (1) number of activities actually tried; and (2) number of new activities "like to be tried". That is, it was expected that high sensation seekers would have tried more sporting activities than compared to low sensation seekers and to indicate a desire to engage in more new sporting activities. Negative correlations were predicted between the sensation seeking scales and number of new activities a subject "would not like to try".

9 It was predicted that high sensation seekers would have engaged in more high-risk behaviour as children compared to low sensation seekers. In line with this prediction, it was expected that high sensation would 'rate' their parents as more adventurous than would low sensation seekers who were expected to indicate low ratings of parental adventurousness. It was further hypothesized that high sensation seekers would rate their parents as less 'protective' than would the low sensation seekers.

10 It was hypothesized that subjects who were engaged in high-risk sports would have a higher socioeconomic status compared to those engaged in low-risk sports.

Chapter 4

# METHODOLOGY

This chapter begins with a detailed characterization of the participants who took part in the present study. It then moves on to outline the measures employed and procedures followed.

## PARTICIPANTS

There were 272 sets of materials sent out to potential participants, and of these, 166 were returned and used in analyses (a return rate of 61%). Collection of data was completed on 30th September 1996. The sample was made up of 166 volunteering participants (male = 119; female = 47), ranging in age from 13 to 76 years, who were currently participating in one of eight sport categories: Automobile racing; sky-diving; hang-gliding; mountaineering; marathon running; swimming, golf; or aerobics. Participants were solicited from July 1996 through to September 1996.

Table 3 provides information with regard to the samples demographic data. The mean age for the whole sample was 29.2 years (SD = 11.86, range 13-76). The mean age for the high-risk sample was 31.0 years (SD = 9.16, range 16-61) and for the low-risk sample 27.1 years (SD = 14.36, range 13-76). In terms of gender, the mean ages were 29.0 years (SD = 16, range 13-76) for females and also 29.0 years (SD = 10, range 15-61) for males. The majority (57%) of the sample were aged between 13 and 29 years. Almost two-thirds (60%) of the participants were single. Most of the participants (93%) identified themselves as of European descent, with 3% identifying themselves as Maori. The remaining participants identified themselves as either Polynesian (n = 1) or Asian (n = 2); three identified themselves as 'Other'. One participant did not state his/her ethnicity. In regards to socioeconomic status, nearly half of the sample were either employed in the administrative and managerial fields (24%) or were students (25%). The remaining half of the sample were employed in the following areas: professional / techniqual (13%); clerical (13%); sales (12%); service (6%); agricultural (2%); production (.6% - one participant); unemployed (1%), and other (5%).

**Table 3.** Sample characteristics: Comparing high and low risk groups with the sample as a whole.

| | Whole Sample (n = 166) | | High-Risk (n = 93) | | Low-Risk (n = 73) | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | |
| **Age** | | | | | | |
| 19 or less | 40 | 24 | 9 | 10 | 31 | 42 |
| 20-29 | 54 | 33 | 34 | 37 | 20 | 27 |
| 30-39 | 45 | 27 | 35 | 38 | 10 | 14 |
| 40-49 | 18 | 11 | 13 | 14 | 5 | 7 |
| 50-59 | 4 | 2 | 1 | 1 | 3 | 4 |
| 60+ | 5 | 3 | 1 | 1 | 4 | 5 |
| **Sex** | | | | | | |
| Female | 47 | 72 | 10 | 11 | 37 | 49 |
| Male | 119 | 28 | 83 | 89 | 36 | 51 |
| **S.E.S** | | | | | | |
| Student | 41 | 25 | 10 | 11 | 31 | 43 |
| Administration | 39 | 24 | 29 | 31 | 10 | 14 |
| Professional | 21 | 13 | 19 | 20 | 2 | 8 |
| Clerical | 21 | 13 | 13 | 14 | 8 | 11 |
| Sales | 20 | 12 | 17 | 18 | 3 | 4 |
| Service | 10 | 6 | 4 | 4 | 6 | 8 |
| Other | 9 | 12 | 0 | 0 | 9 | 12 |
| Agricultural | 2 | 1 | 1 | 1 | 1 | 1 |
| Unemployed | 2 | 1 | 0 | 0 | 2 | 3 |
| Production | 1 | 1 | 0 | 0 | 1 | 1 |
| Transport | 0 | 0 | 0 | 0 | 0 | 0 |
| Labourers | 0 | 0 | 0 | 0 | 0 | 0 |
| **Marital Status** | | | | | | |
| Single | 100 | 60 | 46 | 50 | 54 | 64 |
| Married/DeFacto | 56 | 34 | 39 | 42 | 17 | 23 |
| Divorced/Separated | 10 | 6 | 8 | 9 | 2 | 3 |
| Widowed | 0 | 0 | 0 | 0 | 0 | 0 |
| **Ethnic** | | | | | | |
| European | 154 | 93 | 86 | 93 | 68 | 93 |
| Maori | 5 | 3 | 2 | 2 | 3 | 4 |
| Polynesian | 1 | 1 | 1 | 1 | 0 | 0 |
| Asian | 2 | 1 | 1 | 1 | 1 | 1 |
| Other | 3 | 2 | 3 | 3 | 0 | 0 |

**S.E.S** = Socioeconomic Status. Percentages rounded to the nearest whole number.

Both for convenience and clarity of information, the demographic characteristics of each individual sport group are presented in Table 4.

**Table 4.** Sample characteristics for individual sport groups.

| | Hang-Gliders (n = 25) | Mountaineers (n = 22) | Sky-Divers (n = 11) | Automobile Racers (n = 32) |
|---|---|---|---|---|
| **Age** | M = 31 yrs<br>SD = 7.34<br>R (17-47) | M = 29 yrs<br>SD = 8.26<br>R (17-47) | M = 31 yrs<br>SD = 11.24<br>R (17-48) | M = 32 yrs<br>SD = 10.72<br>R (16-61) |
| **Sex** | | | | |
| Male | 24 (96%) | 18 (82%) | 8 (73%) | 30 (94%) |
| Female | 1 (4%) | 4 (18%) | 3 (27%) | 2 (6%) |
| **S.E.S.** | | | | |
| Professional | 6 | 5 | 2 | 2 |
| Administrative | 6 | 8 | 27 | 14 |
| Clerical | 5 | 2 | 9 | 4 |
| Sales | 5 | 1 | 18 | 9 |
| Service | | | | |
| Agricultural | - | 3 | - | 1 |
| Production | 1 | - | - | - |
| Transport | | | | |
| Labourers | | | | |
| Student | - | - | - | - |
| Unemployed | 2 | 3 | 8 | 2 |
| Other | - | - | - | - |
| **Marital** | | | | |
| Single | 9 | 14 | 6 | 15 |
| Married/Defacto | 15 | 7 | 1 | 15 |
| Divorced/Separated | 1 | 1 | 4 | 2 |
| **Ethnicity** | | | | |
| European | 21 | 21 | 9 | 32 |
| Maori | 1 | - | 1 | - |
| Polynesian | - | - | 1 | - |
| Asian | 1 | - | - | - |
| Other | 2 | 1 | - | - |

Table 4 (Cont.)

| | Swimmers (n = 22) | Marathon Runners (n = 11) | Aerobics (n = 6) | Golfers (n = 34) |
|---|---|---|---|---|
| **Age** | M = 17 yrs<br>SD = 3.12<br>R (13-28) | M = 40 yrs<br>SD = 8.65<br>R (29-53) | M = 34 yrs<br>SD = 8.78<br>R (22-47) | M = 28 yrs<br>SD = 16.66<br>R (14-76) |
| **Sex** | | | | |
| Male | 12 (55%) | 5 (46%) | 2 (33%) | 17 (50%) |
| Female | 10 (46%) | 6 (55%) | 4 (67%) | 17 (50%) |
| **S.E.S.** | | | | |
| Professional | - | - | - | 2 |
| Administrative | - | 3 | 5 | 2 |
| Clerical | - | 5 | 1 | 2 |
| Sale | - | 1 | - | 7 |
| Service | - | - | - | 6 |
| Agricultural | - | - | - | 1 |
| Production | - | - | - | 1 |
| Transport | | | | |
| Labourers | | | | |
| Student | 22 | 1 | - | 9 |
| Unemployed | - | 1 | - | 3 |
| Other | - | - | - | 1 |
| **Marital Status** | | | | |
| Single | 22 | 2 | 4 | 26 |
| Married/Defacto | - | 7 | 2 | 8 |
| Divorced/Separated | - | 2 | - | - |
| **Ethnicity** | | | | |
| European | 21 | 10 | 5 | 32 |
| Maori | - | 1 | 1 | 1 |
| Polynesian | - | - | - | - |
| Asian | 1 | - | - | - |
| Other | - | - | - | - |

M = mean; SD = Standard Deviation; R = Range; S.E.S = Socioeconomic Status.
Percentages rounded to the nearest whole number.

The distribution numbers, percentages, and totals for the four participation levels (elite, club, entry/novice, social/leisure), can be seen in Table 5. Criteria for inclusion within each participation level was based on the participants self-ratings of his or her athletic status or proficiency.

**Table 5.** Sport level distributions.

| | Elite | Club | Novice | Social | **Total** |
|---|---|---|---|---|---|
| Hang-Gliders | 9 (36%) | 6 (24%) | 4 (16%) | 6 (24%) | 25 (100%) |
| Mountaineers | 12 (55%) | 4 (18%) | 3 (14%) | 3 (14%) | 22 (100%) |
| Sky-Divers | 3 (27%) | 3 (27%) | 3 (27%) | 2 (18%) | 11 (99%) |
| Automobile racers | 21 (66%) | 8 (25%) | 2 (6%) | 1 (3%) | 32 (100%) |
| Swimmers | 13 (59%) | 9 (41%) | - | - | 22 (100%) |
| Marathon runners | 9 (82%) | 2 (18%) | - | - | 11 (100%) |
| Aerobics | 6 (100%) | - | - | - | 6 (100%) |
| Golfers | 25 (74%) | 4 (12%) | - | 5 (15%) | 34 (93%) |
| **Total** | 98 (59%) | 36 (22%) | 12 (7%) | 17 (10%) | |

Percentages rounded to the nearest whole number.

# MEASURES

## The Sensation Seeking Scale (Form V) - (SSS-V)

The Sensation Seeking Scale is used to measure individual risk sensation seeking tendencies. Form V of the SSS comprises of 40 items, requiring forced-choice responses between two statements. The over-all score for the 40 responses is regarded as a general sensation seeking score. The questionnaire also yields scores in four subsections. Ten items are contained within each of the four subscales (see Appendix B).

In line with previous research (e.g., Rowland et al., 1986; Freixanet, 1991), a new variable was created. As most of the items from the Thrill and Adventure Seeking (TAS) subscale (9 out of 10) were concerned with sports and activities that the subjects were actually participating in, or had a desire to participate in, a new variable named "Total Sensation Seeking minus Thrill and Adventure Seeking" (SSS-TAS) was created to control for the possibility of variance in Total Sensation Seeking scores being due solely to sports (versus more general activities). That is, SSS-TAS represents the sum of the remaining three subscales (possible range, 0 to 30). The reliability coefficient for internal consistency (Cronbach's Alpha) for scores on the SSS-TAS scale was $r = .96$. A positive correlation coefficient (.94) was also found between SSS-TAS and Total Sensation Seeking ($p < .001$).

The results of several studies have supported Zuckerman's contention that the SSS-V is a reliable and valid measure of sensation seeking (Farley, 1967; Zuckerman & Link, 1988; Zuckerman, Eysenck & Eysenck, 1978; Straub, 1982; Rossi & Cereatti, 1993). Internal consistency coefficients for the four subscales for the American sample ($n = 97$) ranged from .67 to .84 (Zuckerman, 1979). Using the current sample, internal consistency coefficients for the four subsales of the SSS-V ranged from .56 of .68. Intercorrelations among the four subscales is moderate, ranging from .06 to .37 (Zuckerman, 1979). Again using the current sample, positive and significant Intercorrelations among the four subscales were found, ranging from .21 ($p<.01$) to .76

($p<.001$). Test-retest reliability for the four subscales and the total SS score, over a 3 week period, ranged from .61 to .93 (Zuckerman, 1979).

To test the concurrent validity of the SSS, several tests available which have attempted to measure the same or a similar constructs as the SSS have been correlated. The correlation between the General Scale and the Change Seeker Index (Garlington & Shimona, 1964) in five studies ranged from 0.56 to 0.70, all significant $p<.0001$ (Acker & McReynolds, 1967; Farley, 1971; Looft & Baranowski, 1971; McCarroll, Mitchell, Carpenter, & Anderson, 1967; McReynolds, 1971). The correlation of the General Scale with the need for change index of the Jackson Personality Research Form (Jackson, 1967) in two studies ranged from 0.39 to 0.60, all significant $p<.01$ (Pearson, 1970; Zuckerman, 1974).

In four studies correlating the General Scale with the Extraversion scale of the Eysenck Personality Inventory (1964), correlations ranged up to 0.58, (Bone & Montgomery, 1970; Farley & Farley, 1967; Farley & Farley, 1970; Zuckerman & Link, 1968). Correlations between Jackson's Personality Research Form (1967) impulsivity index and the SSS in two studies ranged from 0.31 to 0.51, both significant $p<.05$ (Daitzman & Turnilty, 1974; cited in Zuckerman, 1979; Zuckerman, 1974). The most consistent correlation found between the SSS and the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1951) was the hypomania scale for prisoners (Blackburn, 1969) and for psychiatric patients (Daitzman & Turnilty, 1974; cited in Zuckerman, 1979). These are some of the several examples of the relationship of the SSS to other measures of a similar construct. Currently, no studies are available which have investigated the discriminant validity of the SSS-V.

