THE SENSATION SEEKER ATTENTION SCALE (SSAS):

A MEASURE OF SENSATION SEEKING

BY ADOLESCENTS

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BY ADOLESCENTS

Warner H. Britton

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Warner H. Britton

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Warner Hunt Britton, son of Warner Alexander and Barbara Jean (Hunt) Britton, was born March 7, 1950, in Kansas City, Missouri. He graduated from Sidney Lanier High School in Montgomery, Alabama and entered Auburn University in September, 1968. He graduated with a Bachelor of Arts degree in Psychology in 1972 and earned Elementary Teaching Certification in 1975. While continuing to teach children with special needs in the Auburn area public schools, he graduated with a Master of Education degree in Special Education in 1980. He earned certification or completed required coursework at the Master's level in School Psychometry, Instructional Supervision, Learning Disabilities, and Early Childhood Education for the Disabled. He has taught at the preschool, elementary, middle, high school, and university levels for 33 years. He has two professional publications. He has five children and four grandchildren. He married Debora Myles, daughter of William R. and Mary C. (Gray) Myles, on July 28, 2006.

DISSERTATION ABSTRACT

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BY ADOLESCENTS

Warner H. Britton

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The purpose of the present study was to construct a Sensation Seeking Attention Scale (SSAS) as a predictive measure of negative sensation seeking by adolescents. Four hundred and thirty-five high school students completed the Scale as a predictive measure of the sensation seeking construct and its relationship to a measure of negative/anti-social school behaviors and grade point average.

The analyses of the SSAS yielded two unique factors, entitled Positive Sensation Seeking and Negative Sensation Seeking. Initially, two statistical analyses were performed. A data reduction analysis of the total 60 SSAS items yielded 15 factors. A subsequent second-order factor analysis of ten factors derived from the first 15 identified two distinct factors indicating which items to include on the positive and negative

sensation seeking portions of the scale. Lastly, ANOVAs compared scores on the negative sensation seeking items to office behavioral referrals to test the hypothesis that the students with school behavior problems will achieve higher scores on the negative sensation seeking items than students with no significant problems. A second ANOVA indicated an inverse relationship between a high score on the SSAS negative items and grade point average. Both hypotheses were supported at the .001 level of significance.

The current study lends support for the differential identification of individual adolescents with a likelihood for negative sensation seeking evident through school behavior problems and a low grade point average. Intervention strategies based in part on the results of the study are discussed. Limitations of the present study and topics for further research are presented.

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I. STATEMENT OF THE PROBLEM

Introduction

"Make my day." When faced with disciplinary action, this Clint Eastwood line from the popular film *Sudden Impact* (Eastwood, C., 1983) could be a rejoinder for up to 30% of today's young adults, ages 14 to 25 years old (Hartmann, 1996). For some adolescents, the threat of punishment has little import or worse, may effectively stimulate anti-social or negative behavior. Eaves, Darch and Williams (2004) concluded that conduct problems may develop if a fear of punishment does not serve to motivate the individual. The first step then is to identify these adolescents, preferably before a need for punishment arises.

Reported in popular and research periodicals is the phenomenon of sensation seeking. Zuckerman defined sensation seeking 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 experience" (Zuckerman, 1994, p. 27). Farley (1986) labeled these individuals as Big T (thrill seekers). They are characterized as having low sensitivity to stimuli and therefore in need of high levels of stimulation to maintain an optimal state of arousal. While the construct, sensation seeking, has been used extensively in the literature by researchers from various disciplines, it is often defined according to the writer's purpose. In the current study,

sensation seeking can be defined as the eliciting of behaviors on the part of the self or others to amplify stimuli for the production of an exciting experience.

One area of focus on sensation seeking in current literature has been a population that satisfies a need for stimulation by participating in extreme human experiences such as BASE (Buildings, Antennas, Spans, and Earth) jumping, downhill skiing, mountain climbing, and even intellectually oriented endeavors like day trading and venture-capital investment. While these behaviors pose an interesting study in human trait and personality factors, they are often the domain of upwardly mobile, sometimes independently wealthy individuals. Heath (1997) profiles such so-called adrenalin junkies as having annual incomes of greater than $40,000. Of interest in the present study is an adolescent population that while sharing some of the same needs as their more mobile and independent sensation seeking counterparts, i.e., an exciting experience, may not have the information regarding these activities nor access to them. In particular, the adolescent participants targeted here most likely do not have enough specifics about BASE jumping or other types of thrilling activities. Additionally, it is unlikely that these youngsters could afford them. These types of activities could, however, be considered as possible intervention strategies and are discussed later. The state of affairs for adolescents in this study and for those in similar circumstances, leaves up to 30% of students with fewer opportunities for positive sensation seeking and, by default, negative behavioral choices.

For much of the research designed to identify factors related to sensation seeking, groups of college students have served as the participants (Eysenck, & Zuckerman, M., 1978; Farley & Haubrich, 1974; Rowland & Heatherton, 1987; Zuckerman, 1978). While

these studies contribute to the verification of the sensation seeking construct, the age range and limited variation of the college population may not represent adolescent sensation seekers in need of identification and intervention.

The current study examines adolescent high school students using a measure of the sensation seeking construct and its relationship to negative (anti-social) behaviors. The Sensation Seeker Attention Scale (SSAS) was developed to aid in the differential identification of individual adolescents with a propensity for negative sensation seeking. Discussion includes the etiology of sensation seeking construct, study design, and suggested parameters for intervention. Programs based in part on the results of the SSAS may enable adolescents whose own actions tend to thwart their educational and societal futures to become productive individuals.

Educational Trends Related to the Problem

Incidents of extreme behaviors performed by a few adolescents have left authorities essentially one negative and increasingly severe response towards most adolescents: punishment. School shootings, gang-related violence, and open rebelliousness by young teenagers often seem to demand such a reaction. Society in general, and education in particular, has backed itself into a corner when dealing with behaviors by adolescents who opt to behave negatively. Though many teenagers are testing the hiatus before embracing the responsibilities of adult life, some offenders are tried and treated as adults. Few discipline options are considered for the most negative life explorers because choices are typically limited to punishment.

If the educational environment for most teenagers has changed over the last few decades, it has become more punitive. There may be less tolerance of disruptive behaviors. In *The Romance of Risk: Why Teenagers Do the Things They Do*, Ponton (1997) refuted the traditional idea that risk-taking [sensation seeking] is primarily an angry power struggle between teenagers and their parents and redefined it as a testing process to find out who they are. In addition, adolescents' social, psychological, and biological stresses may lead to behaviors that, while defined as dangerous by adults, may not be perceived as such by teenagers.

Attention-seeking students once considered class clowns are stifled. Findings by Nelson (1992), concluded that Farley's Big T individual attributes provide motives for the class clown's disruptive behaviors. Nelson argued that punishment may not be appropriate since revenge or torment is not the reason for the student's behavior. Instead the class clown prefers novelty, risk, complexity, flexibility, etc. According to Nelson, an educational environment appropriate for these sensation seekers would emphasize not punishment, but a fast-paced, discovery learning program encouraging creativity.

A few years ago, many of the young people who would not or could not comply with the traditional educational regimen were expelled or simply encouraged to drop out of school. Present educational policy mandates that schools make concerted efforts to matriculate all students within the general education program, even those with behavior problems. Since the 1975 passage of the Education for All Handicapped Children Act (PL 94-142), specific resources have been allocated to retain the very students that exhibit behaviors once severe enough to have them removed from school. While a particular student may qualify for special education services under the current (2004)

federal Individuals with Disabilities Education Act and receive some form of intervention, accompanying regulations require extensive due process procedures that leave many school administrators feeling their disciplinary options have been inexorably curtailed. Coupled with the resulting hesitation of administrators to refer students and the introduction of more stringent eligibility requirements, fewer special education students are being identified as behaviorally disturbed, relegating them to the traditional punishment regime.

Unresolved Issues

While school administrators are hesitant to identify students with behavior problems as special education students because of the burdensome due process procedures involved in disciplining them, the goal of providing an education for all children remains. Those who could have qualified for special services based on the severity and longevity of their negative behaviors are currently less likely to be served and are regimented to traditional means of discipline. Applied to sensation seeking students, increasingly punitive consequences may not serve society's purpose and instead may be wasting individual potential and burdening our criminal justice system. At issue is the inability to identify young sensation seekers before they are in trouble. Problematic is the lack of effective intervention programs and the paucity of options available in responding to adolescents who misbehave. Though more discipline choices could be useful, programs designed to promote positive social behavior should be attempted first. Early identification of those students most likely to develop severe behavior problems could serve to propagate alternative intervention programs and obviate the need for

punishment. Such preventive efforts could prove cost effective in individual, administrative, and societal terms.

Social Concerns

Beyond the classroom, society has become increasingly staid as vocations become more service-based and the environment becomes more controlled through technology. Jobs previously available to adolescents that included some form of danger or thrill are either done by machines or are illegal for school-age students. Particularly in schools, the availability of acceptable outlets for sensation seeking has become limited and Gallagher (1994) observed that behaviors once considered daring have become criminalized. For example, fights after school used to be a fairly common occurrence with the participants often becoming friends after the relatively harmless encounter. Such an event today would involve the police and harsh retribution from school authorities.

There can be either positive or negative behaviors proffered in response to life's experiences. If an individual is one of the up to 30% of adolescents considered sensation seekers (Hartmann, 1996), choices of exciting activities may be limited. The sensation seeker must learn either to suppress behaviors that interfere with the educational and socialization process or to find acceptable ways of satisfying their sensation seeking needs. For many young people, discovering and participating in positive or acceptable sensation seeking pursuits is challenging. While organized sports offer opportunities for those that make the team, participation by adolescents who lack the talent or self-confidence and who are without parental encouragement or resources for fees and transportation, lose out before the first pitch. Adolescents deprived of positive role

models and the personal resources to explore positive sensation seeking options are relegated to activities provided by peers and financial constraints. For some adolescents a six pack of beer, a marijuana cigarette, and a speeding car are cheaper and more readily available than a snow-skiing trip.

The relationship between delinquency and sensation seeking has been a topic of study for many investigators. Among them, Farley (1986) found that juvenile delinquents were more likely to be Big T sensation seekers than non-delinquents when matched on age, gender, race and social class. Additionally, he found that escape rates among male inmates who were highest in sensation seeking characteristics were seven times greater than inmates low in sensation seeking characteristics. Female inmates classified as Big T were found to be significantly more likely to fight, disobey supervisors, and escape.

Sensation seekers appear to discount the dangers to themselves and others when seeking thrills. In a Dutch study determining whether the need for stimulation has an influence on perceived risk for male drivers aged 20-30 years, Heino, van der Molen and Wilde (1996) found that low sensation seekers preferred a longer following distance behind an experimental car than high sensation seekers. Such behaviors, when combined with others, may have a cumulative effect. For example, by using illicit drugs, sensation seekers may not only seek an altered state of consciousness, they may also want a secondary source of stimulation, the risk of being caught. One of the greatest dangers to adolescents and society may be that many teenagers multiply their thrills by engaging in more than one risky behavior. Sensation seekers' predisposition toward taking risks may indicate why, according to psychologist Frank Farley, they have twice as many

automobile accidents and many even make a point of driving while drunk for the added excitement and risk (Leo, 1985).

Based on the *Youth Risk Behavior Surveillance--United States,* 1999, Kann et al. (2000) found that approximately three-fourths of all deaths among persons aged 10-24 years result from only four causes: motor-vehicle crashes, other unintentional injuries, homicide, and suicide. Accordingly, numerous high school students engaged in behaviors that increased their likelihood of death from these four causes—during the 30 days preceding the survey: 16.4% had rarely or never worn a seat belt; 33.1% had ridden with a driver who had been drinking alcohol; 17.3% had carried a weapon; 50.0% had drunk alcohol; and 26.7% had used marijuana. Of the respondents, 7.8 % reported they had attempted suicide during the 12 months preceding the survey.

Kann et al. (2000) provided evidence of adolescent behaviors affecting individuals and society even beyond immediate concerns. Habits established during adolescence have an impact on the health of the individual and the subsequent cost to the general public. In 1999, nationwide, 42.0% of the 49.9% of sexually active high school students had not used a condom at last sexual intercourse. Importantly, the majority of risk behaviors associated with cardiovascular disease and cancer—accounting for two thirds of all deaths among persons aged 25 or older—are initiated during high school. In 1999, 34.8% of students had smoked cigarettes during the 30 days preceding the survey; 76.1% had not eaten 5 or more servings per day of fruits and vegetables during the 7 days preceding the survey; and 70.9% did not attend daily physical education classes. Targeting at-risk individuals for intensive, perhaps novel intervention programs could

begin to correct these bleak statistics. Numerous studies conclude that sensation seeking adolescents likely comprise a considerable proportion of these at-risk individuals.

Sensation seeking has been linked with drug and alcohol use among teenagers (Bates, White, & Labouvie, 1994; Earlywine & Finn, 1991; Forsyth & Hundleby, 1987; Newcomb & McGee, 1989;Wood, Cochran, Pfefferbaum, & Arneklev, 1995). Significantly, Segal, Huba, and Singer (1980) found two factors that appear to support the consistent association between sensation seeking and adolescent drug and alcohol use. One factor is the stimulation provided by the substance and the other is the risk or illegality associated with its use.

Donohew, Helm, Lawrence, and Shatzer (1990) found that peer sensation seeking contributes to adolescents' illegal substance use for specific drugs and that up to 80% of adolescent drug users were high sensation seekers. He further reported a reinforcing relationship between individuals with high sensation seeking needs and selecting friends with similar behaviors (Donohew et al., 1999).

Sensation seeking has been related to sociopathy among adult males (Emmons & Webb, 1974; Zuckerman & Neeb, 1979). To be able to identify sensation seeking adolescents before they become entrenched in a punitive situation could be useful in the diagnosis of potential antisocial behaviors. Meanwhile, environments that fail to address the needs of these individuals may unwittingly limit their choices to negative behaviors.

While previous research aimed at identifying sensation seeking adolescents has been successful in finding relationships between sensation seeking and purported risky behaviors, the present study attempts to address two particular issues both in construction and subsequent validation. First, an effort is made to create self-report scale items that

make use of contemporary adolescent language including using simple, direct sentence structure. The majority of studies have used either verbatim or slightly edited versions of Zuckerman, Eysenck, and Eysenck's (1978) Sensation Seeking Scale (SSS). Using the SSS, Michel et al. (1999) found a different factorial structure for 278 adolescent participants that combined the Experience Seeking and Boredom Susceptibility subscales and added a subscale called Non-conformism. Russo, Stokes, Lahey, and Christ (1993) found similar results with three factors identified. Second, the current researcher compares the participants' responses to the SSAS items with their current school office behavioral records and grade point average. Typically, previous research has relied on the participant to report his or her involvement in risky activities. While one such study did develop a brief (8 item) scale based in part on the SSS as reworded for adolescents, the participants were simply asked their attitude toward risky activities (Hoyle, Stephenson, Palmgreen, Lorch, Donohew, 2002). Another study by Hansen and Breivik (2002) used a Swedish scale (Bjorck-Akesson, 1990) based on Zuckerman's scale that asked the participant if they had ever done various negative activities. Therefore, in addition to providing evidence for the item factor and psychometric integrity in the construction of the SSAS, the current study relies on independently documented participant behaviors and school grades to facilitate establishing construct validity.

While most adolescents survive the challenges inherent in the process of maturing into productive adults, some establish behaviors that make this progression difficult. A habit is often more difficult to ameliorate than learning a new behavior. Proactive intervention before an individual adolescent makes serious negative behavioral decisions seems to be a logical alternative to the sometimes dubious consequence of punishment.

Providing intensive preventative services to all adolescents is impractical due to limited resources. Identifying which adolescents are sensation seekers and most likely to employ negative behaviors becomes a necessity. The aim of this study is to devise an instrument for the early identification of adolescents likely to exhibit negative sensation seeking behaviors. These individuals are currently identified after the fact. That is, they are in trouble. They have broken some rule or simply put too much strain on the patience of involved adults. Ostensibly then, the adults' primary goal is to determine what forms of discipline are the most effective in preventing recidivism. Retribution is prescribed and the adolescent either continues to buck the system or conforms to societal norms. An alternative is to develop an intervention program model that would take into account the need for stimulation that these particular young people possess. Devising a reliable method for identifying adolescents prone to negative sensation seeking before problems occur would help insure the efficacy of such a program. The first step in establishing a proactive intervention program model, participant identification via a valid self-report scale, is this study's focus.

The present investigation develops a self-report instrument intended to identify adolescents that have a propensity for negative sensation seeking. As determined by a pilot study of 126 high school students, items with sufficient discrimination power were chosen through factor analysis. The resulting instrument was used in the present study and completed by high school students. ANOVAs of the positive and negative scale provided through factor analysis were contrasted with school behavioral data to serve as a basis for predicting which adolescents are more likely to seek sensation in a negative manner. Also, the two scales were evaluated as independent variables in relation to

participants' grade point averages. Finally, a discussion of the utility of such information for intervention programs and the limitations of the present study are addressed.

Physiological Factors

Contemporary research supports the idea that certain individuals differ from others in their need for stimulation. Since the early 1960s, researchers have attempted to measure these differences through self-report questionnaires (Zuckerman, Kolin, Price, & Zoob, 1964). Subsequently, numerous studies have helped to define and verify the existence of the sensation seeking construct in relation to physiological, genetic, and environmental factors. These variables are explored in an attempt to make a case for approaching the sensation seeking construct as a legitimate physiological condition that may require specialized behavioral intervention and educational programming.

Sensation seeking as a biological trait has been investigated through various biochemical studies at the cellular and molecular level. Relative concentrations of certain brain chemicals have been examined to help explain the presence or absence of the sensation seeking construct. The enzyme Monoamine oxidase (MAO) regulates neurotransmitters in the brain and has been found by researchers to be at low levels in sensation seekers (Zuckerman, 1994). Comparatively low levels of MAO have been correlated with participants who score higher on sensation seeking questionnaires. Additionally, low brain levels of serotonin have been associated with a lack of behavioral inhibition in both animals and humans (Soubrié, 1986). Sensation seeking has also been shown to be related to low serotonergic function in men diagnosed as antisocial personality disorder (Moss, Yao, & Panzak, 1990; Siever & Trestman, 1993).

Gonadal hormones and especially the androgen testosterone may be related to the sex and age differences often found in studies of sensation seeking. Daitzman, Zuckerman, Sammelwitz, and Ganjam (1978) found increased levels of both androgens and estrogens in college males identified as sensation seekers. Low sensation seekers had average testosterone levels for their age while high sensation seekers had unusually high levels of both hormones (Daitzman & Zuckerman, 1980).

Genetic and Environmental Factors

Genes may prove to be an important factor for studying individual differences in sensation seeking. Through an analysis of 1591 adolescent monozygotic and dizygotic twin pairs, Koopmans, Boomsma, Heath, and van Doornen (1995) found that differences in sensation seeking levels could be attributable to genetic factors by accounting for between 48 and 63% of the twins' variance. In fact, Koopmans et al. determined that the monozygotic twins' correlations with Zuckerman's Sensation Seeking Scale (Zuckerman et al., 1971) were about twice the dizygotic twins' correlations, supporting the hypothesis that individual differences in sensation seeking are influenced by genetic factors. Twin studies of other personality traits in adolescence such as extraversion and neuroticism (Eaves, Eysenck, & Martin, 1989) are consistent with the heritability of sensation seeking. In separated twins studies, correlations between identical twins reared together (.58) and those reared apart (.54) showed no family environment influence on sensation seeking (Tellegen et al., 1988; Fulker, Eysenck, & Zuckerman, 1980). As an example, Zuckerman, Kraft, and Cummings (1993) concluded that a father's punishment was not

effective in suppressing impulsive sensation seeking. While genetic factors appear to account for variance in sensation seeking, environmental factors warrant further study.

While the majority of previous studies have supported the assumption that males are more likely than females to engage in sensation seeking, the present study includes both genders. A trend toward increased numbers of females being adjudicated or classified as delinquent and conduct disordered warrants their participation. In a Byrnes, Miller, and Schafer (1999) meta-analysis of 150 studies comparing risk-taking [sensation seeking] tendencies of male and female participants, there were significant shifts in the gender gap between successive age levels, and the gender gap seemed to be growing smaller over time. Additionally, Koopmans et al. (1995) determined that gender differences in genetic influence for sensation seeking were not significant.

It is postulated that there exist both positive and negative sensation seekers. Assuming an individual is defined as a sensation seeker, either physiologically or behaviorally, increased stimulation is required to achieve homeostasis. The adolescent's means to this end may be positive (pro-social) or negative (anti-social) as defined by current laws and mores. Quay (1965) postulated that, based on arousal theory, psychopaths need extra stimulation. Further, Zuckerman (1999) found that while most sensation seekers are not psychopaths, most psychopaths are sensation seekers. The lack of anxiety attributed to primary psychopathy by Cleckley (1976) becomes a factor in distinguishing positive and negative sensation seekers since anticipating anxiety generally serves to inhibit anti-social behaviors that could result in punishment.