In the sport field, the SSS started to be utilized about 15 years ago, particularly to understand better the interindividual differences within the sensation seeking tendencies in high- and low-risk sport participants. At present, the SSS has proved to be the most reliable and valid psychological instrument to assess the personality trait of Sensation Seeking among athletes (Straub, 1982; Rossi & Cereatti, 1993).

Impulsiveness-Venturesomeness-Empathy Scale - (IVE):

Impulsiveness Scale

The IVE is a 63 item questionnaire which measures three primary personality traits; impulsiveness, venturesomeness, and empathy (Eysenck & Eysenck, 1978). The impulsiveness subscale consists of 24 questions, the venturesomeness subscale consists of 18 questions, and the empathy subscale consists of 21 questions. As noted previously, only the impulsiveness subscale was included in the present study for analysis. Alpha reliability coefficients are given in Table 6 showing that the Impulsiveness reliability appears satisfactory (Eysenck & Eysenck, 1978). The reliability coefficients for internal consistency (Cronbach's Alpha) for scores on the impulsiveness scale obtained by the total current sample was r = .83. Separating the sample into genders males had an alpha of r = .82, and females an alpha of r = .85 for the impulsiveness scale.

**Table 6.** Alpha reliabilities for the three IMP scales for men and women.

| Scale | Men (n = 402) | Women (n = 787) |
|---|---|---|
| Impulsiveness | .851 | .822 |
| Venturesomeness | .791 | .775 |
| Empathy | .654 | .637 |

Adapted from: Eysenck, & Eysenck (1978).

High-Risk Sport Classification and Childhood Experience Survey and Past and Present Sport Involvement.

Based upon past research, several questions were formulated to investigate: (1) subject's judgements regarding what they constitute to be a high-risk sporting activity, (2) possible childhood experiences which may have influenced subject's present day sensation seeking tendencies (e.g., parental influences) and (3) participants past and

present actual and desired involvement in sport. To measure participants desired future involvement in sports thirty eight sporting activities were listed in which subjects endorsed either as "would like to try" (possible score range; 0 to 38) or "would not like to try" (possible score range; 0 to 38). This survey is presented in Appendix B for inspection.

The Complete Research Questionnaire Battery:

(1) the demographic subsection inquired about age, gender, occupation, ethnicity, marital status, and number of children; and participants past and present sporting involvement; (3) the Sensation Seeking Scale (Form V) developed by Zuckerman, Eysenck, & Eysenck (1978); (4) the Impulsiveness scale of the Impulsiveness-Venturesomeness-Empathy Scale, developed by Eysenck & Eysenck (1978), and finally (5) High-Risk Sport Classification and Childhood Experience Survey.

This order of presentation consistent for each subject was an attempt not to influence subject's responses to subsequent questions. For example, the high-risk sport questions were placed at the end to the questionnaire so that responses to this set of questions did not unduly influence a subject's responses to other portions of the questionnaire. Specifically, responses to the Sensation Seeking and Impulsiveness scales. The questionnaire in its final form is reproduced in Appendix B.

# PROCEDURE

Potential participants for each of the eight sport categories were solicited by varying means and were from various locations within New Zealand. The first step usually consisted of a telephone call to prominent people of the eight sports associations chosen, to explain the nature and aims of the present study. For example: (1) Marathon running - 'Executive Director' - Coaching New Zealand; (2) Golf - 'Programme Manager' - New Zealand Golf Association; (3) Swimming - New Zealand swimming team coach - Swimming New Zealand; (4) Aerobics - 'Executive Director' - Auckland Gym; (5) Automobile racing - 'Programme Manager' - Manfield Promotions; 'Committee members' - Local car club; (6) Sky-diving - 'Sky-diving instructors' - Palmerston North and Hawkes Bay Aero Clubs; (7) Hang-gliding - 'Administrator' - New Zealand Hang Gliding and Paragliding Association'; and (8) Mountaineering - 'Administrator' - New Zealand Alpine Association.

Typically, a formal letter was requested by the particular sport association from the researcher, explaining the nature of the research and its purpose, following which the telephone numbers and/or the addresses of potential participants were usually obtained. Potential participants were then either telephoned and/or received a cover letter which described the research and requested their voluntary participation.

If potential participants were contacted by telephone, each received the following information: (a) name of researcher and how their name and telephone number was obtained, (b) this study was being done in fulfilment of one of the requirements for a Master's Degree in Psychology at Massey University, (c) this study was being done because of an interest by the experimenter in investigating why people have preferences for particular sporting activities, (d) the study involved filling out a questionnaire (e) the questionnaire would take approximately 30 minutes to fill out, (f) questionnaires would be posted out to participant with a self-addressed, freepost, return envelope so the participant could fill them out at their convenience, and (g) participation was entirely voluntary.

Each participant was mailed an envelope containing an 'information sheet' (see Appendix A), which provided participants with knowledge about the nature of the study, what was expected of participants in the study, a guarantee of confidentiality, a reminder of the voluntary nature of their decision to participate, and where to obtain information regarding the results of the study when it was completed. Together with the information sheet, participants were mailed the five-part questionnaire, and a self-addressed, freepost, return envelope was additionally included. The questionnaires had a key number so that the particular sport that participant was involved in could be identified when returned. No information which could identify participants was required. Instructions to the participants were clearly described throughout the questionnaire (see Appendix B). Participants were informed (through the information sheet and through the questionnaire) that filling in the questionnaire implied consent.

In order to test the hypotheses regarding the predicted differences between high and low sensation seekers, subjects were classified as either high or low sensation seekers according to their total sensation seeking score (SSStotal - possible range 1 to 40). In the present study, subjects SSStotal scores ranged from 4 to 35. Those subjects who's SSStotal fell within the bottom third (score range; 4 to 19), were classified as low sensation seekers, whereas, if the subjects ssstotal score fell in the top third (score range; 26 to 35), they were classified as high sensation seekers. This classification procedure (based on previous research as suggested by Zuckerman, 1997 - personal communication), resulted in a total of 58 (35 male; 23 female) low sensation seekers, and 55 (45 male; 10 female) high sensation seekers. Subjects who's SSStotal score fell within the middle third (score range; 17 to 25), were classified as medium sensation seekers. Table 7 shows the number of subjects classified as either low, medium or high sensation seekers within each sport.

**Table 7.** Classification of high and low sensation seekers according to sport.

| Sport | Number (Total) | Total Sensation Seekers | | |
|---|---|---|---|---|
| | | Low | Medium | High |
| High-Risk | | | | |
| Hang gliders | 25 | 8 | 9 | 8 |
| Mountaineers | 22 | 4 | 7 | 11 |
| Sky-divers | 11 | 1 | 2 | 8 |
| Automobile Racers | 32 | 15 | 8 | 9 |
| Total | 90 | 28 | 26 | 36 |
| Low-Risk | | | | |
| Swimmers | 22 | 3 | 11 | 8 |
| Marathon Runners | 11 | 9 | 2 | 0 |
| Aerobics | 6 | 2 | 0 | 4 |
| Golfers | 34 | 17 | 10 | 7 |
| Total | 73 | 31 | 23 | 19 |

Chapter 5

# RESULTS

## DESCRIPTIVE ANALYSES

The mean total sensation seeking score (possible range, 0 to 40) for males was 22.90 (SD = 6.18), and for females was 19.07 (SD = 7.00). A significant difference was found between these scores [$t(159) = 3.40$, $p<.001$]. Differences were also found on the Disinhibition (Dis) and Total Sensation Seeking - Thrill and Adventure Seeking (SSS-TAS) scales when the sample was separated by gender. On the Dis scale the mean score for men was 5.91 (SD = 2.38), and for women was 4.02 (SD = 2.64), a significant difference at the .001 level [$t(154) = 4.30$]. Men had a mean score of 15.54 (SD = 5.02) and women 12.62 (SD = 5.19) on SSS-TAS, also a significant difference [$t(159) = 3.28$, $p<.001$]. No significant differences were found on impulsiveness (Imp) between genders ($p > .05$).

As noted to in the previous chapter, the high-risk sport sample had a mean age of 31 years and the low-risk sport sample had a mean age of 27.1 years. A significant difference was found between these groups [$t(116) = 2.05$, $p<.05$] on age. With respect to age, younger participants had higher SS scores than older subjects. Subjects aged 19 or younger (n = 40) and those aged 20-29 (n = 54) scored the highest on total sensation seeking and impulsivness. Table 8 shows the mean scores of the males and females on the SS Scales, Form V within each age group. Figure 1 shows the data for the total score.

Pearson product moment correlation coefficients (r) were computed to indicate potential relationships between age and sensation seeking on each of the SS subscales as well as the Total scale and Impulsiveness. Age correlated negatively with Total Sensation Seeking, $r = -.30$, $p<.001$; and with the Thrill and Adventure Seeking, $r = -.31$, $p<.001$; Disinhibition, $r = -.23$, $p<.01$; Boredom Susceptibility, $r = -.27$, $p<.001$; and Total Sensation Seeking - Thrill and Adventure Seeking, $r = -.24$, $p<.01$, scales for the whole sample. In these correlations, younger participants had higher scores on Total Sensation Seeking, Thrill and Adventure Seeking, Disinhibition, Boredom Susceptibility, and Total

Sensation Seeking minus Thrill and Adventure Seeking (see Table 8).

Analysis found that age for males correlated negatively with Total Sensation Seeking, r = -.31, p<.001, and with the Thrill and Adventure, r = -.31, p<.001, Disinhibition, r = -.29, p<.01, Boredom Susceptibility, r = -.27, p<.01, and Total Sensation Seeking - Thrill and Adventure, r = -.25, p<.01, scales. For the female sample, age correlated negatively with the boredom susceptibility, r = -.38, p< .01, thrill and adventure-out, r = -.40, p<.01, total sensation seeking, r = -.44, p<.01, and impulsiveness, r = -.48, p<.001scales.

**Table 8.** Mean and Standard Deviation scores of males and females on the SS scales by age group.

| Age Groups | N's Male | N's Fem | | Total Score Male | Total Score Fem. | TAS Male | TAS Fem. | ES Male | ES Fem. | Dis Male | Dis Fem | BS Male | BS Fem. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -19 | 22 | 14 | M | 24.96 | 21.40 | 7.84 | 6.73 | 5.33 | 5.67 | 6.74 | 4.64 | 5.12 | 4.53 |
| | | | SD | 3.97 | 5.95 | 7.84 | 5.95 | 1.52 | 2.58 | 1.91 | 1.95 | 1.72 | 2.17 |
| 20-29 | 36 | 15 | M | 24.54 | 20.27 | 7.89 | 7.33 | 5.65 | 5.07 | 6.69 | 4.73 | 4.24 | 3.07 |
| | | | SD | 5.31 | 6.83 | 1.65 | 2.97 | 2.45 | 1.94 | 2.14 | 3.01 | 1.96 | 1.98 |
| 30-39 | 33 | 9 | M | 21.20 | 17.22 | 7.51 | 5.78 | 5.32 | 5.56 | 4.75 | 2.89 | 3.77 | 3.00 |
| | | | SD | 6.82 | 8.36 | 2.11 | 3.19 | 5.32 | 2.55 | 2.43 | 2.67 | 2.22 | 2.60 |
| 40-49 | 15 | 2 | M | 20.63 | 16.00 | 5.56 | 4.00 | 6.00 | 6.50 | 5.60 | 3.50 | 3.73 | 2.00 |
| | | | SD | 7.90 | 5.66 | 2.92 | 2.83 | 2.31 | .71 | 2.29 | 3.54 | 2.09 | 1.41 |
| 50-59 | 2 | 1 | M | 18.00 | 12.00 | 4.50 | 2.00 | 4.00 | 6.00 | 7.50 | 1.00 | 2.00 | 3.00 |
| | | | SD | 1.41 | - | 3.54 | - | .00 | - | 2.12 | - | 2.83 | - |
| 60+ | 1 | 2 | M | 16.00 | 11.33 | 7.00 | 4.00 | 4.00 | 1.00 | 2.00 | 1.50 | 3.00 | 1.50 |
| | | | SD | - | 4.16 | - | 3.65 | - | 1.00 | - | .71 | - | 1.29 |

N's = Numbers; Fem. = Females; M = Mean; SD = Standard Deviation; TAS = Thrill and Adventure Seeking; ES = Experience Seeking; Dis = Disinhibition; BS = Boredom Susceptibility.

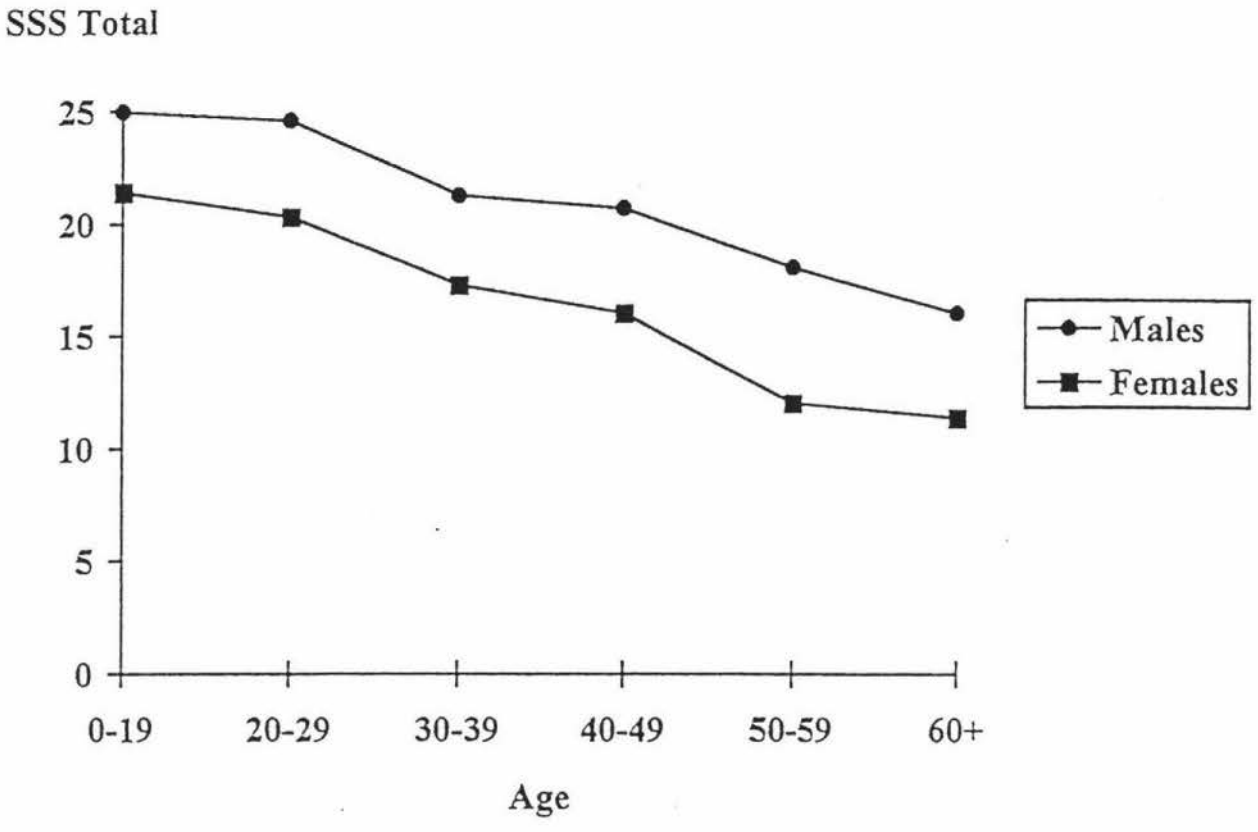


Figure 1. Changes in Total Sensation Seeking Scores as a Function of Age.

# THE HYPOTHESES

*Main Hypothesis 1*

*The personality dimensions of sensation seeking and impulsiveness would be significantly related. That is, significant differences would be found between high- and low-sensation seekers on impulsiveness and that sensation seeking total score would correlate significantly with impulsiveness total score.*

As hypothesized, the high sensation seekers scored significantly (.001 level) higher than the low sensation seekers on impulsiveness (M = 13.47, SD = 4.31; M = 7.58, SD = 4.60; t(108) = -6.92), respectively. A positive and significant correlation coefficient was found between Total sensation seeking and Total impulsiveness score [r = .58, p<.001]. Based on this analyses the main hypothesis one was supported.

*Main Hypothesis 2 (and Specific Hypotheses 1 and 2)*

*High-risk sport participants would score significantly higher on total sensation seeking (main hypothesis) and the other four subscales of the SSS (specific hypothesis 1), and impulsiveness on the IMP scale (specific hypothesis 2) than low-risk sport participants.*

The hypotheses that high-risk sport participants would score significantly higher on total sensation seeking and the other four subscales of the SSS, and impulsiveness, than low-risk sport participants, was tested using one-tailed independent t-tests. The means, standard deviations, and t-values obtained by the two sport categories (i.e., high versus low) on Zuckerman's Sensation Seeking Scale (Form V) and Impulsiveness scale are presented in Table 9.

As shown in Table 9, the high-risk sport group scored significantly higher than the low-risk sport group on SSStotal [t(159) = 2.68, p<.01], ES [t(157) = 3.06, p<.01] and SSS-TAS [t(159) = 2.57, p<.05]. The relationship between sensation seeking and high-risk sport participation, found to be significant on both the SSSTotal and SSS-TAS

variables, shows that the significant difference found on the SSS are general and not due solely to the one scale that includes sports activities (i.e., TAS scale). Although the TAS variable did not meet statistical significance, a trend indicating that the high-risk group tended to score higher than the low-risk group on this variable was shown [$t(131) = 1.94$, $p<.06$]. No significant difference between groups was found on the Imp variable. Based on the above data, high-risk sport athletes have a higher general desire to seek sensations through a variety of experiences as demonstrated on the SSSTotal score and ES subscale compared to low-risk sport athletes.

**Table 9.** Means, standard deviations, and t-values for sport risk categories on the SS scales and Imp.

| Test Components | High-Risk (n = 93) | | Low-Risk (n = 73) | | |
|---|---|---|---|---|---|
| | M | SD | M | SD | t |
| SSS-V | | | | | |
| TAS | 7.41 | 2.16 | 6.64 | 2.78 | 1.94 |
| ES | 5.90 | 2.29 | 4.86 | 1.91 | 3.06** |
| Dis | 5.60 | 2.56 | 5.12 | 2.62 | 1.14 |
| BS | 4.14 | 2.16 | 3.67 | 2.10 | 1.39 |
| SSS-TAS | 15.64 | 5.45 | 13.54 | 4.68 | 2.57* |
| SSSTotal | 23.03 | 6.04 | 20.26 | 6.37 | 2.68** |
| IMP | 10.87 | 4.89 | 10.50 | 5.20 | .65 |

TAS = Thrill and Adventure Seeking; ES = Experience Seeking; Dis = Disinhibition; BS = Boredom Susceptibility; TAS-OUT = Total Sensation Seeking minus TAS; and SSStotal = Total Sensation Seeking; Imp = Impulsiveness.

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

## Comparisons Between Sport Groups:

Because eight sports were investigated in the present study, it was of interest to examine supplementally the different sport groups in more detail, particularly with respect to their scores on the SENSATION SEEKING SCALE and the IMPULSIVENESS SCALE. This information is presented in Table 10. Oneway analyses of variance

(ANOVA) was conducted to see whether the means for each of the subscale scores differed according to sport. The mean scores for the eight sports listed in Table 10 were compared with one another, as well as individually for both sport risk categories.

**Table 10.** Means, standard deviations, and univarite F-values for individual sport categories on the SS scales and the Imp.

| Test Components | High-Risk Sports | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Hang-Gliders (n = 26) | | Mountaineers (n = 23) | | Sky-Divers (n = 11) | | Automibile Racers (n = 34) | | F |
| | M | SD | M | SD | M | SD | M | SD | |
| SSS-V | | | | | | | | | |
| TAS | 8.08 | 1.38 | 8.43 | 1.36 | 7.70 | 1.96 | 6.19 | 2.49 | 7.31*** |
| ES | 5.96 | 2.46 | 7.14 | 1.88 | 7.20 | 1.99 | 4.57 | 1.72 | 8.35*** |
| Dis | 5.46 | 2.87 | 5.29 | 2.53 | 6.50 | 2.32 | 5.51 | 2.51 | .53 |
| BS | 3.96 | 2.39 | 4.33 | 1.91 | 5.30 | 2.11 | 3.94 | 2.17 | 1.14 |
| TAS-OUT | 15.32 | 6.36 | 16.76 | 5.19 | 19.00 | 4.55 | 14.16 | 4.88 | 2.44 |
| SSStotal | 23.28 | 6.83 | 25.19 | 5.80 | 26.70 | 4.52 | 20.38 | 6.68 | 3.83* |
| IMP | 8.96 | 5.09 | 11.05 | 4.59 | 14.20 | 3.88 | 11.47 | 4.80 | 3.15* |
| | Low-Risk Sports | | | | | | | | |
| | Swimmers (n = 22) | | Marathon Runners (n = 11) | | Aerobics (n = 6) | | Golf (n = 34) | | F |
| | M | SD | M | SD | M | SD | M | SD | |
| SSS-V | | | | | | | | | |
| TAS | 7.91 | 1.77 | 4.45 | 3.70 | 7.00 | 2.97 | 6.45 | 2.58 | 4.44** |
| ES | 5.32 | 1.55 | 4.64 | 2.01 | 6.17 | 1.72 | 4.35 | 2.03 | 2.24 |
| Dis | 6.10 | 1.90 | 2.91 | 2.26 | 6.60 | 2.70 | 5.00 | 2.73 | 4.86** |
| BS | 4.59 | 1.65 | 2.00 | 1.10 | 3.00 | 2.35 | 3.72 | 2.29 | 4.78** |
| TAS-OUT | 15.82 | 2.87 | 9.55 | 2.84 | 15.00 | 5.10 | 13.06 | 5.21 | 5.67** |
| SSStotal | 23.73 | 3.89 | 14.00 | 5.76 | 22.00 | 6.99 | 19.68 | 6.27 | 7.68*** |
| IMP | 12.19 | 4.41 | 8.55 | 5.70 | 10.33 | 5.72 | 10.09 | 5.34 | 1.34 |

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

Due to large numbers of post-hoc comparisons for each sport, post-hoc t-tests used a adjusted level of significance using the Bonferroni correction procedure. That is, as six comparisons were investigated (per variable), a .008 level of significance was calculated (e.g., .05 divided by 6 = .008) and applied following a significant ANOVA to indicate possible significant differences between the four sport groups in each risk

category (see Table 10).

High-Risk Sports:

Testing for homogeneity of variance, between the four high-risk sport groups (i.e., Hang-gliders; Mountaineers; Sky-divers; Automobile racers), Bartlett-Box F and Cochrans C tests were non-significant for the ES, Dis, BS, Total Sensation Seeking, and Impulsiveness scales. That is, the variance between groups were equal. This allows for more definitive comparisons between groups on these variables. However, the four groups variances were not homogeneous on the TAS subscale. That is, this variable violated the assumption of homogeneity of variance. Therefore, strong conclusions can not be drawn on this scale.

As shown in table 10, of the high-risk sport groups, the sky-divers had the highest Sensation Seeking mean score followed by the mountaineers, hang-gliders and automobile racers. Oneway analyses of variance (ANOVA) indicated significiant differences between the high-risk sport groups on the TAS, ES, SSSTotal, and Imp variables. Following the Bonferroni correction procedure, post-hoc t-test analyses found that mountaineers scored significantly higher than the automobile racers on TAS [$t(50) = 4.21$, $p<.0001$]. Hang-gliders were found to score significantly higher than the automobile racers on this variable [$t(50) = 3.62$, $p<.001$]. Both mountaineers and sky-divers scored significantly higher than the autombile racers on the ES [$t(49) = 5.05$, $p<.0001$; $t(38) = 4.04$, $p<.0001$] respectively, and SSStotal variables [$t(51) = 2.70$, $p<.008$; $t(40) = 2.79$, $p<.007$] respectively.

Although the Imp variable did not reach statistical significance at the .007 level a trend was indicated -- t-test poc-hoc comparison indicated that sky-divers tended to score higher than hang-gliders on Imp [$t(33) = 2.92$, $p<.01$].

Low-Risk Sports:

In testing for homogeneity of variance between the four low-risk sport groups (i.e., swimmers, marathon runners, aerobic participants, golfers), Bartlett-Box F and Cochrans C tests were both non-significant for all above variables, indicating homogeneity of variance. As shown in table 10, the swimmers had the highest sensation seeking mean of the low-risk sport groups followed by aerobics, golfers and marathon runners. Oneway analyses of variance (ANOVA) indicated significant differences between the low-risk sport groups on the TAS, Dis, BS, SSS-TAS, and SSSTotal variables.

Again following the Bronferroni correction procedure, t-test analyses found that swimmers scored significantly higher than the marathon runners on the BS [$t(31) = 4.69$, $p<.0001$], SSS-TAS [$t(31) = 5.93$, $p<.0001$], and Dis [$t(30) = 4.23$, $p<.0001$] variables. A trend indicated that swimmers also tended to score higher than the marathon runners on TAS [$t(12) = 2.93$, $p<.05$]. In regard to the Dis variable, a trend indicating that the aerobic participants scored higher than the marathon runners was shown [$t(14) = 2.86$, $p<.05$]. As with the above variables, swimmers were found to score sigificantly higher than the marathon runners on SSSTotal [$t(31) = 5.75$, $p<.0001$]. Trends suggesting that both the aerobic participants and golfers scored higher than the marathon runners were indicated [$t(15) = 2.54$, $p<.05$; $t(40) = 2.63$, $p<05$] respectively.

The Eight Sporting Activities:

To compare all eight sports, another Bonferroni correction to account for 28 comparisons adjusted the alpha level to .0018. In testing for homogeneity between the eight sport groups, Bartlett-Box F and Cochrans C tests were non-significant for all the above variables except for the TAS variable. Strong conclusions regarding this subscale therefore can not be made. As can be seen in table 10, of the eight sport groups sky-divers had the highest sensation seeking mean score, followed by mountaineers, swimmers, hang-gliders, aerobic participants, automobile racers, golfers, and finally marathon runners. Oneway analyses of variance (ANOVA) indicated significant

differences between the eight sport groups on all of the above variables, except for the Imp variable: TAS [$F(7,515) = 5.50$, $p<.00001$]; ES [$F(4,148) = 6.30$, $p<.00001$]; Dis [$F(7,145) = 2.31$, $p<.05$]; BS [$F(7,150) = 2.59$, $p<.05$]; SSS-TAS [$F(7,150) = 4.11$, $p<.0001$], and SSSTotal [$F(7,150) = 5.88$, $p<.00001$].