An instrument designed to identify sensation seekers and specifically those that are likely to engage in negative sensation seeking behaviors, could lead to educators

designing more relevant curricula. In addition, Spence (1997) found that grade-point average had a significant inverse relationship with sensation seeking for males. Addressing these individuals' stimulatory needs before negative choices are made, might result in more students being successful in school and becoming productive citizens.

Without intervention, negative sensation seekers may use aggressive behaviors to satisfy their needs. Determining which individuals are more likely to do so could aid in breaking the male aggressive behavior continuity found by Farrington (1991) and Olweus (1979) between childhood and adulthood. Farrington's research supported a positive relationship between early aggressive behavior and violent criminal behavior for males. In their book *Hate Crimes: The Rising Tide of Bigotry and Bloodshed*, Levin and McDevitt (1993) found that thrill was the motivation for 58% of hate attacks. According to Boston, MA police reports, offenders in their city were predominately White teen-age males and in 91% of the attacks, they did not know the victim. Interestingly, the hate-attack type of thrill offender is considered more suitable for alternative rehabilitation programs since they are less likely to repeat attacks.

Identification of negative sensation seeking adolescents could alert both school and community authorities to those individuals that need to participate in programs designed to increase stimulation and reduce delinquency. While some locales have programs that include summer camp, boys' and girls' clubs, church activities, and Boy Scouts, these existing programs are limited and could be considered boring by sensation seekers. Participation usually depends on ability to pay, parent initiative and/or selection by an authority figure. However, those adolescents overlooked or purposefully left out are still seeking sensations and may do so at their and others' peril.

Definition of Terms

Adrenalin: (epinephrine) a chemical produced and secreted by the adrenal glands. It can act as a stimulant, increasing blood pressure, heart rate, and other functions (BioTech, 2000).

Androgens: a class of male hormones that is responsible for the development of male secondary characteristics (deep voice, facial hair, etc.) (BioTech, 2000).

Arousal: Cortical vigilance or readiness in response to sensory stimulation via the reticular activating system (CancerWeb Project, 1998).

Biochemical: chemical properties based on genetic information affecting the metabolic rate of the individual, and possibly resulting in clinical or pathological irregularities (BioTech, 2000).

Conduct disorder: characterized by acting out, aggression, and disruptive behavior (Kasik, 1987).

Estrogen: a steroid sex hormone that regulates female reproductive processes and creates feminine secondary sexual characteristics (BioTech, 2000).

Genes: the fundamental physical and functional unit of heredity (BioTech, 2000). Gonad: a sex organ, such as an ovary or a testicle, which produces the mature male or female reproductive cell (BioTech, 2000).

Hormone: a biochemical substance that is produced by a specific cell or tissue and causes a change or activity in a cell or tissue located elsewhere in an individual (BioTech, 2000).

Monoamine oxidase (MAO): an enzyme that breaks down certain neurotransmitters (BioTech, 2000).

Negative Sensation Seeking: using anti-social or illegal means for the production of an exciting experience (Researcher, 2004).

Neurotransmitter: a chemical released from an axon that binds to a specific site in the dendrite of an adjacent neuron, thus triggering a nerve impulse which excites or inhibits a particular behavior (BioTech, 2000).

Positive Sensation Seeking: using pro-social or legal means for the production of an exciting experience (Researcher, 2004).

Psychopath (Antisocial Personality Disorder): a pervasive pattern of disregard for, and violation of, the rights of others including repeatedly performing acts that are grounds for arrest (American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders*, 1994).

Risk Taking: performing actions with the possibility of loss or injury (Researcher, 2004).

Sensation seeking: the eliciting of behaviors on the part of the self or others to amplify stimuli for the production of an exciting experience (Researcher, 2004).

Serotonin: a hormone, it is both a neurotransmitter (a substance that transmits nerve signals from neuron to neuron) and a vasoconstrictor (a substance that causes the blood vessels to narrow) (BioTech, 2000).

Sociopath: a diagnostic label applied to an individual who exhibits a lifelong pattern of conduct problems or antisocial behavior (Grimm, 1987).

Testosterone: a steroid hormone which is necessary for male sexual reproduction and may also play a role in female sexual response. In males it is produced in the testes

and in both sexes it is produced in small quantities by the adrenal glands (BioTech, 2000).

Thrill Seeking: to cause to experience a feeling of excitement (Researcher, 2004).

Scope of the Study

The scope of the present study is to create an instrument to aid in the early identification of negative sensation seekers. Positive sensation seekers are identified in the current study solely to support the discriminate validity of the negative sensation seeking scale. The study includes an examination of relevant research related to the construct of sensation seeking. Intervention programs are considered. Limitations of the study are discussed. The study assumes that individuals vary in their need for stimulation and can be differentiated through a self-report scale. Additionally, it assumes a portion of those adolescents identified as sensation seekers can be further recognized as having a tendency to increase stimulation through negative or anti-social means. The population of negative sensation seekers identified by the instrument is specifically targeted as adolescents who may behave negatively in an attempt to amplify stimuli for the production of an exciting experience and thus, find themselves in conflict with society.

Following the factor analysis of the items presented to high school students from a pilot study by the researcher, a self-report sensation seeking scale was constructed and administered to high school adolescents. The participants with high scores on the negative SSAS items are correlated with their weighted score for office behavioral referrals and then compared to those adolescents who do not have high weighted office behavioral referrals. The weighted behavioral score is based on the number and type of

referrals to the school office plus resulting discipline procedures, but omitting tardies and skipping. The basis for this procedure is tied to the basic premise of the study that negative sensation seekers can be identified and will have a higher number and more severe behaviors than positive sensation seekers. Referrals to the school office were omitted in the present study based on interviews with educators noting that students being tardy or skipping are typically not the individuals that pose the most serious threats to the educational process. The current researcher's purpose is to identify the students who inordinately tax school teachers and administrators by frequently performing severe behaviors that require additional disciplinary resources like Saturday school, in school suspension, alternative school, and due process procedures prior to indefinite suspension and expulsion. The relative weights for the negative behavior and resulting disciplinary action by school officials are presented in Table 1. A discussion of the implications of the study includes suggestions for intervention programs designed to direct negative sensation seekers toward more productive behaviors.

Table 1

Weighted School Office Behavioral Score

Office Referral Behavior	Weighted Point	Discipline Options	Weighted Point
Disrupting Class	1	Detention	1
Tardies	2	Saturday School	2
Skipping	3	In-School Suspension	3
Profanity	4	Suspension	4
Inciting Other Students	5	Alternative School	5
Defying Authority	6		
Fighting	7		

Note: Tardies and Skipping are omitted for Mean of Office Behavior Referrals in all analyses.

The current study offers a review of literature related to the sensation seeking construct following the topical areas presented in the statement of the problem. Previous research providing a historical context is briefly examined. Specific studies are cited to provide support for delineating the need for the research and the likelihood for obtaining meaningful, relevant, and significant results. A brief summary of the literature reviewed in the present proposal is presented.

A description of the research design begins the methods section of the proposal. The research design was formulated so as to set the stage for subsequent statistical analyses and inferences. A pilot study is presented as a vehicle for the development of the

instrument. Data collection techniques and characteristics of the participants are provided. The rationale for the selection of the participants in both the pilot and primary studies is iterated. Procedures concerning the distribution of materials and instructions to the participants are explained. The data collection and recording process is described followed by a statement of methodological assumptions. A detailed discussion of the statistical analysis includes an account of inherent and attendant limitations. A summary of the proposal method is provided.

II. REVIEW OF LITERATURE

Overview

The present study intends to create a self-report instrument to identify those adolescents that have a predisposition to seeking sensations through behaviors considered negative (socially unacceptable/illegal). This chapter evaluates current literature relevant to the sensation seeking construct, the need for the present study and forms a basis for potential intervention strategies. While research designed to identify sensation seekers has attempted to correlate various negative behaviors with the participant's own estimate of at-risk behaviors, few instruments designed to identify adolescent negative versus positive sensation seekers have attempted to correlate the scores with an actual record rather than a propensity for negative behaviors. Additionally, the majority of studies related to sensation seeking have involved college students. Thus, the population targeted by the present study—small town low to middle income adolescents—represents a group of participants that has been neglected in both the research and popular literature. The selection and arrangement of the literature review corresponds to the objectives delineated in the Problem chapter.

The assumption that humans are predisposed to respond to stimuli in a predictable manner based on stable and measurable personality traits particular to the individual has been a continuing topic of research. The literature provides a myriad of terms and

concepts presumably similar to the hypothetical construct sensation seeking, but defining and measuring these terms has proven problematic due to nonstandard terminology as well as the inherent lack of reliability in human measurement. The present study uses sensation seeking as the elemental term for the construct. While degrees of difference can be attributed to other terms present in the literature, the various definitions contain the common premise that there exists a psychological and/or biological basis for individual variance either in the pursuit of or in the response to stimuli. Included in this review is research corroborating the sensation seeking construct through related terms.

Sensation Seeking

In his 1994 book *Behavioral Expressions and Biosocial Bases of Sensation Seeking*, Marvin Zuckerman defined sensation seeking as "…the seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risk for the sake of such experience" (p. 27). In a study involving 46 scales from eight personality trait questionnaires with 271 college student participants, Zuckerman concluded that sensation seeking and impulsivity are both related to the broad trait of psychoticism as defined by Eysenck (Zuckerman, Kuhlman, & Camac, 1988; Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993).

Historically, the sensation seeking construct was developed by Wundt (1893), further explored by Hebb (1949) and fundamental to a theory of extraversion by Eysenck (1967). A Sensation Seeking Scale (SSS) was first developed by Zuckerman, Kolin, Price and Zoob (1964) while subsequent improvements by Zuckerman and coauthors have resulted in the version: The Sensation Seeking Scale IV (1971). Originally applied to

sensory deprivation research, the SSS was developed to operationally define individual differences in the optimal level of stimulation. The SSS and its successive scales have been used in hundreds of studies exploring various phenomena but as mentioned earlier were developed and primarily used with college-aged participants. Moreover, the SSS did not attempt to make a distinction between positive (constructive) and negative (destructive) sensation seeking as a primary purpose of the scale. The present study attempts to provide a scale to address this potentially useful dichotomy and to insure the new scale is applicable to a younger adolescent population more likely to benefit from early identification and intervention.

Also of interest historically is psychologist Frank Farley's initial research which provides some basis for his later writings and the sensation seeking construct (Farley & Farley, 1972). He has contributed to the understanding of sensation seeking as a personality construct through essays in edited books and articles in popular periodicals. In 1986 Farley noted that sensation seekers, he called them "Thrillseeker, Type T personality or Big T," seek excitement by any means. He stated that some sensation seekers play a positive part in the social order through creative means while others tend to be destructive and identified as delinquent or criminal. Farley labeled the positive sensation seekers "T plus" and the negative sensation seekers "T minus" while at the same time attributing an individual's "choice" of positive or negative behaviors to social circumstances.

In the area of psychopathology, the high-scoring individuals on sensation seeking measures have consistently been correlated with drug users, sociopaths, and delinquent behaviors. Assuming schools and society continue to have limited educational resources

and scant intervention agendas, there is a need to identify children and adolescents who have increased stimulation needs, then to further identify those that have a propensity towards socially destructive futures. Finally, based on their identification, effective intervention strategies must be implemented in an attempt to thwart the T minus or negative sensation seeker's potentially destructive behaviors.

Arousal

Quay (1965) posited that psychopaths are generally underaroused and need extra stimulation to maintain an optimal state. High sensation seekers require increased or varied stimuli to maintain homeostasis and while, "Most psychopaths are high sensation seekers, most high sensation seekers are not psychopathic and find variation that is not antisocial in their work, social, or leisure activities"(Zuckerman, 1999, p. 235). Important to this arousal theory is Cleckley's (1976) listing as a psychopathic trait the lack of emotional arousal including remorse or shame. Thus for some sensation seekers, the lack of aroused anxiety associated with low general affect functions to negate punishment as a behavioral inhibitor.

At a more basic level, individuals adjust the level of arousal sought in the environment, usually unconsciously, through the reticular activating system (RAS). The RAS forms a special system of nerve cells linking the medulla, pons, midbrain, limbic system, and cerebral cortex. The RAS functions as a sentry. In a noisy crowd, for example, the RAS alerts a person when a friend speaks and enables that person to ignore other sounds (*The Columbia Encyclopedia,* 6th ed. 2003). In addition to the RAS, other research suggests a biochemical role in sensation seeking such as testosterone and monoamine oxidase. If, as discussed later, arousal has a biological component, the

poignant “make my day” rejoinder by the miscreant adolescent takes on psychobiological significance. In fact, Gray (1973) argued that personality traits have developed to support adaptation to classes of stimuli based on positive or negative reinforcement. He and others concluded that sensitivity to either depends on the individual’s neurobiology in conjunction with their motivational system (Gray, 1992; Cloninger, Svrakic & Przybeck 1993; Netter, Hennig & Roed, 1996; Zuckerman, 1991). Perhaps the psychopathic sensation seeker cannot utilize vicarious arousal and may actually invite punishment or worse, seek stimulation through the infliction of harm on others (Zuckerman, 1999).

Impulsiveness and Disinhibition

Impulsivity can be defined as the failure to resist an impulse, drive, or temptation that is harmful to oneself or others. It is a measurable feature of behavior, manifesting as impatience (including the inability to wait for rewards), carelessness, risk-taking, sensation seeking, an underestimated sense of harm, and extroversion. Other disorders, notably attention deficit hyperactivity disorder (ADHD) and mania, may also contribute to the expression of impulsivity (Hollander & Evers, 2001). The impulse-control disorders may belong to a group lying at one end of a spectrum of compulsive-impulsive disorders related to risk-taking or avoidance, with impulsive disorders being driven by pleasure or arousal, and compulsive disorders being driven by reduction of anxiety (Hollander, 1998). The ability to moderate pathological impulsivity is of great clinical and public-health relevance because impulsive disorders incur large costs to society, and are associated with substantial morbidity, mortality, social, family, and job dysfunction, accidents, suicide, violence, aggression, criminality, and excessive use of health-care, government, and financial resources (Hollander & Evers, 2001).

The relationship of sensation seeking to impulsiveness was explored in a study of the construct as a predictor of task performance (Oates, 1995). Primary task performance measured as decision times indicated that high sensation seekers were less affected by task complexity than low sensation seekers. One implication, supported by Eysenck and Eysenck (1977) and Barratt (1985), is that delinquent individuals lack the cognitive restraint required to plan for the future. As discussed later, recent advances in MRI brain scanning techniques suggest this lack of restraint or ability to consider behavioral consequences effectively is related to brain maturation.

For example, significant group effects were found using Zuckerman's Sensation Seeking Scale (Zuckerman, 1964) and Barratt's Impulsiveness Scale-II (BIS-II) (Barratt, 1995) for patients with kleptomania. This study compared patients with kleptomania, patients with alcohol abuse or dependence, and psychiatric patients without impulse-control disorders or substance-related disorders on several key psychopathological dimensions. In addition, the comorbidity of kleptomania with other psychiatric disorders was examined. Eleven patients with kleptomania were recruited along with 60 patients with alcohol abuse or dependence and 29 psychiatric comparison patients. All participated in structured clinical interviews. Significant group effects were found for the BIS-II total and cognitive impulsivity scores, with the patients with kleptomania having higher impulsivity scores than the other groups. Significant group differences were indicated for the Sensation Seeking Scale total and disinhibition scores (Bayle, Caci, Millett, Richa, & Olié, 2003).

Psychoticism and Antisocial Personality Disorder

While H.J. Eysenck and S.B. Eysenck categorized personality on two dimensions: Extraversion-Introversion and Neuroticism, a third dimension called Psychoticism was later added (Eysenck & Eysenck, 1963; 1977). Further research led Eysenck to second-order extraversion traits including impulsiveness. A factor analysis of items from the Eysenck Personality Questionnaire (EPQ) proposed that Impulsiveness was one of the factors contributing to Extraversion and Psychoticism (Eysenck & Eysenck, 1977, p. 59).

Hare and Cox (1978) factor analyzed the Psychopathology Check List (PCL) and in a subsequent study, Hare and colleagues found two consistent factors (Harpur, Hakistan, & Hare, 1988). In 1991, Hare described these as Factor 1, "callous, and remorseless use of others" and factor 2, traits including sensation seeking ("need for stimulation and proneness to boredom") and impulsivity (Hare, 1991). Zuckerman considers the second factor: Impulsive Unsocialzed Sensation Seeking as the extreme of a normal dimension of personality found in analysis of questionnaire scales, and the basis for the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition (DSM-III) and DSM-III-R classification of Antisocial Personality Disorder (APD) (Zuckerman, 1989).

As defined by Lykken (1995), psychopaths exhibit a lack of anxiety, guilt, and depression as well as general low arousal of all emotions including positive ones. Additional characteristics include aggressive, impulsive, undersocialized, and sensation seeking traits. Using the Psychopathology Check List (PCL) criteria, antisocial personality disordered (APD) prisoners spend more of their time in prison, have more charges against them after release and show fewer declines in criminal activity than other prisoners (Hare & Jutai, 1983).

Thus, an association has been established that links sensation seeking, arousal, impulsiveness, disinhibition, antisocial personality disorder, and psychoticism. The current study proposes to explore these personality traits under the construct sensation seeking. Additionally, support is provided for a dichotomy between negative versus positive sensation seeking. Further study correlates negative behaviors with the developed scale. Possible treatment paradigms are proposed.

As stated in the previous chapter, an impetus for the present study is to contribute to the existing research assessing the sensation seeking construct with other than college students. Perhaps as a sample of convenience, college professors and others have included few sampling plans utilizing younger participants (Zuckerman, 1978; 1979; 1994). Regarding older participants, there exists enough research, literature, and anecdotal support to exclude individuals older than 25 years from sampling plans. For instance, insurance industry automobile accident projection rates for older drivers empirically support the idea that as they age, individuals engage in less risk-taking. Prison populations continue to reflect the incarceration of relatively young offenders. Commercial advertising, including beer and cigarette marketing, persists in targeting a younger population more prone to experimentation and risk. Older individuals may become less predisposed to risk based on brain maturation (i.e. frontal cerebral cortex) in conjunction with increased levels of monoamine oxidase.

In his writings, Farley (1973; 1981) noted that while sensation seeking is related to those contributing to society as well as those that detract from it, he concluded that these characteristics do not exist in the same individual. Farley cites socioeconomic class as a determinant of positive or negative behavior since the environment dictates whether

an individual has access to travel, sports, etc., or is limited to illegal activities. Further, Zuckerman (1999) found that many of the personality disorders occur most frequently in the lowest socioeconomic level.

Developmentally, sensation seeking and risk-taking appear to function collectively. Stifter and Putnam (2000) generated data supporting sensation seeking characteristics in children as young as 2 years of age. The researchers studied 90 children at 6, 12, 24, and 25 months by presenting them with low intensity and high intensity objects. Children who readily reached for the high intensity object were deemed high approach as compared to their peers. Those high approach youngsters were more likely to perform more risky activities such as reaching inside a black box and jumping off of stairs. When additional factors such as number of verbalizations and emotional expressions were analyzed, the statistical model was similar to adult forms of sensation seeking.

Sensation seeking tendencies of children ages 1, 3, and 5 years old were measured by Putnam, Belsky, and Crnic (1997) using interview questions like, “Would you rather go down a slide head first or go down feet first.” Additionally, the parents were asked to complete the Child Behavior Checklist (Achenbach, 1991) and interviewed regarding observational ratings of their children’s behavior at ages 12 and 13 months. The results indicated that low sensation seeking scores were related to high levels of internalizing. Interestingly, no significant relation was found between externalizing behaviors and sensation seeking. The authors suggested that lack of inhibition and sensation seeking are not directly related.

Participants between the ages of 11 and 14 years were asked by Martin et al. (2002) to complete a drug use self-report, a pubertal-stage questionnaire, and the Sensation Seeking Scale for Children SSSC (Russo et al., 1993). The SSSC was used based on Russo's et al. standardization and validation study which yielded three unique factors, entitled Thrill and Adventure Seeking, Drug and Alcohol Attitudes, and Social Disinhibition. Of the 208 adolescent participants in the Martin et al. study, 48% (N = 61) of the boys and 20% (N = 16) of the girls were recruited from a child psychiatry clinic focusing on youths with disruptive disorders and emphasizing attention-deficit hyperactivity disorder (ADHD). The remainder of the participants were either identified as receiving stimulant drugs for ADHD or were not screened for behavioral problems.