Following Bronferroni correction procedures, post-hoc t-test comparison found that mountaineers scored significantly higher than the marathon runners [$t(11) = 3.44$, $p<.005$], and the golfers [$t(51) = 3.67$, $p<.001$], on TAS. A trend that the aerobic participants tended to score higher than the marathon runners on this variable was also indicated [$t(19) = 2.48$, $p<.05$]. In regard to the ES variable, the mountaineers scored significantly higher than the marathon runners [$t(30) = 3,50$, $p<.001$], and golfers [$t(50) = 5.01$, $p<.0001$]. Sky divers also scored significantly higher than the golfers on ES [$t(39) = 3.88$, $p<.0001$]. In addition, the sky divers were found to score significantly higher than the marathon runners on the BS [$t(19) = 4.56$, $p<.0001$] variable. A trend indicating that the sky divers tended to score higher than the marathon runners on Dis was shown [$t(190) = 3.59$, $p<.002$].

The hang-gliders, mountaineers, and sky divers all scored significantly higher than the marathon runners on SSS-TAS [$t(34) = 3.77$, $p<.001$; $t(30) = 4.27$, $p<.0001$; $t(19) = 5.78$, $p<.0001$] respectively, and SSSTotal [$t(34) = 3.93$, $p<.0001$; $t(30) = 5.19$, $p<.0001$; $t(19) = 5.58$, $p<.0001$] respectively. Several additional trends were found. For example, sky divers tended to score higher than the golfers on SSS-TAS [$t(39) = 3.22$, $p<.003$], and SSSTotal [$t(39) = 3.26$, $p<.002$]. Mountaineers tended to score higher than the golfers on SSSTotal [$t(50) = 3.20$, $p<.002$].

From the above data and in terms of rank order, it appears that the marathon runners, as compared to the other seven sport groups, have the lowest desire to seek sensations. At the opposite end of the sensation seeking continum, sky-divers emerge as the group who had the highest need to seek sensations. This is evident in that they scored the highest on the ES, BS, SSS-OUT, and SSStotal variables. Mountaineers emerged as the next sport group to have a high need for sensation seeking, particularly through

Thrill and Adventure seeking. Swimmers, a sport classified as low-risk appeared to be the third highest ranked high sensation seeking group, followed by the hang gliders, who notably had the second highest score on TAS. The automobile racers followed the aerobic participants, and the golfers presented as the second to lowest sport group on total sensation seeking .

Based on these analyses, main hypothesis Two was supported. Specific hypothesis One found a mixed level of support; specific hypothesis Two was not supported.

*Specific Hypothesis 3:*

*Elite sport participants would score higher on Total Sensation Seeking and the other four subscales of the SSS, and on impulsiveness as compared to the other sporting levels (e.g., club, novice, social/recreational).*

The means and standard deviations obtained by sport levels on each variable are given in Table 11. Testing for homogeneity Barlett-Box F and Cochrans C were non-signifiant - variances were homogeneous. Oneway ANOVA found no significant differences across levels, within the two sport categories, on any of the variables (all p's > .10). Controlling for multiple comparisons (Bonferroni), planned t-test analyses between the high- and low-risk sports, within levels, also found no signficant differences. Thus, specific hypothesis Three was not supported.

**Table 11.** Means and standard deviations by sport level on the SS scales and Imp.

| Test Components | High-Risk Sports | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Elite (n = 45) | | Club (n = 21) | | Novice (n = 12) | | Social (n = 12) | |
| | M | SD | M | SD | M | SD | M | SD |
| SSS-V | | | | | | | | |
| TAS | 7.27 | 1.94 | 7.45 | 2.39 | 8.00 | 1.71 | 7.31 | 2.93 |
| ES | 5.62 | 2.34 | 5.80 | 1.70 | 7.00 | 2.57 | 6.08 | 2.60 |
| Dis | 5.49 | 2.48 | 5.58 | 2.98 | 5.10 | 2.43 | 6.00 | 2.42 |
| BS | 3.97 | 1.93 | 4.55 | 2.33 | 4.42 | 2.47 | 3.85 | 2.51 |
| TAS-OUT | 15.17 | 5.21 | 16.20 | 5.66 | 16.17 | 6.32 | 15.92 | 5.66 |
| SSStotal | 22.39 | 6.22 | 23.65 | 7.03 | 24.25 | 6.89 | 23.23 | 7.51 |
| IMP | 10.78 | 4.81 | 11.50 | 5.41 | 12.55 | 4.68 | 8.77 | 4.21 |
| | Low-Risk Sports | | | | | | | |
| | Elite (n = 53) | | Club (n = 15) | | Novice (n = 0) | | Social (n = 5) | |
| | M | SD | M | SD | M | SD | M | SD |
| SSS-V | | | | | | | | |
| TAS | 6.47 | 2.81 | 7.00 | 2.56 | | | 7.50 | 3.70 |
| ES | 4.94 | 1.94 | 4.57 | 1.50 | | | 4.75 | 3.10 |
| Dis | 5.20 | 2.72 | 5.08 | 2.56 | | | 4.25 | 1.71 |
| BS | 3.82 | 2.11 | 3.47 | 2.23 | | | 2.50 | 1.29 |
| TAS-OUT | 13.85 | 4.78 | 13.00 | 4.42 | | | 11.50 | 4.65 |
| SSStotal | 20.29 | 6.51 | 20.50 | 5.77 | | | 19.00 | 8.04 |
| IMP | 10.76 | 5.32 | 10.67 | 5.04 | | | 7.40 | 4.21 |

*Specific Hypothesis 4:*

*High senstion seekers were hypothesized to score significantly higher on Boredom susceptibility (and impulsiveness, see main hypotheses One) compared to low sensation seekers. Consequently, positive and significant correlations were predicted between Boredom susceptibility and Total Sensation Seeking and between Sensation Seeking subscales and impulsiveness.*

As hypothesized, the high sensation seekers scored significantly (.001 level) higher than the low sensation seekers on impulsiveness (M = 13.47, SD = 4.31; M = 7.58, SD = 4.60; t(108) = -6.92), respectively, and boredom susceptibility (M = 5.53, SD = 1.71; M = 2.44, SD = 1.56; t(110) = -10.00], respectively. Table 12 presents the correlations between the sensation seeking scales and impulusiveness for the sample as a

whole. The impulsiveness scale exhibits moderate positive relationships with the sensation seeking subscales and total scale. Positive and significant correlation coefficients were found between total sensation seeking and boredom susceptibility [r = .67, p<.001], indicating a moderate to strong relationship between this subscale and total sensation seeking.

**Table 12.** Correlations between the sensations seeking scales and impulsiveness.

| | Impulsiveness |
|---|---|
| SSS-V | |
| TAS | .26* |
| ES | .31* |
| Dis | .51* |
| BS | .56* |
| TAS-OUT | .61* |
| SSStotal | .58* |

* p<.001

*Specific Hypothesis 5:*

*High sensation seekers would have a tendency to underestimate the risk involved in their chosen sport compared to low sensation seekers.*

In order to test hypotheses five, subjects were grouped according to their sport (i.e., high versus low), and their sensation seeking status (i.e., high-risk versus low-risk). This categorization was given in Table 7 in the method section. Table 13 shows the total number of subjects who rated their sport to be high-risk. Chi-square was calculated to indicate if the number of subjects who rated their sport to be high-risk (as apposed to low-risk), were significantly different. The Chi-square values are also presented in Table 13.

**Table 13.** Sport risk appraisal by high and low sensation seekers as a function of sport risk category.

| Classification | Risk Appraisal (Sport = High-Risk) Yes | No | x | Sign. p |
|---|---|---|---|---|
| High Sensation Seekers: | | | | |
| in high-risk sports | 16 | 20 | .444 | .51 |
| in low-risk sports | 0 | 19 | 19.0 | .0001 |
| Low Sensation Seekers: | | | | |
| in high-risk sports | 16 | 12 | .571 | .45 |
| in low-risk sports | 1 | 27 | 24.1 | .0001 |

When asked: "Do you consider your sport to be a high-risk activity?", 20 of the 36 (56%) high-risk sports high sensation seekers, answered "No". The remaining 16 (44%) answered "yes". Chi-Square analyses found that this was a non-significant difference. Sixteen of the 28 high-risk sports low sensation seekers (57%) "yes" to the above question. The remaining 12 thus answered "no". Again, Chi-Square analyses found this to be a non-significant difference. None of the 19 low-risk sports high sensation seekers considered their sport to be high risk, and 27 (90%) of the low-risk sports low sensation seekers answered "no" when asked if they considered their sport of be high-risk, which one would expect. Thus, based upon the above analyses, high sensation seekers do not have a tendency to underestimate the risk involved in their sport compared to low sensation seekers. Particularly notable is the non-significant difference found between the high-risk sports - high sensation seekers risk appraisal. Underestimation of risk here was not a function of sensation seeking level. Specific hypothesis Four was not supported.

*Specific Hypothesis 6:*

*High sensation seekers would be aware of potential risks involved in their chosen sport but simply accept these risks as part of the sport. As such, high sensation seekers accept the risks involved in their sport as they have a high need for experience seeking. First, positive correlations were expected between Total Sensation Seeking and Experience Seeking. Furthermore, it was predicted that high sensation seekers low risk appraisal would be explained by the subjects trust in their equipment, knowledge and skills.*

A positive correlation cofficient (.69) was found between total sensation seeking and experience seeking ($p<.001$). Many of the high sensation seekers were aware of the acute risks associated with their chosen sporting activity, as they were directly familiar with cases of injury. Frequency data revealed that 63 percent (34 of 54) of the high sensation seekers had been injured as a result of their current sport. As a result of their injuries, only 2 (5%) of the high sensation seekers had decreased their involvement in their sport. The remaining 95% (32 of 34) continued participating in their sport at the same level as prior to their injury. When asked "why has your participation level not decreased as a consequence of your injuries"?, 54% (19 of 34) of the high sensation seekers said that their injuries were only minor and were not long term, 11% (4 of 34) said that they had made improvements in their techniques as a result of being injuried (i.e., their injury was a learning experience), 9% (3 of 34) said that injuries were a part of their sport, and 9% (3 of 34) said that they put up with their injuries. One high sensation seeking subject reported that his level of participation did not decrease as he did not die from his injuries.

From this data it appears that high sensation seekers generally report injuries and these injuries do not preclude continued high-risk sport participation. It appears that high sensation seekers accept the risks associated with their sport, and they have a high need for experience seeking.

When asked list the characteristics of a high-risk sport, 27 of the 55 (49%) high sensation seekers considered 'injury and death' as the primary characteristic. On examination, statistics showed that 10 the 55 (18%) high sensation seekers also considered that a high risk sport involved 'great skill and knowledge'. Based on this data about half of the high sensation seekers believe that for a sport to be considered a 'high risk activity' it must involve a high degree of risk for injury or death, and that about 1 in 5 believe a person practicing the sport must have a high level of skill and knowledge to avoid the risks associated with that sport. The most frequently reported high-risk sport characteristics reported by the high sensation seeker sample are presented in Table 14 (from the narratives coded by the researcher). Other high-risk sport characteristics reported by the high sensation seekers are presented in appendix C.

**Table14.** The ten most frequently reported high-risk sport characteristics by high sensation seekers.

| Self-reported high-risk sport characteristics | | | |
|---|---|---|---|
| 1. | injury and death (27) | 6. | Depends on saftey involved (4) |
| 2. | Great skill and knowledge (10) | 7. | Rugby (4) |
| 3. | Objective vs perceived risk (6) | 8. | Heights (3) |
| 4. | No contol of external factors (5) | 9. | Risks of error (3) |
| 5. | Speed-impact (5) | 10. | Dangerous (3) |

( ) = Number of sensation seekers who endorsed characterisation. Responses with the same number of subjects have been listed in alphabetical order.

*Specific Hypothesis 7:*

*In contrast to low sensation seekers, high sensation seekers were predicted to be currently involved in more sporting activities.*

In addition to a subjects most current sporting activity (i.e., hang-gliding, sky-diving, swimming etc), 39 (30 males; 9 females) of 53 (74%) high sensation seekers and 30 (20 males; 10 females) of the 58 (52%) low sensation seekers participated in other sports besides their most current sporting activity. Pearson Chi-Square analyses revealed this to be a significant difference [$x = 5.63$, $p<.05$]. From this analyses, it appears that the high sensation seekers, as compared to the low sensation seekers, generally participate in more than one sporting activity at a time. Specific hypothesis Seven was supported.

*Specific Hypothesis 8:*

*Positive correlations were predicted between the sensation seeking scales and (1) number of activities actually tried; and (2) number of new activities that "would like to be tried". It was also expected that high sensation seekers would have tried more sporting activities than compared to low sensation seekers and to indicate a desire to engage in more new sporting activities. Negative correlations were predicted between the sensation seeking scales and number of new activitives a subject "would not like to try".*

The hypothesis that high sensation seekers would have tried more sporting activities when compared to the low sensation seekers was tested first. Comparisons between the two groups (i.e., high versus low) using the total sample revealed that the high sensation seekers had a mean score of 21.31 out of a possible total score of 38 (total number of activities) (SD = 5.4), whereas the low sensation seekers had a mean score of only 16.40 (SD = 7.7). T-test comparisons indicated a significant difference [$t(100) = -3.93$, $p<.0001$]. It appears from the above analyses that the high sensation seekers, as compared to the low sensation seekers, have tried more of the listed sporting activties.