Adolescence has and continues to be the most overrepresented age group for performing risky behavior. Various factors appear to contribute to this phenomenon and continue to challenge researchers, educators and parents to intervene in effective ways. Arnett (1992) presented a developmental perspective in his review of what he termed reckless behavior in teens. While Arnett prefers the term reckless, the present researcher prefers the expression negative sensation seeking for at-risk behavior that, if performed, carries the connotation of significant harm to self or others. Factors promoting negative behaviors were determined by Arnett to include sensation seeking, physiological characteristics, cognitive development, peer influences, and egocentrism. A subsequent study by Arnett in 1993 suggested that a "predisposition or global trait" (p. 293) directs behavior, both reckless and otherwise, depending on environmental influences. In 1995 Arnett explored aggressiveness and its relation to sensation seeking and reckless behavior. Again, sensation seeking was considered a predisposition to negative behavior.

By means of Cooper's (1994) four categories of substance use motivations and 508 adolescents, an investigation of anxiety sensitivity and sensation seeking, among other personality factors, led Comeau, Stewart, and Loba (2001) to conclude that high intensity seeking and low anxiety predicted enhancement motives for alcohol use. They asked 238 females and 270 males (mean age = 15.1) to complete the Arnett Inventory of Sensation Seeking (AISS; Arnett, 1994) and other self-report measures. The AISS consists of a 20-item scale with two ten item subscales entitled Intensity and Novelty. Arnett deemed criterion validity was good and internal consistency was acceptable based on responses by participants aged 16–18. With measures of alcohol and drug use by adolescents as young as 12 years of age, Comeau, Stewart, and Loba (2000) found the AISS to have good concurrent validity and acceptable factorial validity. In the 2001 study, Comeau, Stewart, and Loba found that adolescents who are highly anxious and fear anxiety symptoms are more likely to try to control anxiety through use of alcohol and cigarettes. Furthermore, high risk reasons or motivations for alcohol use were shown to be associated with sensation seeking.

While the purpose of the current study is to provide an instrument for the identification of negative sensation seekers before they endanger themselves and others, an additional perspective may prove valuable. The disconcerting aspects of adolescent sensation seeking maintain a prominent place in the media and with teachers, parents, and law enforcement officers. However, risk-taking by adolescents has been a part of growing up for some time. Ponton (1997) wrote that although teens have more opportunity for taking dangerous risks, their reasons for doing so may not include just the traditional teenage rebellion. She posited that teenagers are going through a natural maturation

process of confronting and experiencing risks associated with self-discovery. Ponton concluded that parents can promote healthy risk-taking. It follows that adolescents identified as being prone to more risky or negative behaviors should be targeted by both social institutions and parents as in need of more acceptable risk-taking experiences and not simply punishment.

According to Jessor and Jessor (1977), adolescents purposefully seek out risks. They suggest that such behaviors permit adolescents to: take control of their lives; express opposition to adult authority and conventional society; deal with anxiety, frustration, inadequacy, and failure; gain admission to peer groups and demonstrate identification with a youth subculture; confirm personal identity; and affirm maturity and mark a developmental transition into young adulthood. Additionally, behaviors considered risky by adults might not be interpreted as such by adolescents. Definitions of these behaviors are based on adult norms (Alexander et al., 1990; Tonkins, 1987).

Alexander et al. (1990) initially asked a group of either male or female rural eighth graders to describe “things that teenagers your age do for excitement or thrills.” The student suggestions were collapsed into six items representing risk-taking and an overall risk-taking score was computed. Then, a cohort study sample of 758 students was surveyed annually over 2 years from eighth to ninth grade. Principal components analyses were performed for each time period leading the authors to conclude the unidimensionality of risk-taking. They further concluded that while daring behavior is viewed differently from delinquent acts as girls mature, risk-taking behavior patterns for boys and girls were similar and did not significantly differ from findings for the total sample. The clustering of items within a single factor indicated that delinquent and

physically daring behaviors were perceived similarly. Also relevant to the present study were Alexander et al.'s findings that adolescents who scored higher on the risk-taking scale were more likely to initiate sexual activity and substance use in the ninth grade than those who scored lower. The authors analyzed the associations between eighth grade risk-taking scores for participants who reported no involvement in risky behaviors and their subsequent reported behaviors in the ninth grade. The results demonstrated that 56% of the eighth grade students who had risk-taking scores in the upper 25% became sexually active in the ninth grade, while only 26% in the lower 25% of risk-taking scores indicated sexual activity the next year. Finally, Alexander et al. discussed the fact that risk-taking by adolescents warrants further study and that a measure of risk-taking is important in determining the antecedents of problem behaviors.

Using a 23 item self-report questionnaire with 440 adolescents (mean age = 18.4 years), Gonzalez et al. (1994) explored adolescents' perception of their risk-taking behavior. They divided the questionnaire into sports and danger-related questions. Additional questions addressed relationship and personality variables that were used as dependent measures for an analysis of variance performed with high/low risk-takers on each of the subscales. The results indicated that: high sports risk-takers as opposed to overall low risk-taking takers engaged in more danger-related risk-taking and drug use; high sports risk-takers had higher self-esteem than overall low risk-takers; high danger risk-takers engaged in high sports risk-taking as well as greater drug use; and high danger risk-takers reported less intimacy with their mothers and less family responsibility-taking behaviors, but less depression than did their low risk-taking peers. The authors concluded

that the high danger risk-taking group might have more socioemotional problems than do the high sports risk-taking group.

The present study intends to identify these negative sensation seeking individuals since there are those adolescents that strain existing resources put in place to ensure a safe and prosperous society. An important endeavor would be to predict which individuals are at risk for behaving in a harmful manner and intervene both for their sake and for the public's. Regardless of the etiology of sensation seeking, the cost to society and families for the actions of some adolescents remains unacceptably high.

The *Youth Risk Behavior Surveillance--United States, 1999 Report* (Kann et al., 2000) monitors six categories of health-risk behaviors often established during adolescence that contribute to the leading causes of mortality and morbidity among youth and adults. This report summarizes results from the national survey, 33 state surveys and 16 local surveys during February through May 1999. It does not indicate separate statistical results for male and female adolescents. In the United States, approximately three fourths of all deaths among persons aged 10–24 years result from only four causes: motor-vehicle crashes, other unintentional injuries, homicide, and suicide. Results from the 1999 *Youth Risk Behavior Surveillance* indicate that numerous adolescents engage in behaviors that increase their likelihood of death or injury to themselves and others.

Valuable social resources would be well spent in determining which youth are more likely to contribute to troubling adolescent statistics and then invest in intervention strategies designed to ameliorate those particular individuals' possibly impending risky behaviors. While research has identified numerous at-risk behaviors that are correlated with negative outcomes, by definition the risky behavior must occur to qualify the

adolescent as at-risk. Theories attempting to explain adolescent risk-taking have included individual dispositional traits; biological models examining genetic, neurological and puberty based influences; ecological assumptions based on social experiences; parental monitoring behavior; and developmental perspectives combining the changes that occur during adolescence. Thus far, these theories have not been supported by enough research to provide conclusive practical value. Sensation seeking as a personality construct was considered along with locus of control as factors influencing adolescents' engagement in risk-taking behavior by Rolison (2002). While she concluded that locus of control was not related, participants indicating higher sensation seeking tendencies were affiliated with more risk-taking. The following studies have found a significant relationship between sensation seeking and at-risk factors such as drug/alcohol use, other delinquent behaviors or psychopathology.

Earlier research by Bates (1993), showed that personality factors such as sensation seeking measures tend to be higher in youth who are more involved in substance use than their peers. A subsequent study by Bates, White, and Labouvie (1994) supported the link with sensation seeking and drug and alcohol use among teenagers. The focus of the second study was on initial level and changes over three years in sensation seeking needs and substance use for 584 adolescents. Participants were initially contacted using randomly generated telephone numbers of New Jersey households that were weighted by population density. Eligibility was based on year of birth and the absence of any serious physical, mental, or language disability. The Disinhibition subscale from Form V of the Sensation Seeking Scale (Zuckerman, 1979) was administered and the frequency and quantity of beer, wine, hard liquor, and marijuana use in the past year was

determined from self-report ratings on a 10-point scale. Experience with other illicit drugs was also self-reported on a 1–10 point scale. Alcohol was indicated at each testing occasion as being used by approximately 22 percent of the sample with males consuming beer in a larger average quantity and more frequently than females who reported a larger increase in wine use after 3 years. The data showed that for sensation seekers, initially high levels of substance use was maintained over time and sometimes increased. The authors concluded that the need for stimulating experiences may be a significant indicator of drug use during adolescent development and conversely those adolescents who maintained low levels of sensation seeking needs reported consistently low substance use across time.

Following a study by Earlywine, Finn, and Martin (1990) that linked disinhibition and drinking, sensation seeking served Earlywine and Finn (1991) as a third variable that could account for the covariance between behavioral disinhibition and drinking habits. They asked 107 undergraduate men to complete anonymously: (a) The MacAndrew (MacAndrew, 1965) and Socialization (Gough, 1969) scales; (b) The experience-seeking and disinhibition subscales of the Sensation Seeking Scale (Zuckerman, 1971); (c) The novelty seeking subscale of the Tridimensional Personality Questionnaire (Cloninger, 1987); and (d) A measure of quantity and frequency of alcohol use adapted from Cahalan and Cisin (1968). Identical items from scales were counted toward the score of only one scale to avoid inflated correlations between measures. Data were analyzed by means of Joreskog and Sorbom's (1986) LISREL VI program. Two three-factor models were computed using sensation seeking as an exogenous or second order construct relating to both behavioral disinhibition and drinking. When the sensation seeking link was

eliminated, there was no significant decrease in the fit of the model suggesting that the association between behavioral disinhibition and drinking habits may be a product of the relation of each to sensation seeking. Caution should be exercised in generalizing the results to other populations that differ such as: younger participants, women, and women alcoholics. Earlywine and Finn emphasized that causal interpretations should wait until longitudinal studies validate the relation between personality and substance use.

In their study of the interaction between certain personality traits and desire to drink (DD) in 171 undergraduate students, Forsyth and Hundleby (1987) found that the DD was greater in boring situations for those scoring higher on sensation seeking. Via a self-report questionnaire, participants (64 males and 107 females; mean age of 20.2 years) were asked to indicate their DD relative to one-sentence descriptions of 50 social situations. Regression analysis using DD as the dependent variable and dummy-coded situation as independent variables gave a squared multiple correlation of $R^2 = .77$. The results supported the view that personality-situation interaction has a part to play in determining DD. One hypothesis suggesting that the high sensation seeker will show greater DD in situations involving boredom was largely supported. The authors concluded that the drinking of alcohol is a complex matter and cautioned that a simple model could prove to be misleading or harmful. The study is cited here to support the relationship between sensation seeking and the consumption of alcohol with the additional purpose of suggesting a possible treatment paradigm that encourages sensation seekers to avoid or adapt to boring situations. As discussed later in the treatment section of this study, the development of alternative positive stimulating behaviors designed to replace negative activities may prove a useful approach.

Relevant to the present study was a longitudinal study by Newcomb and McGee (1989) designed to examine alcohol use and criminal behavior. They used latent variable longitudinal structural models that revealed significant patterns of alcohol use, deviant activity (fighting, stealing, destroying property, and getting into trouble with authorities) and sensation seeking. A sample of 847 high school students (tenth through twelfth grades) was utilized in their finding of "clear support" for the hypothesis that early alcohol use generated or increased later deviance and criminal behavior. Conversely, the deviance events measure did not predict alcohol use. Of specific importance to the present study was the finding that when sensation seeking was included as an underlying influence, it did account for the association, while early delinquent behavior had no effect on changing the pattern of alcohol use. Additionally, they found that there were few major sex differences in the magnitude or patterns of association between alcohol and deviance either by cross-sectional or longitudinal measures. Relevant to this researcher's study is not only Newcomb and McGee's support for the relationship between the sensation seeking construct and negative behaviors but their conclusion that certain types of delinquency may be prevented by providing high sensation seekers with alternative opportunities for meeting their needs.

In an attempt to test the predictive power of a sensation seeking explanation for the variation in self-reported substance use among 1179 high school students, Wood, Cochran, Pfefferbaum, and Arneklev (1995) concluded that the sensation seeking factor generates a statistically significant influence. The authors stated that specific attention was given to assure an adequate sampling of white, black, and Native Americans consisting of male and female adolescents attending grades nine through twelve.

Anonymous, confidential questionnaires were administered and while the non-participants (due to nonattendance) might have higher rates of substance use, the authors felt their absence actually provided a more conservative test of the hypothesis. Results indicated that the sensation seeking indicators outweighed the impact of the study's control variables (age, gender, race, socioeconomic status and rural/urban residency) for each substance use category. Finally, the authors discussed the reason some individuals choose deviant sensation seeking over socially accepted forms of sensory stimulation. They concluded from their study that limited access to culturally approved forms of sensation seeking results in deviance. Importantly, the sensation seeking explanation of substance use questions traditional sociological theory by expanding the construct to refute deterrence and even rational choice since the concomitant reward (thrill) inherent in the risk of being caught and punished may outweigh the perceived risk.

Increasingly, literature exploring adolescent risk-taking supports the view that negative sensation seeking behavior may be rewarding in and of itself. This research follows lines of investigation based on neurophysiology and endocrinology (Ellis 1991; Ellis & Coontz 1990; Gove & Wilmoth, 1990; Koob 1992; Wise & Hoffman 1992; Zuckerman, 1984). These studies conclude that physiologic processes that reinforce risky behavior are similar to the processes that produce the reinforcing effect of many drugs. The dopamine synapses in the nucleus accumbens produce a pleasurable sensation (reward) from both exogenous (drugs) and endogenous (endorphins) experiences since they activate the same dopamine reward system. The cycle—of which the individual himself may not be aware—leads to an increase in substance use and risky behavior.

However, as discussed later in the treatment section, the thrill of risky behavior becomes deviant only when it is pursued in a negative or prohibited fashion.

Risk-taking and Sensation Seeking

An early study by Donohew, Helm, Lawrence, and Shatzer (1990) found that peer sensation seeking contributes to adolescents' illegal substance use for specific drugs and that up to 80% of adolescent users were high sensation seekers. They further showed a reinforcing relationship between individuals with high sensation seeking needs and selecting friends with similar behaviors (Donohew et al., 1999). While the sensation seeking characteristic for eighth graders had an indirect effect on individual adolescents' own use of marijuana and alcohol, it had a direct effect on their peers' sensation seeking and use of both marijuana and alcohol. Donohew et al. (1999) used a structural equation modeling analysis of the associations among sensation seeking, friends' sensation seeking, and the use of alcohol and marijuana. Participants consisted of 428 (60% female) eighth, ninth, and tenth graders who could name a peer who had also participated in a primary (sixth grade) marijuana and alcohol prevention program. In the study, participant sensation seeking was measured by the Sensation Seeking Scale Form V (SSS) Zuckerman (1978) with 24 items selected for suitability for adolescents taken from 40 item SSS correlations. The participant named three peers with whom they interacted most often and those sensation seeking scores were averaged. Correlations were derived from seven items reflecting the positivism of participants' family interaction. Four items assessed drug attitudes and one item ("It is okay to buy alcohol.") assessed alcohol attitude. Two items queried participant's estimate of the proportion of their friends who use alcohol and marijuana. Susceptibility to peer influence was measured by asking

whether the respondent would “smoke marijuana if asked” and “drink alcohol if offered some.”

Most salient to the present study are the conclusions by Donohew et al. (1999) that: participants picked persons of similar sensation seeking levels and the sensation seeking level of these peers tended to influence peer alcohol and marijuana use; attitudes toward alcohol and drug use were directly related to sensation seeking; sensation seeking is a characteristic influencing with whom adolescent peers cluster. Identifying adolescents with negative sensation seeking tendencies could therefore help target those that need more powerful prevention messages required to attract and hold their attention.

Psychopathy and Sensation Seeking

For over three decades, researchers have been interested in exploring the link between sensation seeking and psychopathic behaviors. One early investigation by Emmons and Webb (1974) involved twenty psychopaths, 20 acting-out neurotics, and 20 normal control prisoners as determined by their scores on the Minnesota Multiphasic Personality Inventory (MMPI). In their examination of subjective correlates of stimulation seeking using Zuckerman’s (1960) Sensation Seeking Scale, Emmons and Webb found that the psychopaths were stimulation seekers. In addition, they concluded that channeling these sensation seeking behaviors into socially accepted behaviors could facilitate treatment.

In a sampling technique not typically found in the research literature, Zuckerman and Neeb (1979) used the 2,077 persons that responded to an article in a popular magazine to explore the correlation of sensation seeking and psychopathology. These self-selected participants completed and returned Zuckerman’s Sensation Seeking Scale

(SSS) in addition to supplying personal information such as past treatment, hospitalizations, and diagnoses of psychiatric disorders. To control for the selective factors in the sample, Zuckerman and Neeb matched controls from the same sample concluding that while particular scores of the groups within the sample should not be compared to other groups, relative comparisons within the sample groups were warranted. The authors held that an advantage to this sampling technique was that most of the respondents were likely not in the acute phase of a clinical episode when responding. Additionally, general motivation for the responses by both the psychiatric disordered and the control group was presumed to be based on an interest in finding out more about themselves.

Important to the present sensation seeking study were the various psychiatric classification disorders that Zuckerman and Neeb compared to corresponding control groups. The nineteen participants who reported that they had been diagnosed as manic or manic-depressive were significantly higher than their matched control on the SSS total score. Naturally, manic behavior may represent sensation seeking in its most extreme form. Citing a diagnosis of depression, 39 participants' SSS scores showed small differences compared to their matched controls. The literature supports the notion that unipolar depressives, as compared to manic-depressives, do not seem to differ from normals on sensation seeking. The sociopathic group scored significantly higher on the SSS than the matched controls and in contrast to the other disorder groups consisted of two-thirds males versus females. The group was defined largely as substance abusers while two said they were criminals and one reported being diagnosed sociopathic. For the schizophrenic, neurotic, and personality trait disorder groups (n = 20, 100, and 15,

respectively), the SSS scores compared to the controls were not significant. While keeping in mind that the participants were self-selected, it may be concluded that the Zuckerman and Neeb study supports the relationship between sensation seeking and at-risk factors such as drug/alcohol use, other antisocial behaviors, and/or some psychopathologies.

Purpose of the Study

Instrument and Early Identification

For the individual adolescent with a propensity for sensation seeking, many activities, especially the dangerous ones, may come across as a needed thrill. Combine this disposition with the debatable ability of the typical adolescent to make informed and appropriate decisions in terms of taking risks and problems ensue. Factors that could be considered in the adolescent decision-making process should include their ability to assess consequences and the efficacy of a more mature decision-making process. For example, in a study by Beyth-Marmom, Austin, Fischoff, Palmgren and Jacobs-Quadrel (1993), adults were found to note a greater variety of consequences than adolescents while Parsons, Siegel and Cousins (1997) determined that the perceived benefits were more predictive of involvement in risk-taking behaviors by adolescents than were perceived risks. Differences in adolescent decision making compared to adults included not only the consideration of different options but the relative likelihood, value, and particular consequences attached to those decisions (Furby & Beyth-Marom, 1992).

In a study cited earlier as supporting sensation seeking as an important personality construct, Rolison (2002) found that the total sensation seeking score on the Sensation-

Seeking Scale (Form V) (Zuckerman, 1979) was correlated with risk-taking frequency for her sample of 171 older adolescents. Behaviors ranging from everyday risk to high-risk behaviors were determined by the Risk Involvement and Perception Scale (RIPS) which consists of 19 self-report questions (Siegel, Cousins, Rubovits, Parsons, Lavery, & Crowley, 1994). Assessing the same sample of 74% female and 26% male adolescents, there was no significant correlation between their total scores on Rotter's Internal-External (I-E) Locus of Control Scale (Rotter, 1966) and the dependent variable: risk frequency. However, Rolison's multiple regression analysis of the data revealed that the total sensation seeking score and the total perceived risk score together accounted for between 41% and 50% of the variance in risk-taking frequency. Of additional importance to the present researcher's purpose was the conclusion that the sensation seeking variable be perceived as an essentially stable personality trait given that it was a more significant predictor of risk-taking frequency than even the sampled adolescents' perceived risk variable.

Alternative to Punishment

The contribution of the aversive motivational system to the sensation seeking construct was explored by Lissek et al. (2005) by introducing predictable and unpredictable stimuli across high and low sensation seeking groups. While Zuckerman (1994, p.385) contends that high sensation seekers exhibit an approach behavior or appetite arousal towards intense experiences and low sensation seekers avoid such intensity because of no positive affect from the experiences, Lissek asserted the two groups differ in terms of their motivational traits. Low sensation seekers, therefore, may avoid such intensity because of increased apprehension or aversive feelings due to fear of

negative consequences. Men and women were divided into high (N = 17) and low (N = 17) sensation seeking groups based on the Sensation Seeking Scale-Form V (SSS-V; Zuckerman, 1994) with like ages and anxiety levels using the State-Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). Startle stimuli (loud noise and puff of air) were delivered to the participants in conjunction with eye blink and skin conductance measures. Less fear and anxiety during anticipated predictable and unpredictable aversive stimuli was exhibited by the high sensation seekers than the low. The authors suggested that combined with the appetite arousal experienced by high sensation seekers, a blunted fear response to aversive stimuli may lead them to dangerous activities. In an earlier study, Lissek and Powers (2003) found similar results among high versus low sensation seekers using threatening video images.

Reviewing the literature supports the efficacy of the early identification of adolescents prone to negative sensation seeking. When these youngsters make potentially risky decisions based on a personality trait (sensation seeking) as opposed to a thorough analysis of the consequences or even the fear of punishment, our traditional paradigm of education and punishment should be evaluated. Regardless of the reason for adolescents' negative behaviors, most communities have no alternative to punishment. Treatment paradigms designed to address these sensation seekers prior to the commission of risky behaviors may prove valuable and are discussed following a review of the objectives and postulates relative to the present study.

Objectives

Self-Report Scale

The present study develops a self-report scale intended to identify adolescents that have a propensity for negative sensation seeking. According to Wade and Brannigan (1998), a common criticism about illicit activity surveys is the tendency for people to provide socially acceptable responses. Since the present study's target population is students in high school and the instrument is a self-report scale, one might expect that the respondents could either over or underrate-rate their sensation seeking tendencies, thus biasing the truth. The possibility that sensation seeking exists as a social norm was explored by Rowland and Heatherton (1986). They instructed 25 male (mean age = 19.15 yrs) and 27 female (mean age = 19.19 yrs) college students to complete Zuckerman's (1979) Sensation Seeking Scale Form V (SSS) under two sets of instructions, once under the usual instructions and once under the instructions to create the best possible image for someone they found attractive to then read about them. Scores under the best image instructions (M = 23.85, SD = 6.52) were higher than scores under the usual instructions (M = 18.99, SD = 5.40). The authors concluded that the data is evidence of norms for the social desirability of sensation seeking and that the scale scores may be susceptible to instructional manipulation. To increase reliability in the present study, administrators read a script asking for no talking and directing the students to respond to the scale items in an objective and honest manner. Additionally, participants were reminded that they would not be identified by name and only the researcher would have access to the data. Under these instructions, candid responses should be at least similar to a study of over reporting in a Student Drug Use Survey by Adlaf, Ivis, Smart, and Walsh (1995), which

found in successive surveys an error rate of about 0.5 per cent. The researchers based their finding on no student responding positively about usage of a fictitious drug across successive surveys from 1977 to 1995.

Another concern with using a self-report scale arises from a 2002 study by Guttmacher, Weitzman, Kapadia, and Weinberg concluding that frequently absent students engaged in more risk-taking behaviors than those who were rarely absent. However, the same study found that intensive efforts to obtain the responses of absent students in classroom-based investigations were not warranted by the small improvement produced in regard to risk-taking behavior estimates. The study included 2049 10^{th} grade students who were administered follow-up surveys both in and out of the classroom. While there was a large sample in this study, all of the participants were 10^{th} graders from public schools in New York City so generalizations to other age groups should be made carefully.

Predict Negative Sensation Seeking

The adolescent's perception of high-risk behavior is essential for both their identification and any subsequent intervention efforts. Busen and Kouzekanani (2000) examined the psychometric properties of the revised Adolescent Risk-Taking Instrument (ARTI) (Busen, 1991), which was designed to measure the high-risk adolescent's perception of risk-taking. Black (n = 83) and Hispanic (n = 84) 12– to 21–year olds from an urban population seeking services at a health clinic were used for data analysis. The majority of the sample consisted of single women who were sexually active and preferred condoms for contraception. Exploratory factor analysis supported construct validity and Cronbach's coefficient alpha supported internal consistency. Reliability for the risk-

taking construct was .80. Since the present study utilizes participants representing the general population and functions as a predictive instrument, it should be noted that the participants in both the development and successive use of the ARTI were already identified as high-risk. The original ARTI was pilot tested using 70 students enrolled in a federally funded vocational training program while the revised instrument sample consisted of an additional 300 high-risk adolescents. The ARTI was subsequently used to study recidivism by urban adolescent trauma victims (Redecker, Smeltzer, Kirkpatrick, & Parchment, 1995) and urban minority adolescent's perceptions of health care (Honig, 1996). Thus, the Busen and Kouzekanani (2000) study using early sexual debut and substance abuse as markers for the high-risk sample and the ARTI are limited by the sampling techniques. The authors recommended that additional studies should address the need for recognition of high-risk behaviors in school-aged adolescents before withdrawal or expulsion from school and that intervention should occur in the school setting. Further, the authors proposed the teaching of responsible decision making skills and that positive, constructive outlets be designed to reduce negative risk-taking for identified adolescents. The present study is designed to utilize a more demographically representative sample of general education high school students and to identify those negative sensation seekers (potential risk takers) before they engage in destructive behaviors.

Postulates

Physiological Factors

Identifying physiological factors related to the sensation seeking construct continues to be a research concern and assumes that some individuals prone to sensation seeking may be forced by particular circumstances to satisfy their need for stimulation through negative or socially unacceptable behaviors. Sensation seeking as a biological trait has been investigated through various biochemical studies at the cellular and molecular level. Relative concentrations of certain brain chemicals have been examined to help explain the presence or absence of the sensation seeking construct. A strong case for a biological basis of the sensation seeking trait begs the punishment/treatment issue in favor of less punitive and more preventative/therapeutic approaches to some adolescent behaviors.

Monoamine Oxidase

As the primary neurotransmitter of the central adrenergic nervous system, the relative amount of norepinephrine in the brain has been found by researchers to be at low levels in sensation seekers (Zuckerman, 1994). Further, the enzyme monoamine oxidase (MAO) regulates neurotransmitters in the brain by inactivating the monoamine norepinephrine. Experimental studies summarized by Zuckerman (1994) concluded that through the catecholamine pathways, MAO levels direct the sensation seeker's response to novel stimuli and reward via the limbic system. Thus, comparatively low levels of MAO have been correlated with participants that score higher on sensation seeking questionnaires.

Support for the present researcher's thesis of a need for the identification, of and intervention with, adolescent negative sensation seekers can be derived from a longitudinal study of a large cohort of New Zealand youth. The participants were a group wherein almost every male cohort member was genotyped for common variants of the promoter sequence for the MAO-linked gene. Based on their research, Caspi et al. (2002) concluded that while low MAO levels did not have a significant main effect on violence, it had a significant interaction with parental maltreatment. There was a substantial difference between participants who had been maltreated in childhood—parental abuse or neglect, and other forms of harmful treatment—in combination with low MAO levels compared to individuals with low MAO and no childhood maltreatment. The study found that the 12% of participants who were both maltreated and low MAO accounted for fully 44% of all convictions for violent crimes. Additionally, the maltreatment x low MAO interaction was independent of social class: given that nearly a third of the severely maltreated low-MAO males had convictions for violent crimes by their late 20s whether rich or poor. Sensation seeking adolescents, having a physiologically based lowered MAO level, may face double jeopardy based on a need for increased stimulation that when combined with parental abuse creates a biological predisposition towards negative behaviors including violence.

Correspondingly, virtually all longitudinal studies of sensation seekers have found a decrease in the trait as the participant grows older. A biological link related to the age decline of sensation seeking may parallel the natural decrease in gonadal hormones, including MAO. Importantly, this hormonal decrease is directly correlated to the reduction of the brain enzyme MAO and its inhibitory effect. While not directly

addressing the adolescent population targeted in the present paper, some studies have associated reduced levels of MAO with both increased motor and social activity in infants and antisocial behaviors in adults—supporting the premise that sensation seeking has a biological component. In support of the notion that an individual's level of sensation seeking may be biologically based and therefore beyond their control, specific hormonal factors related directly to the study of sensation seeking are discussed.

Serotonin

Low brain levels of serotonin have been associated with a lack of behavioral inhibition in both animals and humans (Soubrié, 1986). In his own review of the literature, Soubrié presented support for the role of serotonin neurons in animal and human behaviors related to arousal, anxiety, impulsivity, and punishment. He maintained that serotonergic neurons and more importantly the individual organism's relative reduction in cerebrospinal fluid (CSF) levels of the main metabolite of serotonin (5-HIAA) were related to an increase in behaviors that are usually suppressed and a decrease in the ability to tolerate delay before acting. Also of interest is the agreement among researchers that a negative correlation exists between CSF 5-HIAA, a history of aggression and criminal behavior. Finally, Soubrié's findings associate low levels of CSF 5-HIAA more strongly with a lack of impulse control than with a given diagnostic category of psychiatric illness or previous medications.

Sensation seeking has also been shown to be related to low serotonergic function in men diagnosed as antisocial personality disorder (ASP). Alterations in neurotransmission have been previously implicated in disorders characterized by impulsivity, aggression, low mood, and substance abuse. The responsivity to an altered

serotonergic level in 15 men with antisocial personality disorder and substance abuse issues compared to 12 controls was assessed by Moss, Yao, and Panzak (1990). Psychometric measures of hostility and aggression, impulsivity, cognitive tempo, and various aspects of sociopathy were obtained for the participants. The results suggest that altered serotonergic function is associated with assaultiveness and dysphoria but not impulsivity in individuals with ASP. Caution in generalizing this later finding should be exercised since it may be an artifact of the low number of participants.

The basal noradrenaline metabolites of 30 personality disordered patients studied by Trestman et al. (1993) found basal correlations ($p = .002$) with sensation seeking and risk-taking behaviors. Siever and Trestman (1993) cited evidence for the implication of both noradrenaline with impulsivity, and serotonin with impulsivity and aggression in their study of the serotonin system and aggressive personality disorder. Of additional interest to the present study was Siever and Trestman's review of animal models suggesting that lesions producing serotonergic dysfunction were associated with increased aggression and failure to suppress punished behaviors. While the dynamics of a human model are more complex, these studies suggest that the failure of some individuals to respond in the anticipated direction to traditional punishment regimes may have a biological base. Therefore, intervention/treatment paradigms for adolescents may require a more innovative and proactive approach than is currently the practice.

Androgens and Estrogens

Gonadal hormones and especially the androgen testosterone may be related to individual differences often found in studies of sensation seeking. Daitzman, Zuckerman, Sammelwitz, and Ganjam (1978) found increased levels of both androgens and estrogens

in two separate samples (25 and 51 participants, respectively) of college males identified as sensation seekers using The Sensation Seeking Scale Form IV (Zuckerman, 1971). After the initial 25 participants' health status was reviewed at the Student Health Service, a lab technician drew blood samples from the volunteer participants and a single blind analysis was performed assaying for androgen. To provide a more stable measure of their hormonal level, the group of 51 male participants was assayed twice during a 10-day period using the same procedure as the first group plus a measure of their estrogen level. There was no significant average hormonal level difference between the second group's samples. Reliable and significant correlations were found between the sex hormone androgen and the Sensation Seeking Subscale, Disinhibition (the desire for social and sexual disinhibition as expressed in social drinking, partying, and variety in sexual partners) while estrogen correlated with the general Sensation Seeking Scale score. The authors concluded that the pattern of correlations suggests a biological model for sensation seeking and that hormonal differences influence neurotransmitters and inhibitors thereby regulating the optimal level of excitement or arousability of the cortex. They cited sensation seeking behaviors as attempts to reach or maintain homeostasis.

In a 1980 study by Daitzman and Zuckerman, low sensation seekers were found to have average testosterone levels for their age while high sensation seekers had unusually high levels of both hormones (estrogen). The experiment involved 40 white male participants ages 17-20 years old that were pre-selected based on their scores, (lowest and highest 20%) on the Disinhibition subscale of Zuckerman's Sensation Seeking Scale Form IV (1971). Two separate blood samples 3-10 days apart were drawn and along with each participant's psychological test data analyzed by two university

computing centers. The high Disinhibition scoring group had significantly ($p < 0.01$) higher levels of testosterone and estrogen related hormones than the low scoring group. It was noted that the low disinhibitors had typical mean values and variations of testosterone compared to normal males ages 18-22 years old (Legros, Palem & Servais, 1973) but the mean value for the high sensation seeking group was over one standard deviation above normal. Factor analysis of 56 variables, including the hormonal variables, resulted in two factors accounting for 42.5% of the variance. Factor I was identified as Stable Extraversion and had high (over 0.6) factor loadings identified as Social Presence, Sociability, Self Confidence, Capacity for Status, Extraversion, Heterosexual Experience, and Number of Heterosexual Partners, and General Sensation Seeking. Factor II was called Social Deviancy and had high (over 0.4) positive factor loadings identified as MMPI F (overall index of deviancy), Schizophrenia, Hypomania, Psychopathic Deviance, Homosexual and Heterosexual Experience, and External Locus of Control. Testosterone showed a 0.48 loading on the Stable Extroversion factor and estradiol (a type of estrogen) had a loading of 0.62 on the Social Deviancy factor. The authors conclude that high Disinihibition subtest and general Sensation Seeking Scale scores are related to both androgens and estrogens rather than to testosterone alone. It should be noted that the relationship between gonadal hormones and sensation seeking may involve lowered levels of MAO as a regulating mechanism important in explaining resulting behavioral correlates such as convictions of crimes, drug abuse, psychiatric disturbance, and juvenile delinquency.

Psychobiological studies promise advances in the knowledge and treatment of individuals with personality and other behavioral disorders—creating what David

Wasserman (2004) calls “technological optimism: the belief that a science or technology will achieve many or most of its advertised goals”. Of course, the legal and monetary cost of genotyping large groups of adolescents to identify low MOA individuals would be prohibitive. Additionally, it appears limiting to imply a trait or dysfunction based on one physiological condition or neurotransmitter. The recent multifactorial neurotransmitter models, likely based on an individual’s genetic inheritance, along with the concomitant influence of environmental experiences presents the most productive explanation for a particular trait or disorder. However, until and if research on the physiological basis of behavior produces an effectual medical model to preemptively correct adolescents’ negative conduct, innovative and proactive identification of at-risk individuals along with effective advances in new schooling practices ought to be a social researcher’s and educator’s goal.

Genetic and Environmental Factors

Supporting the hypothesis that individual differences in sensation seeking are influenced by genetic factors, Koopmans (1995) determined that the monozygotic twins’ sensation seeking score correlations using Zuckerman’s Sensation Seeking Scale (Zuckerman, 1971) were about twice the dizygotic twins’ correlations. Through an analysis of 1591 adolescent monozygotic and dizygotic twin pairs, differences in sensation seeking levels could be attributable to genetic factors by accounting for between 48 and 63% of the twins’ variance. The twins’ sample characteristics included: rural and urban; ages 12-24, mean age = 17.7; education of parents representative of general population; 275 male and 360 female monozygotic; 258 male and 322 female dizygotic; 485 opposite sex twins. Variance and covariance for Zuckerman’s four

sensation seeking subscales (using a model with additive genetic, shared environmental, and unique environmental factors with sex differences resulting in scales based on heterogeneity of means) were calculated for each zygosity group with PRELIS 1.2 (Joreskog & Sorbom, 1986). Unique environmental correlations were smaller than the genetic correlations, but were still significant.

The contribution of a family/environment component was negligible for 12 of 14 personality measures, and personality similarities were estimated as heritable (.39 to .58) in a study by Tellegen et al. (1988). The Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982) scales were administered to 217 monozygotic and 114 dizygotic reared-together adult twin pairs, and 44 monozygotic and 27 dizygotic reared apart adult twin pairs. Except for four opposite-sex dizygotic reared apart adult twins, all pairs were of the same sex. Since the environment factor, as defined by the authors, apparently also includes measurement error and nonsystematic changes over time, the personality trait variance may not amount to more than about 35%, compared to the approximately 50% that is genetic. In support of the present researcher's contention that the sensation seeking trait in adolescents may be genetically based, Tellegen et al. twins' study found that the third order MPQ dimension, Constraint (impulsiveness and fearless sensation seeking), was highly inheritable.

The genetic and environmental contributions to the sensation seeking trait were investigated based on 422 pairs of adult volunteer twins' scores on the Sensation Seeking Scale (Form IV, Zuckerman, 1971) by Fulker, Eysenck, and Zuckerman (1980). The twins sample consisted of pairs of monozygotic females (n = 174), males (n = 59) and dizygotic females (n = 112), males (n = 26), unlike sex (n = 51). A series of between- and

within-pair analysis of variance, one for each zygosity group, was the basis of the twins' genetic analysis. Each of the five zygosity x sex groups was corrected for age and sex then a multivariate analysis of variance performed. The results specified the proportion of sensation seeking variation that was inherited by the participants as 58.34%. The authors concluded that shared environmental influences, additional personality trait variance, and measurement error had a minor effect on individual differences in sensation seeking.

Elevated scores of impulsivity and sensation seeking in deviant groups (drug abusers, delinquents, and psychopaths) are explained in part by Hur and Bouchard (1997) through correlated genetic predispositions. Fifty-seven pairs of identical and 49 pairs of fraternal twins who were reared apart and 90 individuals (non-twins) completed the Control scale of the Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982) and the four subscales of the Sensation Seeking Scale (SSS; Zuckerman, 1979). An ANOVA showed no significant mean or variance differences among the groups, satisfying a basic assumption of the twin method. A bivariate correlational analysis indicated age was significantly negatively related to all four of the subscales of the SSS but not to the Control scale. Model-fitting heritability estimates for the Control scale and the SSS ranged from 40% to 55%. The remaining variance was attributed to random environmental and measurement error. The authors concluded that genetic factors, which lead to low impulse control, overlap with genetic factors related to high sensation seeking. Elevated scores of both impulsivity and sensation seeking in drug abusers, delinquents, and psychopaths are explained in part by the correlated predisposition to impulsivity and sensation seeking traits. Of importance to the present study is the possibility that when an individual's genetic predisposition to sensation seeking combines

with an environment that provides only negative behavioral choices/models, the individual is more likely to exhibit anti-social conduct.

In summary, twin studies have consistently found that sensation seeking trait variance is due primarily to genetic and not environmental influences. For example the following twins studies found sensation seeking variance due to genetic factors: 58% by Fulker, Eysenck, and Zuckerman (1980); 54% Extraversion and 44% Neuroticism by London Twin Study (262 pairs aged 7-17 years) Eaves, Eysenck, and Martin (1989); a reanalysis of Loehlin and Nichols study (1976) of 850 pairs aged 18 years by Eaves, Eysenck, and Martin (1989) yielded 61% Extraversion and 52% Neuroticism.

While the limitations of the cited studies include effects from, relatively small sample sizes and variations in analytic procedures, the majority of the twins' studies to date conclude that the shared environments played little part in contributing to individual differences in measures of sensation seeking. Further, the sensation seeking trait appears to be directed by additive gene action wherein as much as 60% of the genetic variation is based on a common factor. As previously discussed, physiological factors contributing to the sensation seeking trait suggest a dynamic, interactive paradigm that is probably responsible for an individual's propensity to seek a level of stimulation significantly above that of their peers for an estimated 30% of adolescents (Hartmann, 1996). It follows that if the individual's genes determine relative amounts of neurotransmitters and related brain chemicals, then either sophisticated medications and/or innovative behavioral intervention models are required to address some individuals' reliance on negative activities to satisfy their need for increased stimulation. Of course the present researcher prefers the latter and after reviewing a relatively new avenue of research

supporting the hypothesis that some adolescents may lack the brain maturation to appreciate the ramifications of their sensation seeking actions, behavioral intervention models are proposed.

Brain Maturation and Negative Behavior

Campaigners wanting to ban the death penalty for convicted adolescent murderers may contribute another dynamic relative to the present study's contention that sensation seeking has a biological component. Recent research using brain scans suggests that some adolescents may behave on factors beyond their conscious control. Baird and Fugelsang (2004) reviewed brain scans taken during a test showing adults and teenagers scenarios such as eating a salad or swimming with sharks. The results illustrate that the teens had a more active prefrontal cortex and took longer than the adults to reach a decision when asked to classify each scene as safe or dangerous. The researchers concluded that teenager's brains are less developed than adults who had more basal ganglia activity during the decision process and therefore a more automatic response. The death penalty foes did note that that while Baird's participants were under 18 years old, there was currently no way to know the brain maturity level of an individual 18 to 21 year old. Adolescents may engage in risk-taking behaviors because, compared to adults, they lack the developed neural hardware needed to generate behavioral alternatives. Without the life experiences necessary to direct the neural maturational process, it may be physically impossible for adolescents to foresee effectively the potential consequences of their actions. The United States Supreme Court has been furnished briefs noting deficits in the brain structure, function, and attendant behavior in adolescents compared to adults by the American Psychological Association and the American Medical Association.