It was also of interest to look at the possible differences between genders in the high and low-risk sensation seeking groups (e.g., male high sensation seekers versus male low sensation seekers). The high sensation seeking male's had higher participation scores as compared to the low sensation seeking male's (M= 21.47, SD = 5.72; M = 16.43, SD = 8.13 respectively). One tailed independent t-test showed a significant difference between the male high and low sensation seekers participation scores [$t(59) = -.3.11$, $p<.01$]. The high sensation seeking female's, as compared to the low sensation seeking female's, produced a higher participation score (M = 20.60, SD = 3.63; M = 16.36, SD = 7.06 respectively), and this comparison also indicated a significant difference [$t(29) = -2.24$, $p<.05$].

Pearson product moment correlation coefficients (r) were computed for each gender, and the whole sample, to see if relationships between the number of activities tried and the variables under investigation were different for males and females (see Table 15). For males, the number of activities tried were positively and significantly correlated with the ES and TAS scores as well as the total score, while BS and Dis factors were positively related but correlations did not reach significance. For females, the number of activities tried were positively and significantly correlated with TAS and total scores. While the ES, BS, and Dis scores were positively related, they did not reach significance.

**Table 15.** Correlations between number of activitives tried and sensation seeking scales for males and females.

| | n | SSStotal | ES | BS | Dis | TAS |
|---|---|---|---|---|---|---|
| Tried Activities | | | | | | |
| Males | 108 | .36** | .29* | .07 | .12 | .54** |
| Females | 43 | .44* | .28 | .11 | .23 | .54** |
| Total Sample | 151 | .38** | .29** | .09 | .16 | .53** |

n = number of subjects. *p<.01, **p<.001

Table 16 shows the correlations between the number of new activities that would like to be tried and the sensation seeking scales for both males and females. As shown the variable of 'like to try' correlated positively (.01 level) with TAS for both the male and female subjects. While the other scales were correlated, they did not reach signifiance. Data in Table 16 indicates that, the number of new activities listed as those a subject (males and female) would like to try relates significantly to a high desire for thrill and adventure.

**Table 16.** Correlations between number of new activities like to be tried and the sensation seeking scales for males and females.

| | n | SSStotal | ES | BS | Dis | TAS |
|---|---|---|---|---|---|---|
| Like to Try | | | | | | |
| Males | 105 | .22 | .07 | .12 | .14 | .30* |
| Females | 43 | .28 | -.11 | .15 | .27 | .41* |
| Total Sample | 148 | .21* | .01 | .11 | .14 | .32** |

n = number of subjects. *p < .01 **p<.001

High sensation seeking males produced the largest number of "would like to try" scores (M = 8.51, SD = 4.36), as compared to the low sensation seeking males (M = 6.51, SD = 3.63) A significant difference was indicated between these means at the .05 level [t(77) = 2.56]. High sensation seeking males have more desire to want to engage in more new sporting activities as compared to the low sensation seeking males. The high sensation seeking females produced the largest proportion of would like to try responses as compared to the low sensation seeking females (M = 9.70, SD = 4.57; M=8.59, SD = 5.36) respectively. These means however, were not significantly different (p>.05).

The low sensation seeking females' three most desired new activities were: flying, windsurfing, and scuba-diving, while the high sensation seeking females' five most desired new activities were: auto-car racing, archery, flying, kayaking, and white water rafting. The low sensation seeking males' four most desired new activities were: windsurfing,

flying, parachuting, and scuba-diving, while the high sensation seeking males' five most desired new activities were: parachuting, flying, scuba-diving, and auto-car racing.

The number of activities listed as those the respondents "would not like to try" correlated negatively and significantly with SSStotal, r = -.48, p<.001, with ES, r = -.31, p<.001, and with TAS r = -.72, p<.001, for males. The number of new activities females said they would not like to try correlated negatively and significantly with SSStotal, r = -.64, p<.001, with Dis, r = -.41, p<.01, and with TAS, r = -.84, p<.001. This data is presented in Table 17.

**Table 17.** Correlations between number of new activities not like to be tried and the sensation seeking scales for males and females.

| | n | SSStotal | ES | BS | Dis | TAS |
|---|---|---|---|---|---|---|
| Not like to try | | | | | | |
| Males | 102 | -.48** | -.31** | -.14 | -.21 | -.72** |
| Females | 43 | -.64** | -.29 | -.16 | -.41* | -.84** |
| Total Sample | 145 | -.52** | -.31** | -.14 | -.26** | -.74** |

n = number of subjects. *p<.01, **p<.001.

The low sensation seeking males' lack of desire to try new activities is evident in that this group produced the highest proportion of "would not like to try" scores (M = 14.94, SD = 8.10), as compared to the high sensation seeking males' (M = 7.74, SD = 5.52). A significant difference was indicated at the .001 level [t(53) = 4.47]. The low sensation seeking female group produced the highest scores on "no desire to try new activities" (M = 13.09, SD = 8.15), as compared to the high sensation seeking females (M = 7.70, SD = 4.11). A significant difference between means at the .05 level [t(29) = 2.45] was indicated. Thus, findings here indicate that if an individuals sensation seeking tendencies are low then it is likely that their desire to not engage in new sporting activities will tend to increase. In general, the hypotheses tested in this section were supported.

*Specific Hypothesis 9:*

*It was predicted that high sensation seekers would have engaged in more high-risk behaviour as children compared with the low sensation seekers. In line with this prediction, it was expected that high sensation seekers would 'rate' their parents as more adventureous than would low sensation seekers who were expected to indicate low ratings of parental adventureousness. It was further hypothesized that high sensation seekers would rate their parents as less 'protective' than would the low sensation seekers.*

Frequency data indicated that 21 of the 58 (36%) low sensation seekers reported that they frequently engaged in 'high-risk' behaviour as children. By contrast, 39 of the 55 (71%) high sensation seekers reported to frequently engaged in high-risk behaviour as children. High sensation seekers engaged in more risk behaviour as children compared with the low sensation seekers as indicated by a significant chi-square analyses [$x = 14.58$, $p<.001$].

Table 18 shows the ratings of parental adventureousness according to self-reports from the high and low sensation seekers. Table 19 shows the ratings of parental protectiveness according to the self-reports of the high and low sensation seekers. As shown in Table 18, the majority of the low sensation seekers (92%) 53 of 58 rated their parents moderate or below in adventureous (i.e., somewhat, not at all). Eighty-two percent (45 of 55) of the high sensation seekers rated their parents moderate or low in adventureousness. Chi-square analyses revealed these frequencies to be significantly different [$x = 6.52$, $p<.05$].

Thirty four of 55 high sensation seekers (62%) rated their parents as average or above (62%) in adventureousness (i.e., very, extremely) whereas only 34% (20 of 58) of the low sensation seekers rated their parents as average or above in adventureousness. Chi-square analyses revealed the difference between these differences to be nonsignificant [$x = 9.20$, $p>.05$]. However, Chi-Sqaure analyses did approach signifance ($p=.056$). That is, the frequencies were in the expected direction. The hypothesis that the high sensation seekers would rate their parents as more adventureous than would the low sensation

seekers was not entirely supported.

**Table 18.** Parental adventureousness ratings.

| Parental Adventureousness | High Sensation seekers (n = 55) | | Low Sensation Seekers (n = 58) | |
|---|---|---|---|---|
| | Frequency | % | Fequency | % |
| Extremely Advent. | 1 | 2 | - | - |
| Very Advent. | 9 | 16 | 5 | 9 |
| Moderately Advent. | 24 | 44 | 15 | 26 |
| Somewhat Advent. | 10 | 18 | 16 | 28 |
| Not at all Advent. | 11 | 20 | 22 | 38 |

Percentages rounded to the nearest whole number. Advent. = Adventureousness.

**Table 19.** Parental protectiveness ratings.

| Parental Protectiveness | High Sensation Seekers (n = 55) | | Low Sensation Seekers (n =58) | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| Extremely Protective | 3 | 6 | - | - |
| Very Protective | 14 | 26 | 12 | 21 |
| Average | 20 | 36 | 33 | 57 |
| Somewhat Protective | 14 | 26 | 9 | 16 |
| Not at all Proctective | 4 | 7 | 4 | 7 |

Percentages rounded to the nearest whole number.

As shown in Table 19, many of the high and low sensation seekers rated their parents as average in protectiveness. Chi-square analyses found no significant differences between the high and low sensation seekers on ratings of parental protectiveness (all p's > .05). However, Chi-square analyses approached significance (p=.06) for the upper three protectiveness ratings (i.e., average, very, extremely). Although this was non-significant, the upper three ratings were in the expected direction. That is, the low sensation seekers reported their parents higher in protectiveness compared to the high sensation seekers.

However, despite these trends, this hypothesis was not supported. Taken together the hypotheses in this section found mixed supported. Specific hypotheses related to childhood risk behaviour was supported. On the other hand, contradictory to hypothesis, no differences were found between risk groups as a function of increased parental adventureousness or parental protectiveness.

*Specific Hypotheses 10:*

*It was hypothesized that subjects who were currently engaged in high-risk sports would have a higher socioeconomic status compared to those engaged in low-risk sports.*

Subjects were classified according to the New Zealand Socioeconomic Indices (Johnston, 1983). There are nine major groups within this classification system; 1 = professional, technical and related workers; 2 = administrative and managerical workers (e.g., directors, managers); 3 = clerical and related workers ; 4 = sales workers; 5 = service workers; 6 = agricultural, animal husbandry and forestry workers, fisherpersons and hunters; 7, 8, 9 = production and related workers, transport equipment and operators and labourers not elsewhere classified. The percentages of subjects within each index are given in Table 21.

Chi-square analyses indicated significant differences between the high- and low-risk sport groups on socioeconomic status ($x = 55.32$, $p<.000001$). As shown in Table 20, the high-risk sport group had a higher proportion of subjects, 48 of 90 (51%) in the upper socioeconomic ranges (i.e., professionals; administrative -managerical), as compared to the low-risk sport group who only had 22% (12 of 73) of subjects as classified in these socioeconomic ranges. Chi-square analyses revealed this to be a significant difference ($x = 9.68$, $p<.01$). Fourty-three percent (31 of 70) of the low-risk sport group were students, whereas only 11% (10 of 90) of the high-risk group were classified as students. Chi-square analyses revealed that this was a significant difference ($x = 15.80$, $p<.01$). These analyses indicated that a greater proportion of the high-risk sport group, as compared to the low-risk sport group, had a higher socioeconomic status. This hypothesis was supported.

**Table 20.** Socioeconomic status of the high and low risk sport groups.

| Indices | High-Risk Group (n = 93) Frequency | % | Low-Risk Group (n = 73) Frequency | % |
|---|---|---|---|---|
| Professional - Technical | 19 | 20 | 2 | 8 |
| Administrative - Managerical | 29 | 31 | 10 | 14 |
| Clerical | 13 | 14 | 8 | 11 |
| Sales | 17 | 18 | 3 | 4 |
| Service | 4 | 4 | 6 | 8 |
| Agricultural (animal, forestry, fisherperson, hunters) | 1 | 1 | 1 | 1 |
| Production | - | - | 1 | 1 |
| Transport | - | - | - | - |
| Labourers | - | - | - | - |
| Student | 10 | 11 | 31 | 43 |
| Unemployed | - | - | 2 | 3 |
| Other | - | - | 9 | 12 |

Percentages rounded to the nearest whole number.

## Supplementary Analyses

As subjects were asked 'why they participate in their current sporting discipline', it was of interest to look at their various reasons. The subject's first three (3) responses ('reasons') were used for this purpose. Responses were grouped, and ranked from the most frequently stated reason for participation to the least frequently stated reason. Responses are given for both the high- and low-risk sport categories. Reasons for participation in either the high- or low-risk sports are presented in Table 21.

**Table 21.** Sport participations reasons according to high- and low-risk sport participants.

| Reason | Sport Participants | | | |
|---|---|---|---|---|
| | High-Risk | | Low-Risk | |
| 1 | Fun / Buzz / Adrenalin | (33) | Enjoyment | (25) |
| 2 | Challenge | (29) | Fitness Physical and Mental | (23) |
| 3 | Outdoors environment | (18) | Social - Friendships | (22) |
| 4 | Social - Friendships | (14) | Achievement Reaching Goals | (17) |
| 5 | 'Love - Passion' | (12) | Competition | (12) |
| 6 | Excitment | (11) | Challenge | (11) |
| 7 | Enjoyment | (11) | Becoming Professional | (10) |
| 8 | Personal Development | (10) | Good at it - "natural" | (6) |
| 9 | Competition | (8) | Travel | (6) |
| 10 | Achievement reaching goals | (6) | Fun / Buzz | (4) |
| 11 | Speed | (5) | Outdoors environment | (4) |
| 12 | Family Involved | (5) | 'Love - Passion' | (4) |
| 13 | Always involved | (5) | Relaxation / Stress Release | (4) |
| 14 | Good at it - "natural" | (5) | Personal Development | (2) |
| 15 | Freedom | (4) | Independent - Individual | (2) |
| 16 | Independent - Individual | (3) | Training | (2) |
| 17 | Risk / Danger | (3) | Family Involved - 'in blood' | (2) |
| 18 | Fitness physical and mental | (3) | Health | (2) |
| 19 | Sensations | (3) | Occupation | (2) |
| 20 | Adventure | (2) | Addicitive / Captervating | (2) |
| 21 | Relaxation | (2) | Hobby | (1) |
| 22 | Cheep - Affordable | (2) | Glamerous - Recognition | (1) |
| 23 | Occupation | (1) | Excitment | (1) |
| 24 | Addictive - Captervating | (1) | Representing Country | (1) |
| 25 | Assessable | (1) | Unpredictable | (1) |
| 26 | 'Alive feeling' | (1) | | |
| 27 | Flowing Adol | (1) | | |
| 28 | Pay back people (i.e., money) | (1) | | |
| 29 | Good for bussiness | (1) | | |
| 30 | Becoming professional | (1) | | |
| 31 | Recreation | (1) | | |
| 32 | 'Bloody Awesome' | (1) | | |
| 33 | Non-Contact | (1) | | |
| 34 | Glamerous / Recognition | (1) | | |
| 35 | Pushing Limits | (1) | | |

( ) = Number of participants which gave listed reason.