Baird and Fugelsang concluded that neuroscience can not as yet determine when an individual's brain structure and function have matured. Interested adults then must use self-report or other available measures to identify and treat adolescents whose behavior may challenge the well being of both society and its children.

Increased Female Sensation Seeking

While the majority of previous studies have supported the assumption that males are more likely than females to engage in sensation seeking, the present study includes both genders. A trend toward increased numbers of females being adjudicated or classified as delinquent and conduct disordered warrants their participation. Additionally, the previously reviewed study by Koopmans et al. (1995) determined that gender differences in genetic influence for sensation seeking were not significant.

In a Byrnes, Miller, and Schafer (1999) meta-analysis of 150 studies comparing risk-taking tendencies of over 100,000 male and female participants, there were significant shifts in the gender gap between successive age levels and the gender gap seemed to be growing smaller over time. The authors note that this change could be affected by a specific culture's norms for appropriate gender role behaviors. Differences in gender risk-taking warrant the consideration of two additional conclusions from the meta-analysis. First, different demands are made of males and females depending on the context. Second, the studies support the fact that males engage in risk-taking earlier than females but females eventually catch up and in some behaviors (smoking in college; and drinking, drugs and risky sex in post-college) surpass males.

Farley and Farley (1972), hypothesized that attempted escapes from detention may provide stimulating experiences and researched the relationship between sensation

seeking and delinquent behavior among institutionalized girls. While the sample size of 27 female residents (age range 14-17) was small, the results representing the number of escape attempts in the high- as compared to the low-stimulation seeking girls - were four to one. For females high in sensation seeking, there were significantly more frequent punishments by supervisors for disobedience when compared to girls of low sensation seeking. The difference in frequency of fighting was reported to be in the same direction ($p < .06$).

Importance of the Study

Sensation Seeking, Risky Behavior and Lower Grade Point Average

The present study intends to create an instrument designed to identify individuals that are likely to engage in negative sensation seeking behaviors. Such a tool could lead to educators and others charged with ensuring the well being of adolescents toward designing more relevant intervention paradigms and curricula. Of course, the process of adolescent maturation into responsible adulthood remains a phenomenon necessitating the continued commitment of social and intellectual resources including extensive research. Spence (1997) attempted to integrate major concepts in adolescent risk-taking including sensation seeking. Multiple regression techniques were employed to analyze the relationship between concepts of risk-taking, contextual variables and participant report of engagement in risky behaviors that relate to problem development. The Sensation Seeking Scale (SSS-V) by Zuckerman (1978) was used to assess differences in individual risk-taking behavior. Spence hypothesized a positive relationship between adolescents' sensation seeking and engagement in risk-taking behaviors including drug

use and problem drinking. The sample for the study was 179 high school students in tenth to twelfth grades whose teachers volunteered to have their classes participate. Using Levene's test for equality, the sample demographics were comparable for male and female students, grade level, grade point average, and socioeconomic status. The sample consisted of 88.1% self-reported white students. The dependent variable for the study was the Multi-Problem Behavior Index (MPBI), an instrument designed to measure the self-reported frequency of engaging in alcohol and marijuana use, sexual intercourse and deviant behaviors such as defacing property, shoplifting, etc. Students' scores on the SSS-V and the MPBI were significantly correlated ($r = .63$, $p = .001$) indicating a strong relationship between the individual's reported preference for high levels of sensation seeking and reported engagement in problem behaviors. The author reported that stepwise multiple regression analysis indicated that SSS-V scores comprised the most significant variable (40% of the variability) for explaining the MPBI variance. The study's other variables included: locus of control; risk perception/judgment factors; invulnerability beliefs; and contextual variables such as gender, grade level, and grade point average. The author concluded that "students who indicate a greater preference for novel, complex, and varied stimuli are more likely to report engaging in general deviance, alcohol and marijuana use, and sexual intercourse" (p. 71). Also of interest were the findings that adolescent sensation seeking and risk-taking behavior appeared to be consistent for both genders and that grade point average explained a significant amount of variance in the dependent variable for males. The present study attempts to explore these issues.

Childhood and Adult Sensation Seeking

While sensation seekers may behave in either a positive or negative direction, causal factors based on a nature/nurture paradigm have not been fully supported in the literature. There are studies suggesting sensation seekers do have specific measurable outcomes significantly different from those considered normal. A longitudinal study by Raine, Venables, Reynolds and Mednick (2002) predicted that high stimulation seeking 3-year-olds would have higher IQs and superior scholastic and reading ability by 11 years old when compared to low stimulation seekers. Stating that stimulation seeking in young children is greatly under researched, they drew data from 1,795 children (51% boys and 49% girls) from the island of Mauritius (a country lying in the Indian Ocean between India and Africa). In addition, Zuckerman (1994) reviewed previous studies showing a positive relationship for nonpathological groups between stimulation seeking, intelligence, and Scholastic Assessment Test scores using male and female high school or college aged participants. Similar positive findings were found in samples of drug abusers (Carol & Zuckerman, 1977), juvenile delinquents (Cohen, Dingemans, Lesnik-Oberstein, & van der Vlugt, 1983), 9-14-year-old boys with psychiatric disorders (Russo, Stokes, Lahey, & Christ, 1993), and hospitalized alcoholics (Kish & Busse, 1968). Thus, while there has been consistency in observing significant relationships between stimulation seeking and intelligence across both pathological and normal older populations, there remains a dearth of studies linking stimulus seeking in children to later cognitive ability.

Noteworthy to the present study are the findings of Raine et al. (2002) that individuals with elevated sensation seeking tendencies show a positive association with

high cognitive ability. Of further interest was their finding that, when controlled for parental education and occupation, there was little change in the correlations. Finally, they conclude that early stimulation seeking is associated with more substantive, longer term increases in IQ than the provision of a short term educationally enriched environment.

Sensation Seeking and Childhood through Adult Aggression

For some negative sensation seekers, especially when they are exposed to parenting that is inconsistent or overly punitive, aggression may be the default choice to satisfy their need for stimulation. First determining which individuals are negative sensation seekers could aide in interrupting the continuity between early aggression and later delinquency and crime found by Farrington (1991). He reviewed 16 surveys spanning periods of up to 21 years and found the average correlation for early aggression by males to later acts was .68. In reviewing other studies, Farrington concluded that the most important early precursor of aggression and violence was the harsh attitude and erratic discipline by the parents. Additional parental factors included low income, high daring [risk-taking], criminality, aggressiveness, and alcohol abuse. The major purpose of Farrington's study was to measure correlations between factors possibly causing offending behavior for 411 males interviewed by psychologists at aged 8, then at 10 and 14 years of age. Of the 389 males alive at 18 years old, 94.9% were interviewed by Farrington's research office. The parents were interviewed once a year when the boys were from 8 to 15 years old. Finally, the participants were interviewed at ages 21 and 25 by social science graduates. Offences were determined through searches of the government criminal record office and the annual self-report of boys 14 years and older.

Following interviews with the participants at 32 years old, summary data indicated 153 men (37.2%) were convicted of 683 crimes with an average of 4.5 each. Of this cohort, 50 (32.7%) were convicted of at least one violent crime. For the 32 year olds, all of the measures of their youthful aggression (interviews: personality; psycho-motor impulsivity; labeled by parents and peers as taking many risks) predicted negative outcome behaviors. The predicted activities included: 10 or more months of unemployment in the previous 5 years; smoking more that 20 cigarettes a day; drinking more than 10 pints of beer in one session in the previous month; drunk driving; use of marijuana; and hitting wife or female cohabitant. These findings tend to support the proposal that early risk-taking may signify a predisposition to continued risky activities. Of additional importance to the present proposal concerning the early identification of negative sensation seekers was Farrington's possibly co morbid variable finding that the convicted violent offenders were significantly more likely to have authoritarian parents (defined as harsh parental attitude and discipline and parental disagreement) than the non-violent offenders. Thus, the sensation seeking child's overly controlled negative environment may contribute to the likelihood of antisocial, delinquent, and even criminal behavior. Early identification and treatment of these youngsters, possibly allowing them to express themselves in creative, less restrictive activities, may well be more cost effective in human and financial terms than later obligatory punishment.

Coincidentally, Olweus (1979) also reviewed 16 studies on the stability of aggressive behavior and reaction patterns longitudinally. Each study averaged 116 participants with a total of 1,814 male individuals, ages 2 years to 30 years old. At the time of the first measure of aggression, the age of the participants varied from 2 to 18

years old and the reassessment intervals ranged from 6 months to 21 years with an average of 5.7 years. Attenuation-corrected data are reported in addition to the uncorrected raw data, while Olweus' conclusions are based on disattenuated coefficients. He presented a description of the samples and procedures of the studies under review along with definitions of the variables studied. Significant to the present study, Olweus found a high degree of stability (50% to more than 90% of variance) for aggressive behavior at ages 12 and 13 years for periods of 1 to five years. Interestingly, the different environments discussed in the reviewed studies appeared to have little effect on the stability of aggressive behavior thus suggesting an inherent predisposition towards aggression. Finally, Olweus concluded that personality traits are useful in predicting behavior particularly for some individuals who actively select and may even create the situations in which they act aggressively.

Scope and Delimitations of the Study

While the question of what may cause a particular individual to seek sensations beyond the "normal" level could carry important long-term personal and societal implications, the purpose here is to identify the negative sensation seekers for intervention and treatment programs before they are in a crisis situation. As previously discussed, such identification may be possible either through genetic, neurobiological, or behavioral methods with advantages and limitations inherent to each. Because of the fledgling status and associated problems with the technological/medical methods of identifying high sensation seekers, the present researcher proposes a self-report scale for the targeted population. Additionally, the present study emphasizes the study of a group

of adolescents that because of its demographics—youth, low income, and relative geographic isolation from legitimate stimulating opportunities—receives little attention in the research. This population, however, continues to provide our schools with challenges, the health care system with patients, and the juvenile justice system with criminals.

Certainly the pharmacological approach to treating mental disorders and eventually negative personality/character traits holds great promise. For example, prescribing MAO supplements for youngsters who are at risk for sensation seeking tendencies based on a genetic and/or neurobiological diagnosis seems valuable. Perhaps these adolescents will someday benefit from a prescription drug that would allow them to function in a society that requires compliant behavior. Pending such a drug-driven future are not only medical issues but legal and moral concerns as well. Without prior justification, the individuals chosen for expensive medical/behavioral screening may cite discrimination. As Wasserman (2004) wryly notes, policies promoting the implantation of high MAO genes or the abortion of low MAO fetuses would be problematic. Also of concern would be the effect of an intrusive medical model that treated Farley's (1986) "T-plus" individual's who, because of their high sensation propensities, may actually play a positive part in the social order through creative endeavors. Similarly, caution is recommended for therapeutic inhibition or personality trait neutering of those citizens that could provide laudable actions, including the protection of others through the military or law enforcement. As Wasserman (2004, p. 5) states: "It may be no less facile to assume that every criminal is a potential cop than to assume that every cop is a potential criminal."

With the current state of medical/behavioral science and the aforementioned attenuating drawbacks, identification and intervention for at-risk adolescents must logically occur through society's traditional and currently most relevant model—school. Utilizing the setting in which all adolescents are required to participate appears to be the most pragmatic and efficient approach at this time. Determining which students need specific programs designed to address their need for increased stimulation (genetically, neurologically or environmentally based) should also take place in the school. Further, designing and implementing a curriculum that functions within the school setting could provide a service delivery model most likely to positively impact the largest number of at-risk adolescents. Additional suggestions for intervention are offered in the Discussion section.

Research Objectives

The present study develops three research objectives requisite for determining the salient SSAS items expected to identify negative sensation seeking adolescents and three additional research objectives designed to explore the resulting scale's construct validity. Each objective is predicated on a previous analysis. While additional research objectives could be derived from the presenting data, the following are judged to be the most important to the present study's purpose.

Data Reduction

The primary research objective anticipated a correlated set of self-report SSAS items representing discrete negative vs. positive sensation seeking scales. A first-order item factor analysis evaluated participants' responses to the initial 60 SSAS items. As in

the subsequent factor analyses, only factor loadings greater than .295 were considered salient in the study.

Derived from ten factors or groups of correlated items from the first-order factor analysis, the next research objective predicted a second-order factor analysis would yield two distinct factors entitled positive and negative sensation seeking. Based on the their face/content validity and suitable (>.295) pattern coefficients, 50 SSAS items were selected from the original 60 items to represent the positive and negative sensation seeking tendencies of the participants.

Validity

To explore the convergent and divergent construct validity of the resulting SSAS negative and positive sensation seeking factors or scales, additional research objectives were constructed. Based on a review of the sensation seeking literature, two dependent variables (weighted office behavior and grade point average) were further evaluated in relation to the SSAS item scales through ANOVAs. An alpha of <.05 was required to confirm each hypothesis.

Negative SSAS Items

A key hypothesis related to the convergent construct validity of the SSAS investigates the negative SSAS score, weighted school office behavioral concerns, and GPA of the participants. An ANOVA was employed to assess the relations. The variables included each participant's: (a) score on the factor analyzed SSAS negative items, (b) weighted behavioral score based on the number and type of referrals to the school office plus resulting discipline procedures, but omitting tardies and skipping, and (c) GPA. Each variable was considered separately via an ANOVA.

It was hypothesized that high scores for the SSAS negative sensation seeking items would indicate a main effect (<.05) with the participants' weighted score for school office behavioral concerns. Results of an ANOVA indicating a significant relationship between students' negative SSAS item total score and weighted school behavioral concerns supports the convergent validity of the SSAS as a predictive measure of the negative sensation seeking construct and its direct relationship to inappropriate school behavior.

A second hypothesis suggests that students with high scores for the SSAS negative sensation seeking items would point toward an inverse main effect (<.05) with their grade point average (GPA). An ANOVA indicating a significant main effect between a student's high total score on the negative SSAS items and a corresponding lower GPA, supports the convergent validity of the SSAS as a predictive measure of the negative sensation seeking construct and low grades.

Positive SSAS Items

The previous two factor analyses and support for the efficacy of the negative sensation items derived from the ANOVAs put forward two null hypotheses to explore the main effect (p.<.05) between the positive sensation seeking SSAS items score and the dependent variables school office behavioral concerns and GPA. A nonsignificant difference between high and low positive sensation seeking and inappropriate school behavior or GPA would under gird the discriminatory value of the positive sensation seeking construct and its divergent or discriminate validity. No significant relationship between a participant's score on the SSAS positive sensation items and school behavioral concerns or GPA suggests that while some students may be predisposed to sensation

seeking, they do not necessarily seek stimulation through negative behaviors as defined by school office behavioral referrals or lower grades.

III. METHODS

Overview

Presented in the previous chapters was the rationale for the development of a scale to measure adolescent negative and positive sensation seeking and the theoretical basis for the sensation seeking construct. The Method chapter details the research design selected to best support the development of the Sensation Seeker Attention Scale (SSAS) and to confirm the present study's hypothesis that high negative sensation seeking adolescents are more likely to engage in socially unacceptable behaviors than low negative sensation seekers. Conversely, it is assumed that both high and low positive sensation seekers are less likely to engage in socially unacceptable behaviors than those individuals with high negative SSAS scores. Following the Method chapter, a discussion of the utility of predicting which adolescents are more likely to seek sensation in a negative manner is presented including suggestions for intervention programs. Finally, limitations of the study are delineated.

The present study developed the SSAS as a measure of sensation seeking by adolescents. The SSAS is intended to identify adolescents that have a propensity for negative sensation seeking via a self-report rating instrument. Adolescence, as the targeted age group, is a period in life where responsibility is typically minimal and unsupervised free time at a maximum. This fact combines with the findings by Lotz and

Lee (1999) that sensation seeking peaks during adolescence, and by Csikszentmihalyi and Larson (1984) that boredom in school can lead to acts with peers taking various forms, including poor school performance and crime (Raine, 1997).

A description of the research design begins the Method chapter. The design is formulated so as to set the stage for subsequent statistical analysis and inference. The pilot study is presented as a vehicle for the initial development of the instrument, data collection techniques, and characteristics of the sample. The rationale for the selection of the participants in both the pilot and primary studies is explained. Procedures concerning participant parental permission, the distribution of materials, and instructions to the participants are discussed. The data collection and recording processes are described and followed by a statement of methodological assumptions. A detailed review of the statistical analysis includes an account of inherent and attendant limitations. Finally, a summary of the method is provided.

Research Design

Two relatively distinct statistical procedures comprise the present study's research design. It was assumed that when the data from the two procedures were analyzed, the SSAS could be considered a reliable and valid rating instrument capable of predicting which adolescents have a propensity for negative sensation seeking. First, two related data reduction procedures using principal axis factor analysis were performed on the data, and secondly, ANOVA procedures were applied to two dependent variables: school office behavioral referrals and grade point average (GPA). The factor analysis procedures were utilized to identify specific items from the SSAS that represent an individual's

preference for negative sensation seeking. The subsequent ANOVAs were intended to confirm a relationship between the SSAS negative sensation seeking items and students who actually exhibit school office behavioral concerns and low grades. Support is provided as well for evidence of a significant dichotomy between negative versus positive sensation seeking as measured by the SSAS.

Initial SSAS item content was determined on a rational, face/content validity basis and was stated in terms thought relevant to today's adolescent population. In addition to the researcher's original items, selected items from existing adult sensation seeking instruments and popular literature were modified for inclusion in the SSAS. A balance of 60 items, each thought to measure positive (30) or negative (30) sensation seeking, was included. Prior to the pilot study, items were formed and further refined through asking a random sample of 35 adolescents to offer comments and improvements. While Anastasi (1988) cautioned that face validity is not validity in the technical sense, Burns (1996) stated that evidence of content validity is supported when experts in the field agree that the items are representative of the nature and quality of the field of study. Prior to the study, professionals in the area of adolescent education and counseling were asked to submit specific item modifications. These qualified adults with experience in working with troubled adolescents included special and general education teachers, school administrators, counselors, university professors, and fellow doctoral students. This rational procedure can be employed when attempting to measure a trait for which a generally established method has not been determined (Edwards, 1970). Finally, specific SSAS item inclusion on the scale was determined from the pilot study through factor analysis of the items. While the study is discussed in more detail later, note that a sample

of 126 high school students randomly chosen from available English classes served as the participants. Thus, the scale development used an approach similar to that of Lanyon and Goodstein (1982) designed to ensure factor analytic/internal uniformity. The factor analysis of the present SSAS data is predicted to yield two distinct factors or sets of items entitled negative and positive sensation seeking. Item-factor correlations are computed to obtain internal consistency estimates for the derived factors (Kline, 1983). As advocated by Lanyon and Goodstein, the method for the SSAS item construction incorporates an objective procedure including initial rational item creation, expert review, and subsequent factor analysis.

The SSAS rating scale response format using four choices per item was favored to gain information on the strength of the participant's tendency to pursue stimulation in a positive or negative direction. While most sensation seeking scales employ a yes/no or forced-choice format, the present study's Likert Scale response format allows the rater to assign varying degrees of identification with each item as opposed to a choice of all or none. With the more traditional forced-choice format, information is lost relative to the perceived importance or strength a particular item might have in portraying a participant's sensation seeking tendencies. Moreover, requiring the participant to read the item for the purpose of determining the degree to which it applies, not just whether it is or is not a part of his/her personality, may avoid some inherent problems of rating scales with a forced-choice format. For example, the forced-choice format more likely contributes to a distorted response set wherein the participant decides that regardless of item content, responding in one direction (yes or no) is quicker and easier. Using the forced-choice format, another type of response set occurs in which a participant has a

tendency to respond systematically to personality assessment in one direction so as to appear to have or not have that trait (Lanyon & Goodstein, 1982). As mentioned, the present study's use of a four-point scale (Never, Sometimes, Often, Always) provides a measure of degree to which a participant identifies with a particular item. The SSAS rating scale item format may reduce the tendency of a participant to bias the profile since it requires that the participant reflect as to what extent each item represents his or her true feeling.

Factor Analyses

Factor analysis "…addresses the problem of analyzing the interrelationships among a large number of variables (e.g., …questionnaire responses) and then explaining these variables in terms of their common underlying dimensions (factors)." [Hair, Anderson, and Tatham, 1987, p. 235]. Since the objective of factor analysis in the present study is to identify appropriate variables for subsequent application in a correlational analysis, the factor matrix is examined. Such a factor analysis results in a factor pattern demonstrating the underlying internal relationships of the SSAS rating items. The second-order factor analysis predicted two distinct factors entitled negative and positive sensation seeking.

ANOVA

The next statistical procedure investigates the relationship between the predicted negative and positive sensation seeking factors as derived from the factor analyses, and two dependent variables. Lotz and Lee (1999) used the term hedonistic activities to examine adolescents' negative behaviors and found an inverse relationship between such negative behavior and both attendance and grades. Lawrence (1985) found that

adolescents with below-average grades and poor attendance had more acts of delinquency. Thus, these variables were chosen based on previous research, results from the present researcher's pilot study and possible ramifications for establishing treatment paradigms.

Historically, the study of sensation seeking has indicated that males tended to score higher than females on individual rating scales. However, a trend toward increased numbers of females being adjudicated or classified as delinquent and conduct disordered warrants their participation in the present study. Additionally, gender differences in genetic influence for sensation seeking have not proven significant. Based on the scope of the present study, both male and female participants were included but an analysis of their respective contributions to the results was not considered.

Another hypothesis initially considered relative to the present study was that higher social economic status (SES) sensation seeking adolescents are less likely to pursue negative (illegal, socially unacceptable) sensation seeking activities than their lower SES sensation seeking counterparts. Of interest is an adolescent population that, while sharing some of the same characteristics as their more affluent sensation seeking counterparts, may not have the information regarding more positive (non-criminal or more socially acceptable) activities nor financial access to them. The determination of SES was based on each student's eligibility for free or reduced lunch in contrast to those who reported family income that requires they pay full price for school meals. While this participant data was collected, the relation between an individual's SES and self-reported propensity toward negative sensation seeking on the SSAS contrasted with their school office referrals and grades was not explored in the present study.

Pursuit of negative sensation seeking activities by adolescents frequently results in retribution by authorities. As the most salient hypothesis of the study, the first ANOVA explores the relationship between the individual respondent's weighted score of school office behavioral concerns and the SSAS items score determined by factor analysis to measure the negative sensation seeking construct.

Pilot Study

A pilot study was conducted to aide in the development of the Sensation Seeking Attention Scale (SSAS) consisting of 126 high school adolescents (61 males and 65 females) ranging in age from 14 to 19 years old. Approximately 77% of the participants classified themselves as White, 18% as Black, 4% Hispanic, and 1% Asian. The sample was recruited from randomly chosen English classes.

Completing the SSAS rating instrument for the pilot study involved asking adolescent participants to complete demographic information and answer a series of questions involving family order, participation in sports, grade point average, problems at school, etc. On the second and third pages of the protocol, the participants were asked to indicate the level to which they would like to engage in 60 activities. A 4-point scale was utilized on the scale as the item response options and included 1 = Never, 2 = Sometimes, 3 = Often, or 4 = Always. The researcher, with assistance from the classroom teachers, collected data. The teachers involved were given a script that directed the students to select the response that most accurately represented them. It was emphasized to the adolescents that there were no right or wrong answers and that, in responding to each item, they should not be concerned with other students' responses. Indeed, the sharing of

responses was firmly discouraged. Any questions that arose were clarified by the researcher.

To minimize a response set based on social desirability, the pilot study participants were told not to write their names on the protocol and that all personally identifying information would be kept confidential and utilized solely for the researcher's study. Given that the participants did not furnish their names, the procedure used by Gullone, Moore, Moss, and Boyd (2000) for the development of their Adolescent Risk-Taking Questionnaire was used whereby individual SSAS protocols were matched to school records based on other identifying information. All respondents were required to indicate their teacher, room number, current date, grade, gender, race, and date of birth. This information was used determine the student's identity and then to match the rating scale to the individual's attendance records, grade point average, and school administrative office behavioral referrals. The analysis of the student's school records was not used for the present study. For the pilot study, the participant-supplied data indicating trouble with law enforcement authorities was not utilized.

The results of the pilot study principal axis factor analysis supported the two distinct factors entitled negative and positive sensation seeking. With factor loadings equal to or greater than .4 after 14 iterations, 22 of the 60 pilot study items could be assigned to negative (13 items) or positive (9 items). Of specific interest to the present study were the items loading on the factor deemed Negative Sensation Seeking. They included the following (item number and factor loading): 52. Get in fights. (.93); 55. Hit someone before they hit me. (.79); 48. Race cars on public highways. (.70); 50. Do things to see people get mad. (.60); 34. Cuss out strangers on the phone. (.56); 45. Hear people

say I'm crazy. (.56); 54. Hear people say I'm tough. (.52); 47. Scare others. (.45); 53. Make people fall. (.42); 46. Drive with my seat belt off. (.40); 43. Run around with people who break the law. (.59); 21. Give police a hard time. (.46).

Present Study

Four hundred and sixty two high school students submitted SSAS protocols in the present study. Twenty seven of the participants were deleted due to missing SASS item responses and were not present in any analyses. The study examines a self-report measure of the sensation seeking construct and its relationship to two dependent measures, including negative (anti-social) behaviors and grade point average (GPA). The present study utilized some of the same procedures as described in the pilot study with a few notable exceptions. While the researcher administered the SSAS scale to the students in the pilot study, classroom teachers administered the scale for the larger study. This procedural change helped ensure that the researcher could not directly identify any of the students. The teachers were instructed to have the student place and seal their completed protocol into the provided envelope following administration, therefore prohibiting the teacher from seeing a student responses on the SSAS. The Superintendents of the respective high schools instructed their high school principals to chose a data manager to be responsible for the distribution and collection of the SSAS parent consent forms and the SSAS protocols. While the researcher accessed the students' school records in the pilot study, for the present study, the school data manager downloaded the student data and coded it to match the case number on the student's protocol. Consequently for the present study, none of the adults involved were able to match an individual student by his/her name with their school record and completed SSAS scale.

The original protocol was edited prior to the present study by omitting the student's birthday and including a statement forbidding any names of parents, siblings or businesses. A final change for the present study involved simplifying the parent consent form.

Instrumentation

The SSAS scores served as the independent variables and was administered to adolescents to elicit their self-rating of items determined by factor analysis to measure negative or positive sensation seeking. Students were asked to determine the degree to which they would like to engage in various activities. Each participant rated his or her likelihood of participation for each item as: 1 = Never, 2 = Sometimes, 3 = Often, or 4 = Always. As in the pilot study, the following sociodemographic information was requested directly from the participant on the SSAS protocol: estimated grade point average (A,B,C,D,F); type of guardian (parent, relative, other); parents' job type; sibling birth order; sport/activity participation; employment; and career choice. Additionally, the students were asked how many times this year and why they had been referred to the office, Saturday school, in-school suspension, out of school suspension and arrested.

Procedure

A contact person for the researcher, based his or her familiarity with student records and confidential information requirements at each high school, was chosen by the respective principals to serve as a data manager. The data manager facilitated the distribution and collection of the parent consent forms and the SSAS protocols with teachers. Additionally, the data manager downloaded individual school records for each participating student including: date of birth, gender, race, grade, grade point average,

absences, office behavioral referrals (number and reasons), discipline actions, and eligibility category if special education. Finally, the data manager ensured the confidentiality of the students by providing the researcher a nameless coded list matching the student's protocol with their school records by case number. Each teacher involved in the study was furnished a packet by the researcher that included administration instructions, script, parent consent forms or the SSAS protocols, and sealable envelopes. Specific teacher instructions included the distribution, administration, collection, and confidentiality procedures as well as directions for returning the materials to the data manager.

All of the classes at high school #1 were provided a parent consent form for each student. After the signed parent consent forms were returned, 422 SSAS protocols were completed and returned by the classroom teachers via the data manager to the researcher. At high school #2, parent consent forms were provided for the students enrolled in the psychology and sociology classes and resulted in 40 SSAS protocols being completed and returned to the researcher. The public school locations and populations, being similar to many small to medium sized towns in the Southeast, should be noted when considering sociodemographic bias and heterogeneity of the sample.

Upon the data managers' submission of the participants' completed SSAS protocols and coded school records, the researcher scored the protocols. Any participant's protocol found to be missing one or more SSAS item was completely deleted from the study and subsequent statistical procedures. All other types of missing data were deleted listwise during analysis. Next, the individual student's school data were linked with the two variables: school office behavioral referrals and grade point average.

Statistical Analysis

Two interconnected principal axis factor analyses were performed on the SSAS item data. Second, with the participant's weighted school office behavioral referrals score and GPA as the dependent variables, ANOVAs were applied to assess the relations between the negative and positive SSAS items scores.

The factor analyses was intended to identify particular items from the SSAS that represent an individual's preference for negative sensation seeking. Specifically, those items from the SSAS that were statistically determined via factor analysis to represent negative sensation seeking were later subjected to ANOVAs with the two dependent variables: weighted school behavioral office referrals and GPA. Hence, the principal purpose of the study was to determine if a relationship existed between students who indicated they would like to participate in the behaviors represented by the SSAS negative sensation seeking items and those students who in fact exhibit negative behaviors and poor grades. A related purpose was to determine the relationship between positive sensation seeking and negative behavior and poor grades.

Methodological Assumptions

The present study assumes that individuals vary in their need for stimulation and can be differentiated through a self-report scale. According to Wade and Brannigan (1998), a common criticism about illicit activity surveys is the tendency for people to provide socially acceptable responses. Since the present study's target population was students in high school and the instrument is a self-report scale, one might expect that the respondents could either over or underrate their sensation-seeking tendencies, thus biasing the truth. The possibility that sensation seeking exists as a social norm for

students and would prejudice the results may be ameliorated based on the Student Drug Use Survey by Adlaf, Ivis, Smart and Walsh (1995), which found in successive surveys from 1977 to 1995 an error rate of about 0.5 per cent. They used a procedure similar to the present study by not requiring students to furnish their name and informing them that only the researcher would have access to identifying information.

Additionally, the present study assumes a portion of those adolescents identified as sensation seekers can be further recognized as having a tendency to increase stimulation through negative or anti-social means. The literature is replete with studies attributing a significant relation between the sensation seeking construct as measured by self-report and risk-taking, including negative activities. It is frequently noted in the literature that while a considerable portion of individuals who are incarcerated and/or identified as conduct disordered are sensation seekers, most sensation seekers are not criminal or disordered in their activities. Thus, an instrument capable of discriminating between positive sensation seekers and those who may be predisposed to negative activities could prove valuable.

Summary of the Method

The present study proposes to put forward a vehicle for determining the negative sensation seeking tendencies for an identified group of adolescents. Based on the pilot study's results and the subsequent development of the SSAS self-report instrument, 435 high school students completed the scale. The rationale for the selection of the participants and characteristics of the population in both the pilot and primary studies was discussed. Procedures concerning participant parental permission, the distribution of

materials and instructions, data collection and recording process, and finally a statement of methodological assumptions were presented. A detailed discussion of the statistical analysis, including inherent and attendant limitations, is presented in the Results and Discussion chapter.

IV. RESULTS

From the initial sample size of 462 high school students, 27 students with incomplete item protocols were deleted based on one or more SSAS missing items. Four hundred and thirty five students participated in the present study to examine a self-report measure of the sensation seeking construct and its relationship to two dependent measures, including negative (anti-social) school behaviors and academic performance. The sample was recruited from two high school populations. The largest sample of 422 participants came from the only high school in a town of about 30,000 residents. The remaining 40 students were attending psychology or sociology classes at the sole high school in a town of about 74,000. School class or grade included: 9^{th} (n = 140), 10^{th} (n = 107), 11^{th} (n = 116), and 12^{th} (n = 68). The ages of the participants ranged from 14 to 19 years old with 132 males and 297 females. The study sample consisted of 286 African Americans, 124 Caucasians and 9 students of other origins. A complete summary of the participant demographics can be found in Table 2.

Table 2

Participant Demographics (N = 435)

Variable (code)	Number (%)	Range	Mean	Standard Deviation
Age:	433 cases	14-3 to 19-6	16-6	1.14
Grade:	431			
9	140			
10	107			
11	116			
12	68			
Gender:	429			
Female (0):	297 (69.2)			
Male (1):	132 (30.8)			
Race:	419			
White (1):	124 (28.5)			
Black (2):	286 (65.7)			
Other (3):	9 (2.1)			
Special Education:	23 (.05)			
Gifted (1):	7 (1.6)			
L.D. (2):	5 (1.1)			
M.R. (3):	2 (.5)			

(table continues)

Table 2 (continued)

Variable (code)	Number (%)	Range	Mean	Standard Deviation
SES (Federal Lunch):	411 (94.5)			
Free (1):	228 (52.4)			
Reduced (2):	45 (10.3)			
Paid (3):	138 (31.7)			
GPA:	432 (99.3)	.3 to 4.0	2.67	.83
0-.9	13 (3.0)			
1-1.9	70 (16.1)			
2-2.9	167 (38.4)			
3-4	182 (41.8)			
Office Referrals:	229 (52.6)	1 to 115 points	11.7	19.09
None:	206 (47.4)			
Behavior Weight				
Disrupt x1	22 (.05)	1 to 9 points	2.09	2.37
Tardy x2	141 (32.4)	2 to 28	5.11	4.01
Skip x3	33 (.08)	3 to 9	3.73	1.68
Profanity x4	11 (.03)	4 to 4	4.0	.00
Incite x5	6 (.01)	5 to 10	6.17	2.86
Defy x6	155 (35.6)	6 to 60	13.51	11.25
Fight x7	17 (.04)	7 to 14	9.47	3.45

(table continues)

Table 2 (continued)

Variable (code)		Number (%)	Range	Mean	Standard Deviation
Discipline					
Detention	x1	172 (35.6)	1 to 6	1.81	1.13
Sat. school	x2	77 (17.7)	2 to 6	2.9	1.31
In sch.susp	x3	121 (27.8)	3 to 18	5.53	3.65
Suspension	x4	74 (17.0)	4 to 16	6.43	3.62
Altern. Sch	x5	22 (.05)	5 to 10	6.14	2.15

First-order Factor Analysis

The initial statistical procedure endeavored to answer: "How many factors are needed to represent the 60 SSAS items?" and "What do these factors represent?" A first-order factor analysis included the 60 item SSAS scores for 435 participants. While referring to confirmatory factor analysis, Curran, West, and Finch's (1996) cautions regarding suspect values for skewness greater than 2.0 and kurtosis greater than 7.0 may be applicable to the present exploratory factor analyses. However, Micceri (1989) notes that most behavioral research data does not follow a normal distribution and Curran, et al. (1996, p. 17) states: "Indeed, in some important areas of research such as drug use, child abuse, and psychopathology, it would not be reasonable to even expect that the observed data would follow a normal distribution in the population." As indicated in Table 3, the same seven SSAS items have a skewness greater than 3.0 and a kurtosis greater than 7.0, while three additional items report only a kurtosis greater than7.0. It should be noted that

Hu et al. (1992) and Muthén and Kaplan (1992) found that the larger the sample size, the less important the skewness and kurtosis measures. For the 60 SSAS items, first-order statistical values are listed in Table 3 as the mean and standard deviation, as well as, skewness and kurtosis.

Table 3

Means, Standard Deviations, Skewness, and Kurtosis for SSAS Items

Item	*Mean*	*SD*	*Skewness*	*Kurtosis*
1. Cheat to win.	1.50	.61	1.05	1.26
2. Jump off of high places.	1.40	.70	1.80	2.89
3. Play on a sports team.	2.67	1.10	-.11	-1.34
4. Go to new places even if get lost.	2.46	1.00	.140	-1.03
5. Go hear big loud music concerts.	2.64	1.07	-.04	-1.29
6. Do more than one thing at a time.	2.89	.91	-.25	-.96
7. Compete in everything.	2.29	.91	.51	-.49
8. Sneak out of the house.	1.52	.81	1.58	1.84
9. Shoot rifles or pistols.	1.63	.97	1.37	.59
10. Do anything if it’s a dare.	1.74	.84	1.10	.76
11. Change jobs to learn new things.	1.83	.85	.89	.24
12. Ignore pain if I'm having fun.	2.26	1.04	.32	1.08
13. Show off.	2.03	.90	.67	-.23
14. Smash things.	1.72	.94	1.11	.17
15. Pick on someone so they cry.	1.21	.53	2.99	9.69
16. Write dirty words on walls.	1.20	.58	3.29	11.03

(table continues)

Table 3 (*continued*)

Item	*Mean*	*SD*	*Skewness*	*Kurtosis*
17. Sneak on somebody's land.	1.45	.77	1.73	2.29
18. Have body piercings.	2.04	1.07	.66	-.85
19. Play sport/activity.	2.95	1.05	-.46	-1.13
20. Take a dare even if it's illegal.	1.34	.68	2.23	4.90
21. Give policemen a hard time.	1.26	.60	2.78	8.31
22. Surf the internet for hours.	2.68	1.07	-.16	-1.25
23. Get high w/ people break law.	1.22	.65	3.26	10.08
24. Go parachute jumping.	1.44	.81	1.81	2.30
25. Try different drugs at same time.	1.09	.43	5.55	32.07
26. See fights or wrestling matches.	2.00	1.01	.70	-.62
27. Hang around exciting people.	3.28	.82	-.75	-.54
28. Sell illegal drugs.	1.11	.47	4.90	25.04
29. Go to wild, crazy parties.	2.14	1.05	.55	-.88
30. Cheat on tests.	1.74	.85	1.18	.95
31. Watch movies of making love.	1.93	.96	.83	-.25
32. Argue with people who disagree.	2.35	.96	.37	-.79
33. Get hypnotized for fun.	1.34	.72	2.35	5.10
34. Cuss out strangers on the phone.	1.70	1.00	1.29	.40
35. Get people excited when bored.	2.57	1.06	.01	-1.23
36. Jump from activity to another.	2.50	.96	.23	-.94
37. Play violent video games.	2.25	1.19	.34	-1.42
38. Ski or bike down a big hill.	1.52	.89	1.66	1.64
39. Get wasted on alcohol.	1.47	.87	1.81	2.20

(table continues)

Table 3 (*continued*)

Item	*Mean*	*SD*	*Skewness*	*Kurtosis*
40. Go out often so don't get bored.	2.75	1.18	-.21	-1.10
41. Drive a car without license.	1.65	.93	1.32	.68
42. Get a tattoo.	2.02	1.10	.73	-.82
43. Hang out w/ people break law.	1.50	.84	1.71	2.09
44. See how fast a car will go.	1.83	1.08	.99	-.45
45. Get high and go out.	1.27	.74	2.77	6.67
46. Leave my seat belt off in car.	1.86	1.00	.93	-.26
47. Do things that scare people.	1.76	.95	1.10	.18
48. Race cars on the highway.	1.35	.78	2.37	4.74
49. Hurt animals (fun - not hunting).	1.06	.32	6.88	52.70
50. Do things to see people get mad.	1.77	.88	1.10	.55
51. Cuss out a teacher.	1.28	.69	2.77	7.36
52. Get in fights.	1.67	.93	1.31	.74
53. Make people fall down.	1.46	.78	1.87	3.12
54. Hear people say I'm tough.	1.74	.98	1.10	.02
55. Hit somebody before hit me.	1.94	1.10	.84	-.68
56. Steal money/ things.	1.22	.57	3.05	9.87
57. Skip places in line.	2.09	1.06	.58	-.89
58. Carry a hidden gun or knife.	1.25	.71	2.99	8.00
59. Tease someone until they cry	1.21	.61	3.29	10.62
60. Listen to new/unusual music.	2.65	1.11	-.10	-1.35

Based on the students' item scores, the results indicated that the Kaiser-Meyer-Olkin measure of sampling adequacy equaled .903. The KMO indicates the proportion of variance in the SSAS items that might be caused by underlying factors. Large values for the KMO measure confirm that a factor analysis of the variables is realistic. Another indicator of the strength of the relationship among the SSAS items is Bartlett's test of sphericity. It is used to test the null hypothesis that the variables (items) in the population correlation matrix are uncorrelated. A spherical model implies that the repeated contrasts are uncorrelated and the assumption of multiple univariate ANOVA is met (Huyn & Mandeville, 1979). The observed significance level in the current SSAS analysis is .00 and sufficient to reject the hypothesis and conclude that the strength of the relationship among the items is strong - again supporting a factor analysis of the SSAS data.

The first-order factor analysis used principal axis factoring to reduce the data from the 60 SSAS items to 15 factors and resulted in extraction sums of squared loadings for a cumulative percent of variance of 48.31. The oblique promax with Kaiser normalization rotation method produced the factor correlation and pattern matrix. After suppressing absolute values of less that .295 to make significant pattern coefficients more apparent and meaningful, factor relationships were factored or grouped into 10 factors based on the rotated pattern matrix. For example, Factor #1 was entitled Negative Drug since it was formed by item values of: .94 for item 23. "Get high with people who break the law."; .55 for item 25. "Try different drugs at the same time."; .67 for item 28. "Sell illegal drugs."; .47 for item 39. Get wasted on alcohol."; .92 for item 45. "Get high and go out."; and .47 for item 58. "Carry a hidden gun or knife." Each of the remaining item's

pattern coefficients and Cronbach's alphas, measuring internal consistency, are listed in Table 4. The 15 factor correlation and covariance matrix values are presented in Table 5.