Chapter 6

# DISCUSSION

The present study set out to investigate the sensation seeking tendencies of high- and low-risk sport participants, in an attempt to test Zuckerman's (1994) Impulsiveness-Sensation Seeking theory (ImpSS) and associated hypotheses. For clarity and ease of comprehension, this chapter first provides an integrated summary of the main findings and then presents more specific findings.

## SUMMARY OF MAJOR FINDINGS

Findings provided support for the main idea put forward by Zuckerman's (1994) ImpSS theory, and one of the main hypothesis of this study suggesting that sensation seeking is integrated within a broader trait called -- 'Impulsive-Sensation Seeking'. Two important findings provided this support: (1) the significant differences found between the high and low sensation seekers on impulsiveness, -- the high sensation seekers scored significantly higher -- and (2) the positive and significant correlations between the SS scales and the impulsiveness dimension. Freixanet (1991), also found positive and significant correlations between the SS (form V) scales and impulsiveness. Freixanet (1991) results are comparable with the present findings as Freixanet also utilized the Impulsiveness scale of the Impulsiveness-Venturesomeness-Empathy Questionnaire (Eysenck & Eysenck, 1978).

No significant differences however, were found between the high- and low-risk sport groups on the impulsiveness scale. These results are connected with those of Freixanet (1991) and Kerr and Svebak (1989) findings. Freixanet (1991), found that the target sports groups (alpinists; mountaineering related sportsmen; sportsmen engaged in 'risk' sports - scuba diving, parachuting, hang-gliding, etc.), did not differ from a control group (those not engaged in any risky sports activity), on the Impulsiveness scale. Kerr and Svebak (1989) also found that those engaged in risky sports did not differ from those engaged in non-risky sports on the impulsiveness dimension.

A possible explanation for the non significant differences found between the high- and low-risk sport participants on the impulsiveness dimension is that Zuckerman's ImpSS theory is particularly focused towards the hypothesized differences between high and low sensation seekers as opposed to high- or low-risk sport participation. Thus, based upon the current findings, it appears that individuals' sensation seeking tendencies (i.e., high versus low) maybe related more to their impulsiveness tendencies (i.e., high versus low) rather than their participation in risky sporting endeavours.

Although no significant differences were found between the target sport groups (i.e., high versus low-risk) on the impulsiveness dimension, the athletes who were participating in the high-risk sports (i.e., hang-gliding, mountaineering, sky-diving, automobile racing) did, as hypothesized (main hypothesis Two), score significantly higher in Total Sensation Seeking than those participating in the low-risk sports (e.g., swimming, marathon running, aerobics, golf). These results are consistent with the findings of Calhoon (1988), Cronin (1991), Fowler et al., (1980), Freixanet (1991), Hymbaugh and Garrett (1974), Robinson (1985), Straub (1982), and Wagner and Houlihan (1993), who all found that their high-risk sport samples tended to score higher on total sensation seeking than their low-risk sport samples or norm groups. Importantly, the present data also provides support for Zuckerman's (1994) ImpSS model regarding the hypothesis that high sensation seekers are more likely to engage in sports which offer new and potentially arousal increasing experiences.

The high- and low-risk sport participants also differed significantly on the following sensation seeking subscales; (a) Experience Seeking, and (b) Total Sensation Seeking Minus the Thrill and Adventure Seeking subscales. Differences on the TAS-SSS indicate that differences on the Scale were general and not due solely to the one scale that included sports activities (i.e., TAS scale). These results are consistent with those of previous studies (e.g., Freixanet, 1991; Rowland et al., 1986).

By contrast, the Thrill and Adventure Seeking subscale itself, and the Boredom Susceptibility subscale did not significantly differentiate between the high- and low-risk sport participants. Though the difference on both of these subscales were not significant, scores were in the expected direction (i.e., high risk scoring higher than the low-risk sport participants). Larger samples of participants may be needed to detect actual significant differences. That issue notwithstanding, these findings did not support the hypotheses: "high-risk sport participants would score significantly higher than low-risk sport participants on all subscales of the SSS". It is interesting that the Thrill and Adventure Seeking subscale -- which contains mainly sports items (e.g., I would like to try parachute jumping) -- did not differentiate between the two sport groups. This finding may reflect the fact that high- and low-risk sport participants are not able to be differentiated on the basis of this subscale. On the other hand, the low-risk sport group had a higher number of younger participants (i.e., 19 or younger). This age bias may have influenced participants responses to the Thrill and Adventure Seeking questions as age has been found to influence particular sensation seeking tendencies (e.g., Zuckerman, 1979).

Another notable finding of the present study was the failure of the Disinhibition subscale of the sensation seeking measure to distinguish between high- and low-risk sport participants. Zuckerman (1979, p.103) defined Disinhibition as: "a more traditional type of sensation seeking, which seeks release and social Disinhibition through drinking, partying, gambling, and sex". Zuckerman (1979) also indicated that Disinhibition "reflects a traditional pattern of non-conformity through rebellion against strict codes about acceptable social behaviour" (p.103). Most athletes are not considered to be rebellious and possess more conforming life-styles (Straub, 1982). Thus, while the study's hypothesis was not supported by this finding, it is not that surprising to find that Disinhibition was not a feature of their self-reported profiles. Zuckerman (personal communication, cited in Straub, 1982) himself stated that "Disinhibition is not an aspect of sensation seeking that is necessarily characteristic of athletes in many sports" (p.252).

Significant differences on total score and subscales were found when comparing participation in high- versus low-risk sports. Particularly notable was the finding that the

sky divers and mountaineers commonly scored significantly higher than the marathon runners on all of the Sensation Seeking scales. It would appear that sensation seeking is less relevant to this low-risk sport than it is the high-risk sports of sky diving and mountaineering. Those individuals who participate in specific high-risk sporting activities, especially those of mountaineering and sky-diving, appear to have higher general and specific sensation seeking dispositions than participants in particular low-risk sporting activities.

A surprising finding of the present study was that the swimmers (an a priori low-risk sport classification), obtained a higher total sensation seeking mean score than did either the hang-gliders or automobile racers. Although the differences between these means were limited to statistical trends, this finding is nevertheless notable. It is possible that some of the between-groups variance in sensation seeking among the high- and low-risk sport participants may have been due to the mean age differences between the high- and low-risk sport athletes. As mentioned previously, the swimmers had a mean age of 17 years, whereas the automobile racers and hang-gliders had a mean age of 32 and 31 years, respectively. As discussed in previous chapters, sensation seeking tendencies appear to increase with age until some time in adolescence and then decreases through adulthood into old age (Berlyne, 1960; Kish, 1966; Zuckerman, 1979; Zuckerman et al., 1978). Zuckerman (1979) postulated that an explanation for the decline in sensation seeking with age might be that "experience in life leads to increasing conservatism and decreased risk taking" (p.126). In the present study, swimmers were younger. Because the hang-gliders and automobile racers were approximately 15 years older than the swimmers, their lower sensation seeking scores may have been related to their increasing age.

Taken together, results provided support for the main hypotheses of the present study. That is, the personality dimension of sensation seeking and impulsiveness were significantly related, and total sensation seeking tendencies reliably differentiated between high- and low-risk sport participants.

## SUMMARY OF FINDINGS RELATED TO SPECIFIC HYPOTHESES

Taken together, the results of the present study provided mixed support for more specific hypotheses derived from Zuckerman's ImpSS theory -- that is, while the main hypotheses found support, some of the singular hypotheses (i.e., hypotheses 1-10) were supported, some had a mixed level of support, others found no level of support. These findings are now discussed.

Results indicated that high sensation seekers in the sport domain tend to be more impulsive, had a higher susceptibility to boredom, and tended to have more desire to seek new experiences through a variety of sporting activities compared to low sensation seekers and thus supported relevant hypothesis. Consistent with these findings is the significantly larger number of activities previously tried by the high sensation seekers, the significantly greater number of activities the high sensation seekers indicated they would like to try in the future, and the significantly larger number of high sensation seekers reporting that they generally participate in more than one sporting activity at a time. These latter results are similar to Rowland et al., (1986) findings that showed that high sensation seekers tended to become involved in more sports than did low sensation seekers but that low sensation seekers tended to remain involved with any one sport for longer periods of time.

Findings of the present study supported Zuckerman's (1994) definition of a 'sensation seeker': "the seeking of varied ... sensations and experiences, and the willingness to take physical ... risks for the sake of such experiences". Along with the findings previously discussed in this and the previous section, the positive correlations between (a) the number of activities tried and Total Sensation Seeking, (b) the number of activities tried and Experience Seeking; (c) the number of activities tried and Thrill and Adventure Seeking; (d) the number of activities that would like to be tried and Total Sensation Seeking (e) the number of activities that would like to be tried and Thrill and Adventure Seeking; and (f) the moderate to strong relationship found between total sensation seeking and Boredom Susceptibility and total sensation seeking and Experience

Seeking provided additional support for the sensation seeking construct.

The development of an individual's sensation seeking tendencies has been hypothesized to begin to form from early childhood based in part on the role of the family environment and, in particular, parental influences (Zuckerman, 1994). Zuckerman hypothesised that high sensation seeking parents are likely to encourage sensation seeking exploration in their children whereas low sensation seeking parents, frightened by potential risks, would be more likely to attempt to discourage sensation seeking behaviour in their children. The finding that the high sensation seekers in the present study tended to engage in more risk behaviour as children compared to the low sensation seekers appears to provide at least some foundational support for this hypothesis.

More specific findings did not support Zuckerman's family environment hypothesis. That is, the present study found no relationship between levels of sensation seeking and participant's reports of their parents level of adventurousness or protectiveness. These findings are supported by other previous findings that have cast doubt on the singular role of the family environment. An earlier study of sensation seeking (Fulker, Eysenck, & Zuckerman, 1980), showed no influence of shared environment on the sensation seeking trait. Fulker et al., (1980) analyzed the genetic and environmental contributions to the trait of sensation seeking using a large sample of twins (442 pairs). Results showed that 58% of the general sensation seeking trait was heritable. There was no evidence of a shared family environmental influence. Taken together, the current findings combined with those of previous studies suggests that childhood and adult risk behaviour are related; however, the role of familial influences is unclear and needs further clarification in future research.

Zuckerman (1994) hypothesised that high sensation seekers do not always take risks simply for the sake of risk itself. When they do take risks, the point of the activity is thought not to be risk per se but new experiences and its associated arousal. High sensation seekers may even seek to minimize the risk in certain instances (e.g., taking full advantage of safety equipment, skills and knowledge). This hypothesis was moderately

supported. A majority of the high sensation seekers in the present study were aware of the risks involved in their chosen sport (i.e., through injuries), but they simply accepted these risks as part of the sport through continued participation. In addition, a number of the high sensation seekers (20%) considered 'great skill and knowledge' to be an important characteristic of a high-risk sport. In fact, these two attributes were the top two ranked characteristics of high-risk sports as identified by the high sensation seekers. These results are similar to Piet's (1987) findings using six stunt people (classified as a risky occupation) as subjects. All six subjects reported that the actual risks of their jobs were "relatively small" precisely because of their skill and planning. They reported feeling capable of reducing the risks to a minimum through careful preparation and experience and skills, and concentration at the time of a stunt. Thus, it appears that high sensation seekers in high-risk sports may be prepared to put up with a high degree of risk to achieve their goals (e.g., new and varied experience) but, at the same time, some will mitigate this risk in various ways through increased skill and relevant knowledge.

These findings may explain why the high sensation seekers who participated in high-risk sports did not have a tendency to underestimate the risk involved in their chosen activity. Straub (1982) also found that the majority of participants in both hang-gliding and automobile racing did not underestimate -- they accepted their sport as a high-risk endeavour. This earlier finding notwithstanding, the above results are surprising as a number of past studies (e.g., Heyman & Rose, 1980; Potgieter & Bischoff, 1990; Zuckerman, 1979), have found that high sensation seekers show a tendency to underestimate risk. However, it may be the case that some high-risk sport participants are realistic in their risk appraisal of their given sport for various reasons, some of which have been discussed previously. Whatever the case, future research is needed to clarify these contradictory findings.

The high-risk sport group was found to have a higher proportion of subjects in the upper socioeconomic levels as compared to the low-risk sport group. This finding provides support for the hypothesis that socioeconomic aspects of an individual's environment determines the range of possible sensation-seeking expressions. That is, for

the upper classes there is a wider range of capitalized possibilities available (e.g., sports, cars, travel), whereas available or surplus capital resources in the lower classes may limit the range of possible sensation seeking expressions. However, as the low-risk sport group in the present study had a higher proportion of subjects who were students compared to the high-risk sport group, and the socioeconomic index used to assess socioeconomic status is considered to be relatively old (i.e., 1983) in terms of today changing occupations, strong conclusions can not be drawn based on this finding. One must also be aware that not all high- and low-risk individuals fall into these potentially stereotypical categories. For example, Brannigan and McDougall (1983) found that there was no obvious trend in the types of occupations that hang-gliders were associated with in terms of socioeconomic status.