Table 4

First-order Factor Analysis Coefficients 60 SSAS Items (n = 435)

Negative Items (r = .842)	Pattern Coefficient (>.295)
Drug: (r = .835)	
23. Get high with people who break the law.	.94
45. Get high and go out.	.92
28. Sell illegal drugs.	.64
25. Try different drugs at the same time.	.55
39. Get wasted on alcohol.	.47
58. Carry a hidden gun or knife.	.44
Aggression: (r = .797)	
14. Smash things.	.92
9. Shoot rifles or pistols.	.65
10. Do anything if it's a dare.	.62
13. Show off.	.49
47. Do things that scare other people.	.44
17. Sneak on somebody's land.	.43
53. Make people fall down.	.36

(table continues)

Table 4 (continued)

Negative Items (r = .842)	Pattern Coefficient (>.295)
54. Hear people say I'm tough.	.33
37. Play violent video games.	.30
Cheat/Steal: (r = .667)	
30. Cheat on tests.	.85
1. Cheat to win.	.61
56. Steal money/things.	.50
46. Leave my seat belt off in the car.	.49
31. Watch movies of people making love.	.38
49. Hurt animals for fun (not hunting).	.30
Physical/Verbal: (r = .772)	
51. Cuss out a teacher.	.77
52. Get in fights.	.66
55. Hit somebody before they hit me.	.52
50. Do things to see people get mad.	.51
34. Cuss out strangers on the phone.	.45
Break Law: (r = .756)	
48. Race cars on the public highway.	.65
44. See how fast a car will go.	.59

(table continues)

Table 4 (continued)

Positive Items (r = .611)	Pattern Coefficient (>.295)
41. Drive a car without a license.	.49
43. Hang out w/people who break the law.	.42
Tease: (r = 747)	
15. Pick on someone so they cry.	.86
59. Tease someone until they cry.	.74
16. Write dirty words on walls.	.41
21. Give policemen a hard time.	.30
Social: (r =.695)	
35. Get people excited when I'm bored.	.65
27. Hang around exciting people.	.64
40. Go out often so I don't get bored.	.58
36. Jump one activity to another.	.56
60. Listen to new and unusual music.	.44
Compete: (r = .517)	
6. Do more than one thing at a time.	.70
7. Compete in everything.	.45
12. Ignore pain if I'm having fun.	.35

(table continues)

Table 4 (continued)

Positive Items (r = .611)	Pattern Coefficient (>.295)
Thrill: (r = .554)	
24. Go parachute jumping.	.77
38. Ski or mountain bike down a big hill.	.74
2. Jump off of high places.	.52
33. Get hypnotized for fun.	.31
Music/Tatoo: (r = .600)	
18. Have body piercings.	.54
42. Get a tattoo.	.52
5. Go hear big loud music concerts.	.42
11. Change jobs just to learn new things.	.41

Discarded Items: First-order Pattern Coefficients less than .295

3. Play on a sports team.

4. Go to new places even if I might get lost.

8. Sneak out of the house.

19. Play football, skate or other sport/activity.

20. Take a dare even if it's illegal.

22. Surf the internet for hours.

26. Go see fights or wrestling matches.

(table continues)

Table 4 (continued)

Discarded Items: First-order Pattern Coefficients less than .295
29. Go to wild, crazy parties.
32. Argue with people who might disagree.
57. Skip places in line.

Table 5

Correlation and Covariance Matrix 60 Items to 15 Factors

Factor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**3.84**	.12	.50	.47	.43	.24	.46	.14	.21	.54	-.09	.18	.04	.16	.09
2	2.14	**2.56**	.42	.33	.40	.19	.14	.44	.16	.36	.25	-.05	.21	.21	.08
3	5.24	2.73	**7.38**	.58	.52	.52	.50	.46	.12	.67	.21	.16	.15	.31	.08
4	3.19	2.60	4.87	**3.89**	.45	.14	.52	.19	.20	.48	.34	-.11	.40	.16	.02
5	2.75	4.07	5.59	3.13	**6.29**	.22	.42	.31	-.05	.36	-.02	.19	-.04	.51	.07
6	4.59	1.61	5.90	3.46	3.30	**6.90**	.25	.30	.17	.35	.05	.14	-.11	.32	.08
7	4.05	1.90	6.14	3.08	2.98	5.07	**4.64**	.14	.18	.35	.13	.20	.26	.12	-.14
8	1.80	1.93	3.47	1.60	2.96	3.70	1.28	**2.47**	-.04	.32	.12	.17	-.05	.27	.02
9	3.33	2.95	5.45	4.53	5.08	6.63	3.65	3.06	**8.91**	.23	.14	-.09	.27	-.19	-.01
10	5.15	2.50	6.65	4.62	4.14	6.59	3.31	2.45	5.54	**6.21**	.05	.07	.15	.15	.05
11	2.68	3.94	4.64	3.89	5.72	4.88	1.38	3.37	4.65	3.13	**6.76**	-.42	.52	-.07	.11

(table continues)

Table 5 (continued)

Factor	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
12	2.94	3.00	5.39	2.68	4.11	4.04	3.14	2.97	5.88	4.64	3.22	**8.80**	-.40	.17	-.14
13	3.82	1.54	5.21	3.35	2.84	5.87	3.11	1.66	4.91	3.79	3.63	3.97	**6.64**	-.31	.05
14	2.20	4.25	4.94	3.38	6.23	4.57	1.97	2.83	4.90	4.01	4.91	5.72	4.27	**7.03**	.13
15	5.80	3.17	7.52	6.64	5.15	9.21	6.66	3.40	8.68	6.62	3.46	8.09	6.27	3.68	**12.63**

Note. Variances are in bold on the diagonal. Correlations are above diagonal and covariances are below the diagonal.

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

Six items that did not have a pattern coefficient of at least .30 on any of the 15 factors were dropped from the study. Two items that were Singletons (i.e.: the sole item in a factor with a pattern coefficient greater than .30) were dropped as were two items comprising a Doubleton (i.e. the only two items in the factor). The twelve factors were reduced to ten by dropping two factors having Singletons. Since those two items' second highest pattern coefficient (greater than .30) occurred in one of the ten remaining factors, they were retained in the study. For example, item 29. "Go to wild crazy parties." appeared as the sole item on factor #15 with a coefficient of .50. However, item 29 had a second higher coefficient of .25 on factor #4 entitled Positive Social. Item 29 was then placed in Factor #4 which contained items such as: item 27, "Hang around exciting people" (factor loading .65); item 35, "Get people excited when I'm bored" (.65); and 36, "Jump from one activity to another" (56). Statistics regarding the mean, standard deviation, skewness, and kurtosis can be found for the 10 SSAS factors in Table 6. Unrotated and oblique eigenvalues and recovered variance are presented in Table 7.

Table 6

Means, Standard Deviations, Skewness, and Kurtosis for the Ten Factors in Second-order Factor Analysis

Item	Mean	SD	Skewness	Kurtosis
1. Negative Drugs	7.41	2.94	2.75	7.59
2. Negative Aggression	15.80	5.18	.90	.32
3. Negative Cheat & Steal	9.31	2.78	1.25	1.85
4. Negative Physical & Verbal	8.37	3.36	1.21	1.18
5. Negative Law People & Cars	6.33	2.78	1.47	1.70
6. Negative Tease	4.87	1.75	2.84	9.02
7. Positive Social	13.75	3.34	-.02	-.55
8. Positive Thrill	5.71	2.31	1.70	2.59
9. Positive Music & Tattoo	8.52	2.77	.47	-.36
10. Positive Compete	7.44	2.05	.18	-.36

Table 7

Eigenvalues and Variance Recovered in the Unrotated Extraction and Oblique Rotation of 60 Items to 10 Factors

	Extraction			Oblique Rotation	
Factor	Eigenvalues	Percent of Variance	Cumulative Percent	Eigenvalues	Percent of Variance
1	12.92	21.54	21.54	8.03	5.55
2	3.27	5.45	26.99	5.19	3.59
3	2.19	3.66	30.65	10.03	6.94
4	1.91	3.19	33.84	7.65	5.29
5	1.58	2.63	36.47	6.80	4.70
6	1.22	2.03	38.50	4.12	2.85
7	.87	1.45	39.95	6.21	4.30
8	.77	1.29	42.54	2.24	1.55
9	.71	1.19	43.73	7.89	5.46
10	.63	1.05	44.78	1.87	1.29

Extraction Method: Principal Axis Factoring

Second-order Factor Analysis

The second-order factoring procedure used the ten first-order factors as variables to further reduce the data into a smaller set of dimensions (factors) with a minimum loss of information. The principal axis factoring with Promax and Kaiser Normalization resulted in a Kaiser-Meyer-Olkin measure of sampling adequacy of .874 for the sample, indicating that the data represented a homogeneous collection of variables suitable for factor analysis. A significance of .000 for Bartlett's Test of Sphericity indicated that the set of correlations in the correlation matrix was significantly different from zero and suitable for factor analysis.

The second-order factor analysis pattern matrix produced a ten-factor reduction to two factors with six apparently negative clusters of items loading on Factor #1 and the remaining four apparently positive clusters loading on factor #2 (> .295 coefficients). A scree plot identified two factors as well. Communalities ranged from .51 to .64 for Factor #1, or the Negative Scale. Factor #2, or the Positive Scale, communalities ranged from .24 to .41. The oblique Promax rotation applied to the ten factors revealed that a two-factor solution recovered 45.24% of the total variance. Oblique rotated pattern coefficients ranged from .56 to .79 for the Negative Scale and from .40 to .74 for the Positive Scale. The intercorrelation between the two factors was .63. For the 10 factors, pattern coefficients and commonalities are presented in Table 8 for the unrotated solution and for the oblique rotated solution Table 9. Unrotated and oblique eigenvalues and recovered variance are presented in Table 10.

Table 8

Pattern Coefficients and Communalities (h^2) for the Two-Factor Unrotated Solution for SSAS 10 Factors

Factor	1	2	h^2
Negative Drugs	.67		.49
Negative Aggression	.80		.60
Negative Cheat & Steal	.65		.42
Negative Physical & Verbal Abuse	.71		.51
Negative Break Law w/ People & Cars	.78		.57
Negative Tease	.70		.48
Positive Social	.42	.49	.26
Positive Thrill	.46		.33
Positive Music & Tatoo	.46	.46	.27
Positive Compete	.40	.30	.23

Note. Coefficients less than .295 are omitted.

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

Table 9

Pattern Coefficients and Communalities (h^2) for the Two-Factor Oblique Rotated Solution for SSAS 10 Factors

Factor	1	2	h^2
Negative Drugs	.79		.52
Negative Aggression	.56	.32	.64
Negative Cheat & Steal	.73		.47
Negative Physical & Verbal Abuse	.62		.51
Negative Break Law w/ People & Cars	.72		.62
Negative Tease	.79		.55
Positive Social		.74	.41
Positive Thrill		.40	.26
Positive Music & Tatoo		.54	.30
Positive Compete		.49	.24

Note. Coefficients less than .295 are omitted.

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

Table 10

Eigenvalues and Variance Recovered in the Unrotated Extraction and Oblique Rotation of 10 Factors to 2 Factors

	Extraction			Oblique Rotation	
Factor	Eigenvalues	Percent of Variance	Cumulative Percent	Eigenvalues	Percent of Variance
1	3.857	38.566	38.566	3.683	26.24
2	.668	6.676	45.242	2.668	19.01

Extraction Method: Principal Axis Factoring

ANOVAs

By the use of ANOVAs, the final statistical procedures attempted to answer the questions: What relationship do Factor #1 (negative SSAS items) and Factor #2 (positive SSAS items) have to the dependent variables: school office behavioral referrals and grade point average? The following four ANOVAs were found to be supportive of the use of the SSAS in discriminating negative sensation seekers from positive sensation seekers.

The negative SSAS items score for all participants was divided into three levels of subjects entitled low (25%), medium (50%), and high (25%). The levels served as the independent variable when compared through an ANOVA to the mean weighted scores for office behavior referrals. A significant main effect for the negative SSAS items and office behavior referrals occurred at the .00 level. A post hoc Sidak procedure at the 95% confidence interval for the means indicates that when the low, medium, and high negative SSAS items scores are compared, the high scoring group is significantly different from both the low and medium groups. The confidence intervals for the low and medium group overlap and are not significantly different. This relationship supports the present study's primary hypothesis that a correlated set of self-report SSAS items representing discrete negative vs. positive sensation seeking scales exists and can identify students who exhibit school office behavioral referrals. Table 11 provides the sum of squares, degrees of freedom, mean square, F value, and significant level. Figure 1 illustrates the graphic relationship between weighted office behavior referrals and negative SSAS items divided into low, medium, and high score totals.

Table 11

ANOVA Weighted Office Behavior Referrals by Negative SSAS Items Score

	Sum of Squares	df	Mean Square	F	Sig.
Negative Sensation Seeking	6680.08	2	3340.04	12.51	.00
Within Groups	114518.80	429	266.94		
Total	121198.88	431			

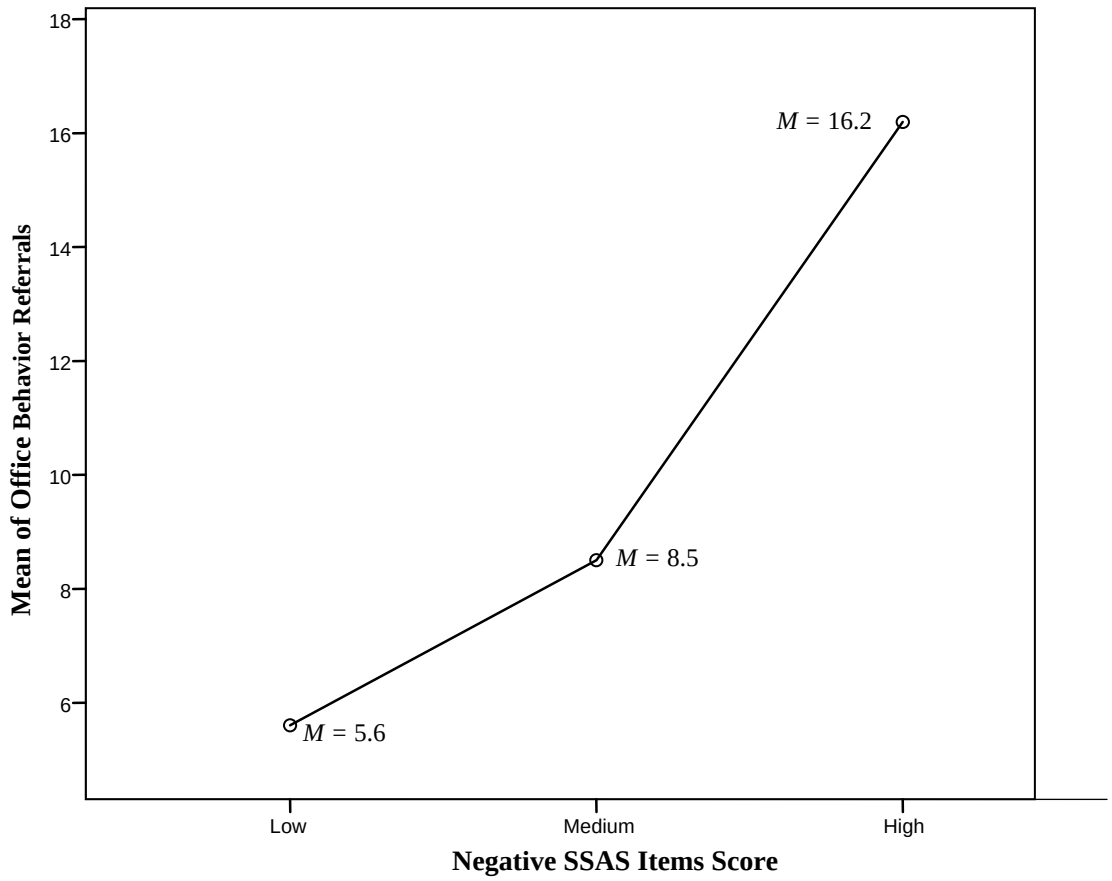

Figure 1. ANOVA Weighted Office Behavior Referrals by Negative SSAS Items Score

Using the low, medium, and high levels for negative SSAS items score, a second ANOVA revealed a significant inverted comparison ($p < .00$) between the participants' grade point average (GPA) and those that scored at the high level on the negative SSAS items. The Sidak procedure indicted that there was no significant difference in the means for the Low and Medium levels of negative SSAS scores and GPA. Consequently, the convergent validity of the SSAS as a predictive measure of the negative sensation seeking construct and low grades appears to be supported. Table 12 provides the sum of squares, degrees of freedom, mean square, F value, and significant level. Figure 2 illustrates the graphic relationship between grade point average and negative SSAS items divided into low, medium, and high score totals.

Table 12

ANOVA Grade Point Average (0-4) by Negative SSAS Items Score

	Sum of Squares	df	Mean Square	F	Sig.
Negative Sensation Seeking	10.98	2	5.49	8.24	.00
Within Groups	285.69		429	.67	
Total	296.67		431		

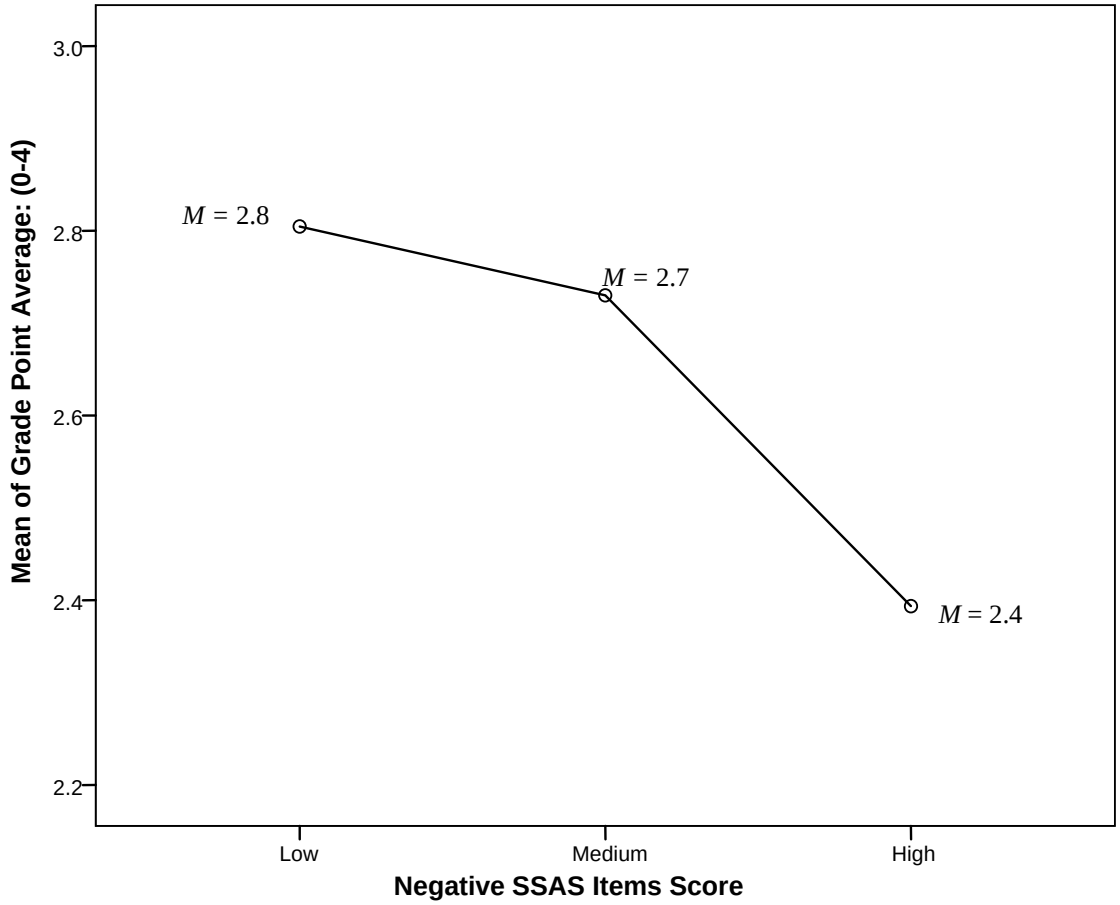

Figure 2. ANOVA Grade Point Average (0-4) by Negative SSAS Items Score

Given that the previous two factor analyses and subsequent ANOVAs support the efficacy of the negative sensation items and their relationship to the participants' school office behavioral referrals and GPA, two null hypotheses explored the main effect ($p < .05$) between the positive sensation seeking SSAS items score and the dependent variables school office behavioral concerns and GPA. Non-significant ANOVA relation scores for theses variables sustained the discriminatory value of the negative vs. positive sensation seeking construct and its divergent or discriminate validity. No significant

relationship between the participant's score on the SSAS positive sensation items and school behavioral concerns ($p < .19$) or GPA ($p < .99$) suggests that while some students may be predisposed to sensation seeking, they do not necessarily seek stimulation through negative behaviors resulting in school office behavioral referrals or lower grades. Table 13 and 14 provide the sum of squares, degrees of freedom, mean square, F value, and significant level. Figure 3 illustrates the graphic relationship between weighted office behavior referrals and positive SSAS items divided into low, medium, and high score totals. Figure 4 illustrates the relationship between grade point average and positive SSAS items divided into low, medium, and high score totals.