The present study did not find support the prediction that elite sport participants would score significantly higher on the Sensation Seeking scales, and impulsiveness measures, compared to other sporting levels (i.e., club, novice, recreational). However, the above findings are consistent with Davis and Mogk's (1994) study that found no evidence that elite athletes could be distinguished from other groups (e.g., subelite, recreational sport enthusiasts, non-athletes) on sensation seeking and other personality dimensions (e.g., extraversion, neuroticitism, psychoticism, achieving tendency).

Due to the large number of hypotheses tested in the present study a summary is warranted at this time (see Table 22).

**Table 22.** Summary of findings.

| Hypotheses | Level of Support |
|---|---|
| **MAIN** | |
| 1. The personality dimensions of sensation seeking and impulsiveness would be significantly related. That is, significant differences would be found between high- and low-sensation seekers on impulsiveness and that sensation seeking total score would correlate significantly with impulsiveness total score. | **Supported** |

| | | |
|---|---|---|
| 2. | Total Sensation seeking would differentiate between high- and low-risk sports participants. | **Supported** |

**SPECIFIC**

| | | |
|---|---|---|
| 1. | High-risk sport participants would score significantly higher on the Sensation Seeking subscales than low-risk sport participants. | **Mixed Support** |
| 2. | High-risk sport participants would score significantly higher on Impulsiveness than low-risk sport participants. | **No support** |
| 3. | Elite sport participants would score significantly higher on the Sensation Seeking scales and Impulsiveness compared to other sporting levels (i.e., club, novice, recreational). | **No Support** |
| 4. | High sensation seekers would score significantly higher on Boredom Susceptibility (and impulsiveness) compared to low sensation seekers. Consequently positive and significant correlations were predicted between Boredom Susceptibility and Total Sensation Seeking and between Sensation Seeking subscales and Impulsiveness. | **Supported** |
| 5. | High sensation seekers would have a tendency to underestimate the risk involved in their chosen sport. | **No Support** |
| 6. | High sensation seekers would be aware of potential risks involved in their chosen sport but simply accept these risks as part of the sport as they have a high need for experience seeking. First, positive and significant correlations were expected between Total Sensation Seeking and Experience Seeking. Second, high sensation seekers would have higher levels of trust in the equipment, knowledge and skills. | **Moderate Support** |
| 7. | In contrast to low sensation seekers, high sensation seekers were predicted to be currently involved more sporting activities. | **Supported** |

| | | |
|---|---|---|
| 8. | Positive correlations were predicted between the Sensation Seeking scales and; (1) number of activities actually tried, and (2) number of new activities that "would like to be tried". That is, it was expected that high sensation seekers would have tried more sporting activities than compared to low sensation seekers and to indicate a desire to engage in more new sporting activities. Negative correlations were predicted between the Sensation Seeking scales and the number of new activities a subject "would not like to try". | **Supported** |
| 9. | High sensation seekers would have engaged in more high-risk behaviour as children. High sensation seekers would 'rate' their parents as more adventurous, and less 'protective' compared to low sensation seekers. | **Mixed Support** |
| 10. | High-risk sport participants would have a higher socioeconomic status compared to low-risk sport participants. | **Supported** |

# RECOMMENDATIONS

## Limitations of the Study

Although the results of the present study generally provides support for the notion that high sensation seekers are more attracted to high-risk sports than are low sensation seekers, and that sensation seeking is related to implusiveness, one must nevertheless be aware of limitations of the current study. Several caveats are now noted.

The first limitation involves the characteristics of the sample. Although the present research findings confirm many of the findings of previous research, the generalizability of the findings to the broader population of all high-risk and low-risk sport participants is tentative as the present study involved a highly selected group of athletes. Therefore, current findings may not be generalized, or 'hold true' across all high and low-risk sport populations.

Second, some of the selected sport activities samples had small ($n < 15$) numbers of participants (i.e., sky-divers $n = 11$; marathon runners: $n = 11$, aerobics: $n = 6$). Again, this leads to lack of generalizability within and across these populations. Despite this constraint, the present study did utilize a much larger total sample size ($n = 166$) than compared to previous investigations which have typically utilized small samples ($n < 50$; e.g., Hymbaugh & Garrett, 1974; Cronin, 1991).

Third, as sport groups were not matched for age, it is possible that some of the between-groups differences in sensation seeking among the high- and low-risk sport participants may have been due to age differences. As such, age variation between the sport groups may have limited the comparisons across sports. To eliminate this problem, future research might match participants on age.

The next limitation involves some of the special characteristics of the Sensation Seeking Scale (Form V) -- specifically, the 'forced-choice' format. Several participants (approximately 5), made comment on this issue. A typical opinion which illustrates this point of view is as follows:

> "... in many of the questions, the two alternatives are not opposites for which I agree with both points. In others, I disagree with both points ... (and) many questions express extreme opinions. In most of these questions my opinions are somewhat in the middle".

Despite these criticisms the present study largely supports the use the Sensation Seeking Scale as a reliable and valid measure for use with athletes. The SSS has also been used in the overwhelming majority of prior related studies (e.g., Rowland et al., 1986; Straub, 1982; Zaleski, 1984; Wagner & Houlihan, 1994). Furthermore, this particular format has been investigated and rated positively by both males and females in a study conducted by Franken, Gibson, and Rowland (1989). Typically, subjects rated the SSS-V forced-choice format as "entertaining", "fun", and "informative".

Returning to potential limitations, although only a small number of participants in the present study expressed concern with the scale format, such an issue nevertheless deserves consideration. As an alternative, the present study might have utilized the new, but less validated version of the SSS - the Sensation Seeking Scale (Form VI), which has eliminated the forced-choice format. When using the new scale, subjects are only required to indicate, from a list of 62 activities, which activities they have experienced (part A), and which activities they would/would not like to try in the future (part B). Future research might compare these two scales to determine comparability of responses. The current study was designed to use the SSS-V in order to benefit from its reliability and validity and to be able to compare current findings with previous studies also using the SSS-V. Future research might use both scales

One of the more pertinent limitations of the present study is the lack of comprehensive validity data for the Impulsiveness scale of the Impulsiveness-Venturousness-Empathy Scale. To the researchers knowledge, the Impulsiveness scale has only been used in one study (Freixanet, 1991) prior to the present thesis in which no psychometric data was presented. As very little psychometric data has been provided for this scale -- apart from indications of adequate alpha reliability -- one must remain cautious in interpreting the results found through the use of this scale. However, it must also be said that the findings of the current study in relation to this measure have been previously hypothesized by theory -- in this way, an increased level of support is provided for the concurrent validity of this scale.

Finally, the present study made no empirical attempt to operationalise the sport participation levels of 'elite', 'club', 'novice', and 'social / recreational'. Criteria for inclusion within each participation level was based on the participants self-ratings of his or her athletic status or proficiency. To eliminate this problem, the present study could have presented the subjects with a checklist of more objectively based criteria that could then be used to determine the level of expertise of each participant. However, this problem was mitigated in part by the fact that many of the elite athletes were contacted through elite-based sport commissions (e.g., New Zealand Golf Academy). Nonetheless, future research might include other criteria (e.g., awards achieved) to help determine more precisely one's level of expertise in a given sport.

## Suggestions for Future Research

On the basis of the present findings at least three possibilities emerge for future research beyond those already discussed.

### Motivational Factors

As with most human endeavours, how one selects a sport in which to participate is a complicated area and obviously involves additional factors beyond those investigated by the present study. Thus, future research should try to investigate more fully some factors addressed in this study (e.g., family involvement, physical ability, age) that might mediate sensation seeking, impulsiveness, and risk taking. In line with this proposal, future research should attempt to isolate the factors which mediate the choice of socially acceptable ways of meeting sensation seeking needs (e.g, sports) as compared to the use of antisocial means such as substance abuse and criminality to those ends.

In association with the above suggestion, it is proposed that more observational and qualatative research be undertaken with related studies in the future. This would be an attempt to identify some of the factors influencing more individual involvement in particular sporting activities based upon participant observational study and interviews with the athletes themselves. Such a research design could control for the 'pigeon hole effect' that many current subjects stated as a potentially negative consequence of utilizing questionnaire formats. It could also be used to generate additional hypotheses that would then be further tested.

### The Sensation Seeking Scale (Form VI)

If future research wishes to use the questionnaire research design to assess sensation seeking tendencies among athletes, it is suggested that these studies also include the newest version on the Sensation Seeking Scale: The Sensation Seeking Scale (Form VI) (Zuckerman, 1984b; Zuckerman, 1984c). This new scale eliminates some of the

potential problems associated with the previous scale (e.g., forced-choice format). In particular, as mentioned earlier, research needs to be undertaken to investigate whether findings from previous studies which have used the SSS-V for analyses can be replicated by the SSS-VI.

Childhood Experiences

Future research in the sport and sensation seeking domain should look more closely at childhood experiences and how these experiences may influence a persons sensation seeking behaviour in adulthood. Thus, future research should include some longitudinal studies to assess sensation seeking, impulsiveness, and risk taking over age and those factors that mediate their development.

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# APPENDIX A

## INFORMATION SHEET

Personality Dimensions:
Their related influence on sport participation.

**This information sheet is for you to keep.**
**Please read it carefully,**
**then detach it before you return the questionnaire.**

This sheet provides information about a study being conducted by Sarah Jack, a Massey University Psychology Postgraduate student who is under the supervision of Dr. Kevin Ronan, a Massey Psychology Department lecture. The study has been approved by the Massey University Human Ethics Committee.

The aim of this study is to look at why individuals have preferences for particular sports. The main focus is directed to looking at individuals who report different personality characteristics and how these differences reflect sport participation.

Participation in this study is entirely voluntary. As a participant you will be asked to complete a questionnaire which will take approximately 20-30 minutes of your time.

If you take part in this study, you have the right to:

* Refuse to answer any particular questions, and to withdraw from the study at any time.
* Ask any further questions about the study that occur to you during your participation.
* Provide information on the understanding that it is completely confidential to the researcher.
* Receive a summary of the results upon request when the study is finished. This information will be made available at the location where you completed the questionnaire and at the Psychology Department, Massey University. It is expected that the summary will be available by March 1997.
* It is assumed that filling in the questionnaire implies consent.

If you have any additional questions about any aspect of the study, the researcher can be contacted through the Psychology Department, Massey University, telephone number: (06) 356 9099, or through Dr. Kevin Ronan, telephone: (06) 350 4145.

Thank you

**RESEARCHER:** Sarah Jack

# APPENDIX B

## RESEARCH QUESTIONNAIRE

**It is assumed that filling in the questionnaire implies consent.**

### SPORTS AND ACTIVITIES QUESTIONNAIRE

Age: (Years) _____ Sex: (circle one): Male Female

Current occupation: _____

How long have you been employed in the above occupation? _____

Please list your previous occupations (if any), and your average length of stay within each (e.g., 1 year, 2 years, 6 months):

_____

_____

_____

Marital status: (circle one) Single Married Widowed

Divorced Separated De facto

Do you have any children?

YES ____ NO ____

Ethnic Group: (circle one) European Maori Polynesian

Asian Other

**The following questions relate to your past and current sporting involvement.**

What sporting activity are you most currently involved in?

_____

How long have you participate in the above mentioned sport? (Please indicate in years):

_____

How did you first become involved in this sport? (Please tick the appropriate column):

| | | | |
|---|---|---|---|
| Friends | _____ | Family | _____ |
| Media | _____ | Work Colleagues | _____ |
| Other | _____ | | |

How frequently do you engage in the above mentioned sport? (Please tick the appropriate column):

**Frequently** (more than 4 times a week) _____

**Average** (2-3 times a week) _____

**Infrequently** (less than once a week) _____

Do the majority of your friends participate in the same or similar kinds sports as your self? (Please tick the appropriate box)

| | | | |
|---|---|---|---|
| | ____ | | ____ |
| YES | ____ | NO | ____ |

If applicable, does your spouse/partner participate in the same or similar kinds of sports as your self? (Please tick the appropriate box)

| | | | |
|---|---|---|---|
| | ____ | | ____ |
| YES | ____ | NO | ____ |

If you answered YES to the above question, did your spouse/partner participate in this sport prior to you meeting them? (Please tick the appropriate box)

| | | | |
|---|---|---|---|
| | ____ | | ____ |
| YES | ____ | NO | ____ |

At what level do you participate in this sport? (Please tick the appropriate column).

- **Formal Competition**
  - Elite _____
  - Club _____
  - Entry Level _____
- **Social / Leisure** _____
  (i.e., for fun, skill development, social contact)

Why do you participate in this sport?

_____
_____
_____
_____
_____
_____
_____

Have you suffered any injuries as a consequence of your current sport? (Please tick the appropriate box).

| | | | |
|---|---|---|---|
| | ____ | | ____ |
| YES | ____ | NO | ____ |

If you answered **YES** to the above question, has your participation level in this sport decreased as a consequence of these injuries? **If YES**, please state why, **if NO**, why not?

| | | | |
|---|---|---|---|
| | ____ | | ____ |
| YES | ____ | NO | ____ |

_____
_____
_____
_____
_____

Do you participate in any other sports while participating in the above mentioned sport? If **YES**, please list.

YES ____ NO ____

_____
_____
_____
_____
_____

Please list the sporting activities that you have been involved in from the least current to the most current, and your average length of participation within each.

_____
_____
_____
_____
_____

Generally, why did you stop participating in the above mentioned sporting activities? (Please indicate by ticking the appropriate column(s)).

Boredom _____ Age _____

Non challenging _____ Finances _____

Injury _____ Family _____

Other (Please specify):

_____
_____
_____
_____

From the sports activities listed below, indicate which new sports or activities you would and would not like to try. By placing an **'L'** beside one of the listed sports/activities indicates that you would **LIKE** to try it. By placing an **'N'** beside one of the listed sports/activities indicates that you would **NOT LIKE** to try it, and a **'H'** indicates that you **HAVE TRIED** it.

PLEASE NOTE: You do not have to indicate a preference for all the sports/ activities listed below.

**L = LIKE TO TRY N = NOT LIKE TO TRY H = HAVE TRIED**

| | | | |
|---|---|---|---|
| AEROBICS | _____ | ARCHERY | _____ |
| AUTO-RACING | _____ | BASKETBALL | _____ |
| BUNGY-JUMPING | _____ | BICYCLE RIDING | _____ |
| CAMPING | _____ | CANOEING | _____ |
| DOWNHILL SKIING | _____ | FLYING | _____ |
| GOLF | _____ | GYMNASTICS | _____ |
| HIKING | _____ | ICE CLIMBING | _____ |
| ICE SKATING | _____ | KAYAKING | _____ |
| MOUNTAINEERING | _____ | MOUNTAIN BIKING | _____ |
| MOUNTAIN CLIMBING | _____ | NETBALL | _____ |
| PARACHUTING | _____ | PING PONG | _____ |
| POOL/SNOOKER | _____ | ROCK CLIMBING | _____ |
| RUGBY | _____ | RUNNING | _____ |
| SAILING | _____ | SCUBA DIVING | _____ |
| SNORKLING | _____ | SURF BOARDING | _____ |
| SWIMMING | _____ | TARGET SHOOTING | _____ |
| TENNIS | _____ | VOLLEYBALL | _____ |
| WATER SKIING | _____ | WEIGHT LIFTING | _____ |
| WIND SURFING | _____ | WHITE WATER RAFTING | _____ |

Apart from sport, what other 'activities' do you enjoy?

_____

_____

_____

_____

_____

# INTERESTS AND PREFERENCES

**DIRECTIONS:** Each of the items below contains two choices, **A** or **B**. Please indicate which of the choices most describes your likes or the way you feel by circling either **A** or **B**. In some cases you may find items in which both choices describe your likes or feelings. Please choose the one which better describes your likes or feelings. In some cases you may find items in which you do not like either choice. In these cases mark the choice you dislike least. Do not leave any items blank.

It is important you respond to all items with only one choice, **A** or **B**. I am interested only in your likes or feelings, not in how others feel about these things or how one is supposed to feel. There are no right or wrong answers as in other kinds of tests. Be frank and give your honest appraisal of yourself.

1. A. I like "wild" uninhibited parties.
   B. I prefer quiet parties with good conversation.

2. A. There are some movies I enjoy seeing a second or even a third time.
   B. I can't stand watching a movie that I've seen before.

3. A. I often wish I could be a mountain climber.
   B. I can't understand people who risk their necks climbing mountains.

4. A. I dislike all body odours.
   B. I like some of the earthy body smells.

5. A. I get bored seeing the same old faces.
   B. I like the comfortable familiarity of everyday friends.

6. A. I like to explore a strange city or section of town by myself, even if it means getting lost.
   B. I prefer a guide when I am in a place I don't know well.

7. A. I dislike people who do or say things just to shock or upset others.
   B. When you can predict almost everything a person will do and say he or she must be a bore.

8. A. I usually don't enjoy a movie or play where I can predict what will happen in advance.
   B. I don't mind watching a movie or play where I can predict what will happen in advance.

9. A. I have tried marijuana or would like to.
   B. I would never smoke marijuana.

10. A. I would not like to try any drug which might produce strange and dangerous effects on me.
    B. I would like to try some of the new drugs that produce hallucinations.

11. A. A sensible person avoids activities that are dangerous.
    B. I sometimes like to do things that are a little frightening.

12. A. I dislike "swingers" (people who are uninhibited and free about sex).
    B. I enjoy the company of real "swingers".

13. A. I find that stimulants make me uncomfortable.
    B. I often like to get high (drinking liquor or smoking marijuana).

14. A. I like to try new foods that I have never tasted before.
    B. I order the dishes with which I am familiar, so as to avoid disappointment and unpleasantness.

15. A. I enjoy looking at home movies, videos, or travel slides.
    B. Looking at someone's home movies, videos, or travel slides bores me tremendously.

16. A. I would like to take up the sport of water skiing.
    B. I would not like to take up water skiing.

17. A. I would like to try surf board riding.
    B. I would not like to try surf board riding.

18. A. I would like to take off on a trip with no preplanned or definite routes, or timetable.
    B. When I go on a trip I like to plan my route and timetable fairly carefully.

19. A. I prefer the "down to earth" kinds of people as friends.
    B. I would like to make friends in some of the "far out" groups like artists
or "punks".

20. A. I would not like to learn to fly an aeroplane.
    B. I would like to learn to fly an aeroplane.

21. A. I prefer the surface of the water to the depths.
    B. I would like to go scuba diving.

22. A. I would like to meet some persons who are homosexual (men or women).
    B. I stay away from anyone I suspect of being "gay or lesbian".

23. A. I would like to try parachute jumping.
    B. I would never want to try jumping out of a plane with or without a parachute.

24. A. I prefer friends who are excitingly unpredictable.
    B. I prefer friends who are reliable and predictable.

25. A. I am not interested in experience for its own sake.
    B. I like to have new and exciting experiences and sensations even if they are a little frightening, unconventional or illegal.

26. A. The essence of good art is in its clarity, symmetry of form and harmony of colors.
    B. I often find beauty in the "clashing" colors and irregular forms of modern paintings.

27. A. I enjoy spending time in the familiar surroundings of home.
    B. I get very restless if I have to stay around home for any length of time.

28. A. I like to dive off the high board.
    B. I don't like the feeling I get standing on the high board (or I don't go near it at all).

29. A. I like to date persons who are physically exciting.
    B. I like to date persons who share my values.

30. A. Heavy drinking usually ruins a party because some people get loud and boisterous.
    B. Keeping the drinks full is the key to a good party.

31. A. The worst social sin is to be rude.
    B. The worst social sin is to be a bore.

32. A. A person should have considerable sexual experience before marriage.
    B. It's better if two married persons begin their sexual experience with each other.

33. A. Even if I had the money I would not care to associate with flighty rich persons like those in the "jet set".
    B. I could conceive of myself seeking pleasures around the world with the "jet set".

34. A. I like people who are sharp and witty even if they do sometimes insult people.
    B. I dislike people who have their fun at the expense of hurting the feelings of others.

35. A. There is altogether too much portrayal of sex in movies.
    B. I enjoy watching many of the "sexy" scenes in movies.

36. A. I feel best after taking a couple of drinks.
    B. Something is wrong with people who need liquor to feel good.

37. A. People should dress according to some standard of taste, neatness, and style.
    B. People should dress in individual ways even if the effects are sometimes strange.

38. A. Sailing long distances in small sailing crafts is foolhardy.
    B. I would like to sail a long distance in a small but seaworthy sailing craft.

39. A. I have no patience with dull or boring persons.
    B. I find something interesting in almost every person I talk to.

40. A. Skiing down a high mountain slope is a good way to end up on crutches.
    B. I think I would enjoy the sensations of skiing very fast down a high mountain slope.

# INSTINCTIVENESS

**Instructions:** Please answer each question by putting a circle around the "YES" or the "NO following the question. There are no right or wrong answers, and no trick questions.

1. Do you often long for excitement? YES NO
2. Do you feel at your best after taking a couple of drinks? YES NO
3. Do you save regularly? YES NO
4. Do you often buy things on impulse? YES NO
5. Do you generally do and say things without stopping to think? YES NO
6. Do you prefer quiet parties with good conversations to "wild" uninhibited ones? YES NO
7. Do you often get into a jam because you do things without thinking? YES NO
8. Would you often like to get high (drinking liquor or smoking marijuana)? YES NO
9. Are you an impulsive person? YES NO
10. Do you usually think carefully before doing anything? YES NO
11. Do you often do things on the spur of the moment? YES NO
12. Do you often enjoy breaking rules you consider unreasonable? YES NO
13. Are you rather cautious in unusual situations? YES NO
14. Do you mostly speak before thinking things out? YES NO
15. Do you often get involved in things you later wish you could get out of? YES NO
16. Do you get so "carried away" by new and exciting ideas, that you never think of possible snags? YES NO
17. Do you get bored more easily than most people, doing the same old thinkgs? YES NO
18. Would you agree that planning things ahead takes the fun out of life? YES NO
19. Do you need to use a lot of self-control to keep out of trouble? YES NO
20. Would you agree that almost everything enjoyable is illegal or immoral? YES NO

21. Are you often surprised at people's reactions to what you do or say? YES NO

22. Do you get extremely impatient if you are kept waiting by someone who is late? YES NO

23. Do you think an evening out is more successful if it is unplanned or arranged at the last moment? YES NO

24. Do you get very restless if you have to stay around home for any length of time? YES NO

How would you describe a **'High-Risk'** sport? What characteristics would be involved?

_____
_____
_____
_____
_____

Do you consider your current sport to be **High-Risk?** (Please tick the appropriate box).

YES ____ NO ____

Which of the following do you consider to be either a **High-Risk** or a **Low-Risk** sport? (Please tick the appropriate column).

| | **HIGH-RISK** | **LOW-RISK** |
|---|---|---|
| Hang Gliding | _____ | _____ |
| Marathon Running | _____ | _____ |
| Motor Car Racing | _____ | _____ |
| Aerobics | _____ | _____ |
| Swimming | _____ | _____ |
| Golf | _____ | _____ |
| Bungy-Jumping | _____ | _____ |
| Sky Diving | _____ | _____ |

How would you describe a person who engages in a High-Risk sport? (Please tick the appropriate column(s)).

Unproductive _____ Foolhardy _____

Impulsive _____ Outgoing _____

Interesting _____ Exciting _____

Other (Please Specify) _____

How would you describe a person who engages in a Low-Risk sport? (Please tick the appropriate column(s).

Boring _____ Dull _____

Conservative _____ Sensible _____

Rational _____

Other (please specify) _____

Would you say that, as a child you frequently engaged in high-risk behavior? (Please tick the appropriate box).

YES ____ NO ____

On the 5-point scale below indicate how adventurous you believe your parents are. (Please circle the appropriate number).

1 = Extremely adventurous

2 = Very adventurous

3 = Moderately adventurous

4 = Somewhat adventurous

5 = Not at all adventurous

Would you say that, as a child your parents were 'protective' of you? (Please indicate your answer on the 5-point scale below).

1 = Extremely protective

2 = Very protective

3 = Average

4 = Somewhat protective

5 = Not at all protective

**Thank you for your cooperation.**

# APPENDIX C

## Charateristics Of High-Risk Sports According to High and Low Sensation Seekers

| | Low-Sensation Seekers | High-Sensation Seekers |
|---|---|---|
| 1 | Injury and death (32) | injury and death (27) |
| 2 | Dangerous (7) | Great skill and knowledge (10) |
| 3 | Depends on Safety involved (7) | Objective vs perceived risk (6) |
| 4 | No control of external factors (6) | No contol of external factors (5) |
| 5 | Excitment (2) | Speed-impact (5) |
| 6 | Great skill and knowledge (2) | Depends on safety involved (4) |
| 7 | height (2) | Rugby (4) |
| 8 | Mountain Climbing (2) | Heights (3) |
| 9 | Objective vs Perceived risk (2) | Risks of error (3) |
| 10 | Risks of error (2) | Dangerous (3) |
| 11 | Sky-diving (2) | Adrenalin (2) |
| 12 | Speed-impact (2) | Body contact (2) |
| 13 | Accuracy is critical (1) | Car racing (2) |
| 14 | Body contact (1) | Drink driving (2) |
| 15 | Car racing (1) | Mountain climbing (2) |
| 16 | Challenge (1) | No protection (2) |
| 17 | Downhill skiing (1) | Relying on equipment (2) |
| 18 | Extreme sports (1) | Accuracy is critical (1) |
| 19 | For wild people (1) | Chance (1) |
| 20 | Ice climbing (1) | Defying death (1) |
| 21 | Physically demanding (1) | Excitment (1) |
| 22 | Relying on equipment (1) | Exhilerating (1) |
| 23 | Rugby league (1) | Guts (1) |
| 24 | Stupidity (1) | Horse riding (1) |
| 25 | Trust (1) | Not popular - unconventional (1) |
| 26 | Unnecessay risk (1) | On the edge (1) |
| 27 | Unplanned participation | Psychological prepardness (1) |
| 28 | Unpredictable (1) | Pushing limits (1) |
| 29 | Violent tendencies (1) | Respect (1) |
| 30 | | Scared - uneasy (1) |
| 31 | | Selfish (1) |
| 32 | | Uncontrollable (1) |
| 33 | | Unplanned (1) |
| 34 | | Unpredictable (1) |
| 35 | | Unsafe atmosphere (1) |

( ) = Number of sensation seekers who endorsed characterisation. Responses with the same percetage have been listed in alphabetical order.