Table 13

ANOVA Weighted Office Behavior Referrals by Positive SSAS Items Score

	Sum of Squares	df	Mean Square	F	Sig.
Positive Sensation Seeking	945.62	2	472.81	1.69	.19
Within Groups	120253.26	429	280.31		
Total	121198.88	431			

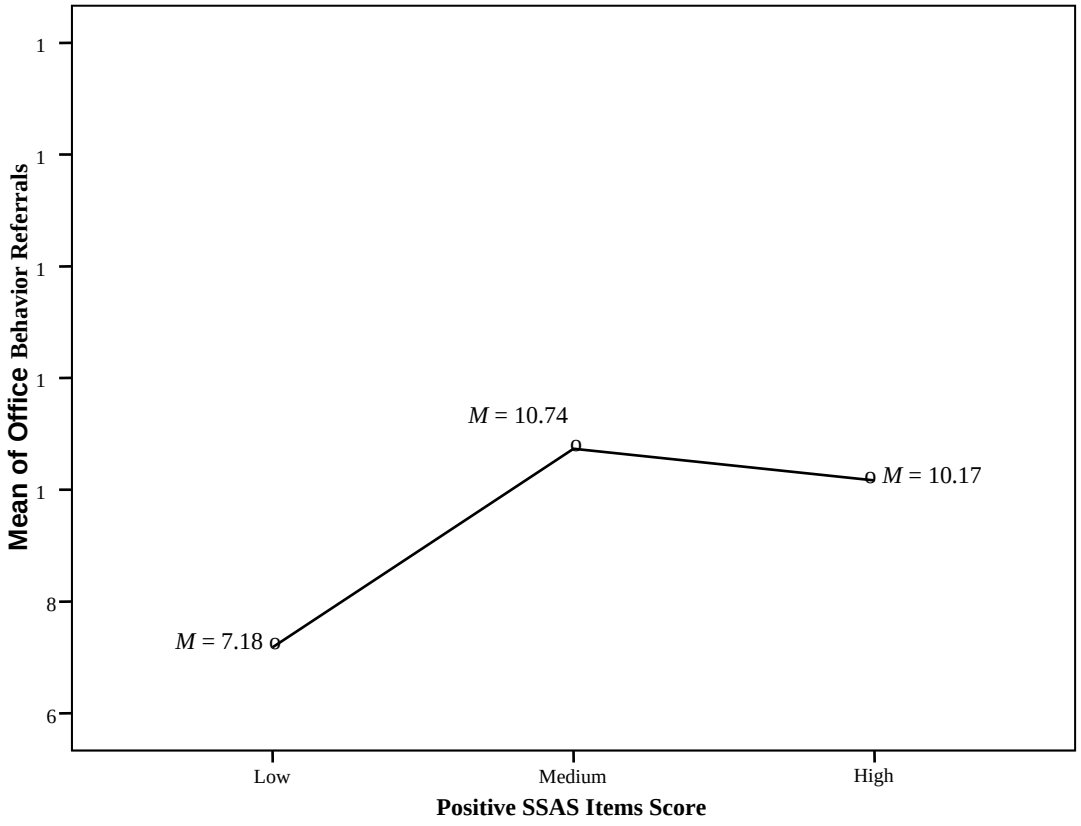

Figure 3. ANOVA Weighted Office Behavior Referrals by Positive SSAS Items Score

Table 14

ANOVA Grade Point Average (0-4) by Positive SSAS Items Score

	Sum of Squares	df	Mean Square	F	Sig.
Positive Sensation Seeking	.02	2	.01	.01	.99
Within Groups	296.65	429	.69		
Total	296.67	431			

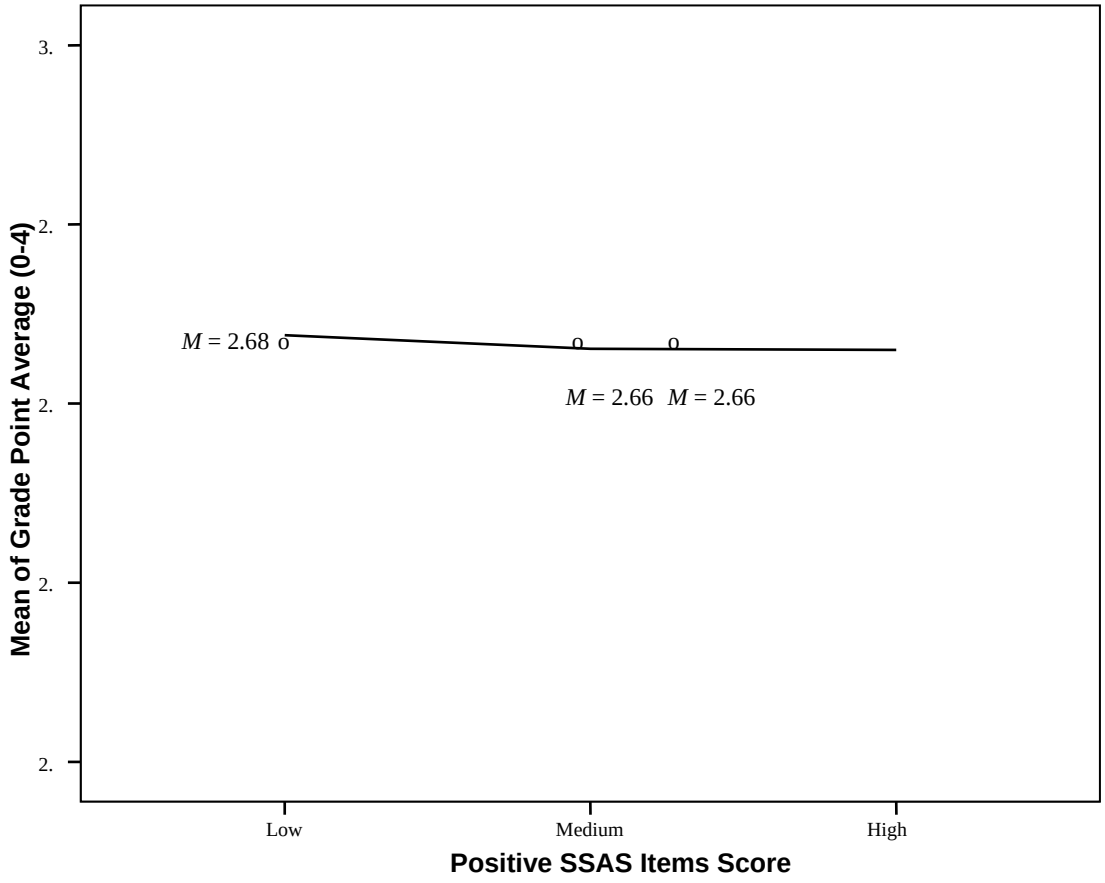

Figure 4. ANOVA Grade Point Average (0-4) by Positive SSAS Items Score

Discussion

The idea for the present study was first generated in the field. While teaching students eligible for special education services (based on the significance and longevity of their problem behaviors), I began to consider that some of these students caused trouble for the thrill of it. After 30 years of working with students eligible and not eligible for specialized instruction, I noticed sensation seeking behavior in pre-school, elementary, pre-teen and adolescent students in both special and general education

settings. Following a student-instigated episode of a negative behavior, their most common reply to my question, “Why did you do that?” was, “I don’t know.” I began to consider the possibility that they really did not know why they did it. While I trust that no one wants to be a failure, I believe some students couldn’t help but exhibit negative behaviors. Something was driving these kids to act out in counter-productive ways.

One confounding or compounding explanation for this negative conduct is that if a child does not have coping behaviors in their repertoire, they are unlikely to exhibit them spontaneously. In my students’, at times, chaotic environments outside of school, they were seldom provided a model, much less taught, appropriate behaviors to contend with delay of gratification, boredom, and frustration. They were accustomed to a relatively high level of negative stimulation and would seek homeostasis by doing what they knew - responding aggressively or even instigating trouble at school. Yet, some students from the same environment, even family, did not exhibit negative behaviors at school and some from apparently stable, nurturing environments did cause trouble. Again, some of my students seemed driven to create anarchy.

My experience taught that a majority of young people will tell the truth about themselves and their motivations if they do not feel threatened by doing so. Thus, I began to ask some of these older troubled and troubling students questions like, “Would you kill somebody for a million dollars?” Some seemed to answer truthfully that they would and for considerably less money. These same students would also tell of things they had done that were illegal and even cruel. I thought that perhaps asking younger students, who were not yet identified as having significant behavior concerns, if they would like to do

certain things could help identify the miscreant before the offenses occurred and they were placed in my classes or adjudicated.

The study design required that I formulate questions that are relevant to today's adolescent's daily experiences and therefore pique their interest enough to actually read the item. Additionally, the items are short, to the point, and all on one piece of paper. I considered both positive and negative question content in order to discriminate between those students who needed that extra bit of stimulation but had learned constructive coping skills and those who had not. I wanted to separate those students who said they would like to do things that were exciting or even dangerous from those who would do the same types of things but would also endanger themselves and others.

If the selected questions identified two different groups of respondents through data reduction procedures, the next step was to match an existing record of problem behaviors with the two groups. Did the group of respondents scoring high on the negative sensation seeking items also have a significant record of school behavior problems? Did the other group scoring high on only the positive sensation seeking items not have significant school behavior problems? Also of interest was whether those students scoring high on the negative items had significantly lower grades than those with low scores.

The results tend to support the original idea that some students may seek stimulation by getting in trouble at school and that they will identify themselves by the way they answer certain questions. Also supported is the notion that some students in need of stimulation have found ways to satisfy the need without getting in trouble. It may be possible to ask younger adolescents the same questions, predict which students are

likely to have school problems, and commit resources to help them find more constructive ways to satisfy their needs.

Factor Analyses

First-order principal axis analysis. The original 60 SSAS items were reduced to 15 factors through a first-order principal axis analysis. These factors were then pared to ten through the process described in the Method chapter. The psychometric integrity of the ten factors was supported by the resulting 50 items having salient pattern coefficients greater than .30 and only item 43 ("Hang out with people who break the law.") having coefficients appearing on two factors: Negative – Break Law (.42) and Negative – Drugs (.34). Satisfactory face/content validity may be assumed by noting the homogeneity of the items comprising each of the ten factors.

Second-order principal axis analysis. The ten factors were then subjected to a second-order principal axis analysis reducing the ten factors to two. The pattern coefficients for the ten factors ranged form .56 to .79 for the Negative factors and from .40 to .74 for the Positive factors suggesting statistical power. Of the ten, only the Negative – Aggression factor had pattern coefficients larger than .30 on the two resulting factors (Positive factor .32 and the Negative factor .56). Again, face/content validity may be assumed by noting the homogeneity of the six factors comprising the Negative factor and the four factors comprising the Positive factor. The resulting Negative and Positive derived factors from the principle axis analyses served as the independent variables for the application of four ANOVAs to support the SSAS's convergent and discriminate validity in relation to behavior concerns at school and grade point average.

Negative versus Positive Sensation Seeking and School Behavior

The first ANOVA provided support for the contention that students with high scores on the Negative items would have significantly more behavior concerns at school. For an individual who indicates on a self-report questionnaire that he/she would like to behave inappropriately, the convergent validity of the SSAS negative items suggest that the instrument measures a propensity to actually get in trouble. Further support for the SSAS is provided by an ANOVA using the Positive items as the independent variable and behavior concerns at school as the dependent variable. The resulting statistic that no significant relationship exists between the Positive items and behavior concerns at school underscores the SSAS's discriminate validity. Thus, students who report on the SASS that they would like to participate in Positive sensation seeking activities do not get in trouble in school.

Negative versus Positive Sensation Seeking and Grade Point Average

Additional support for the SSAS's convergent validity is evident from the ANOVA indicating students who scored high on the SSAS Negative items had a significantly lower grade point average. Discriminate validity is again reinforced by the ANOVA demonstrating no significance for student's high score on the Positive items and grade point average. Consequently, which students are likely to have low grade point averages may be predicted by their scores on the SSAS Negative items but not on the Positive items.

The analysis of the SSAS yielded two unique independent measures, entitled Positive Sensation Seeking and Negative Sensation Seeking. Scores on the negative sensation seeking items were compared to office behavioral referrals in support of the

researcher's hypothesis that the students with noteworthy school behavior problems would achieve higher scores on the negative sensation seeking items than students with insignificant problems. This hypothesis was supported by an ANOVA at the <.001 level of significance. Also statistically occurring by chance at less than one in one hundred cases was the inverse relationship between high scores on the negative sensation seeking items and the student's grade point average.

Previous research has explored the relationship between sensation seeking and risky behavior in adolescents via self-report questionnaires and the individual's statement of participation in targeted behaviors. The majority of those studies have found a significant relationship with high sensation seeking scores and self-reported negative behaviors. While the present study relies on a revamped questionnaire to assess adolescent sensation seeking levels, it uses school behavior records matched to each participant to judge frequency and severity of targeted behaviors. Therefore, in addition to providing evidence for the item factor and psychometric integrity in the construction of the SSAS, the current study effectively relies on independently documented participant behaviors and school grades to establish construct validity.

As in earlier research, the SSAS supports the sensation seeking construct by providing evidence that a group of adolescents self-report their need for additional stimulation. Previous research has offered less data for the existence and efficacy of a dichotomy between positive and negative adolescent sensation seekers. The present study supports that approach. Students who are positive sensation seekers may have the drive to make important contributions to society by directing their energies toward constructive endeavors. Negative sensation seeking students may evidence that drive for stimulation in

behaviors that are counter productive for themselves and society. Further research is needed to explore this dichotomy.

The present study supports the sensation seeking construct by defining a particular subgroup of adolescents that requires more stimulation than most of their peers. Notably sustained is the researcher's hypothesis that a portion of the sensation seeking subgroup exhibits negative behaviors in the school setting and lower grade point averages and that these individuals can be identified by the SSAS. What then, do the results mean in terms of living with and educating these individuals?

As in many cases of students experiencing school problems, early intervention may be warranted if early sensation seeking proves to be a tipping point for later behavior problems. Only through longitudinal research could this issue be definitively answered. Even the students who seek stimulation through positive behaviors could benefit from programs that challenge and channel their drives resulting in gains for themselves and society. Many of the activities currently provided for students identified as gifted and talented could provide constructive activities to challenge the sensation seekers. Of course, all students including those sensation seeking students who exhibit negative behaviors could benefit from such a program. This later group will need more resources. Once identified, negative sensation seekers may need counseling, family intervention, and programs designed to accept participants with a zero reject policy.

Can negative sensation seekers be transformed into positive sensation seekers? Thirty years of teaching both groups suggests at least some of them can. The challenge is that we do not know which individuals will be successful until we try. The SSAS may

help identify students that are predisposed to seeking increased stimulation through negative means and improve the efficacy of intervention by targeting those individuals.

V. SUMMARY, DISCUSSION AND RECOMMENDATIONS

Conclusion

Current research estimates that up to 30% of today's young adults ages, 14 to 25 years old, may have a genetic and or physiological predisposition to increase the intensity of their daily experiences. Some sensation seeking adolescents may find the threat of punishment has little significance or may reinforce anti-social behavior. The first step then is to identify these adolescent negative sensation seekers, preferably before a need for punishment arises, and intervene in an appropriate and effective manner.

The positive sensation seeking behavior factor is clearly composed of behaviors that could otherwise be referred to as positive risk-taking behaviors because they are generally socially acceptable. There are a number of these sensation seeking individuals who are able and willing to utilize existing positive and even constructive activities to satisfy their "need for speed." Many athletes, stunt riders, skiers, day traders, video gamers, soldiers, police officers, amusement park visitors, etc. have found ways to gratify their drive for extra stimulation. The other factor, referred to as negative sensation seeking could be labeled anti-social behaviors since participation may result in adverse social or legal consequences or injury and death of the self or others.

Young people who engage in one form of delinquent behavior are likely to experience other negative behaviors (Dryfoos, 1993). As cited earlier, Wood, Cochran,

Pfefferbaum, and Arneklev (1995) concluded from their study that limited access to culturally approved forms of sensation seeking results in deviance. Historically however, little effort—other than punishment—has been expended in the proactive identification and treatment of negative (anti-social) sensation seeking adolescent high school students. If negative sensation seekers can be identified prior to their exhibiting behavior concerns, the next important step would be to devise a treatment paradigm for a population of young people for whom traditional consequences, such as punishment, may have limited prohibitive effect.

Should society in general and our social institutions in particular continue advocating for funds and resources to administer punishment to sensation seeking adolescents? Biology likely sets the stage for the amount of stimulation an individual needs to reach homeostasis, but the environment may determine whether that need is satisfied through appropriate or inappropriate behavior. Can schools direct students away from delinquent activities by providing stimulating experiences? Leo (1985) concludes that sensation seeking school children should not be put down but given novel, interesting, diverse, and intense opportunities that lead them to be resourceful in discovering the arts, sports, and science. Accordingly, efforts at controlling or reducing individuals' high sensation seeking may serve to inhibit their protective mechanism against stress by increasing their external locus of control (Rotter, 1966).

Significantly, Segal, Huba, and Singer (1980) found two factors that appear to support the consistent association between sensation seeking and adolescent drug and alcohol use. One factor is the stimulation provided by the substance and the other is the risk or illegality associated with its use. Bates, White, and Labouvie (1994) cited their

research stating: “The results support Segal et al.’s (1980) and Zuckerman’s (1983) suggestion that therapy with high sensation seeking drug abusers might be better aimed at providing behavioral substitutes (i.e., high-thrill and adventure-seeking activities) for drug taking than at facilitating personality change, because personality change may not prompt decreased use” (p. 73). Further, some research suggests that exciting experiences may essentially serve as a surrogate for drug use (Bardo & Mueller, 1991).

Spence (1997, p. 75) stated “Interventions which provide alternative, pro-social methods for adolescents to experience novel and intense stimulation which also minimizes the health risks to which they are exposed would be a useful strategy.” Settings that fail to meet these students’ needs give them no choice but to pursue available—possibly negative—activities. Of course, intervening at an earlier age than the possible age of onset since children as young as nine have already established risk images for smoking and drinking Gibbons and Gerrard (1995). Furthermore, innovative programs are not easily conceived or executed. Numerous studies have shown that even when adolescents have been presented information regarding the dangers of engaging in risky behaviors, they may perform the behaviors anyway. There is a lack of research into finding interventions focusing on negative risk taking and risk awareness that is effective.

Finally, not all of adolescents’ problems can or should be addressed solely at school. Family and social attachments continue to influence risk taking and the expression of sensation seeking tendencies. Opportunities should be provided outside of the formal educational setting where adolescents can experience not only exciting positive activities but acceptance as individuals with varying wants and needs. Relationship and career counseling can help establish lasting relationships with peers and

others that, according to Wade (1998), can develop into attachments to spouses and employers capable of attenuating the behavior of youth with serious adolescent delinquency histories. Sensation seeking is not a fixed psychiatric disorder and can be tempered by effective social, familial and institutional intervention (Gibbs, 1989).

Limitations

The conceptual hypothesis on which the present study is predicated may be considered a limitation. To wit, personality traits are by definition to be cautiously interpreted as universal or stable across individuals. While many such constructs have been subject to studies applying various analytical procedures, the literature presents continued differences in the definition and application of the sensation seeking construct. Secondly, the present study presumes a dichotomy exists between negative and positive sensation seeking that can be explored through a relation procedure. As noted by Olweus (1979), personality traits are useful in predicting behavior particularly for some individuals who actively select and may even create situations where they can experience negative sensation seeking.

Importantly, the negative and the positive sensation seeking scales should not be considered dichotomous. That is, the sensation seeking scales are not mutually exclusive as is the variable male/female. Adolescent sensation seekers with high scores on the negative scale typically had high scores on the positive scale as well. Significantly, the SSAS may be able to discriminate between those adolescents who score high on the positive scale but do not necessarily score high on the negative scale from those that score high on both. It is the later population that concerns this researcher.

While the SSAS was completed anonymously and under scripted teacher supervision, some halo or response set may have influenced some students' responses. The use of a coded student list and the requirement that the student immediately seal the scale in the envelope provided, may have lessened the number of erroneous item ratings. In the researcher's opinion and that of other adults individuals involved in this study, the students appeared to take the completion of the scale seriously and inaccuracies appear to be minimal.

Another limitation of the present study includes the participant demographics. The ratio of male (n = 132, 30%) compared to the to the female (n = 297, 70%) participants was not representative of the populations of the contributing schools. However, based on popular literature and virtually all of the related research, males are significantly more likely to be score higher on measures of sensation seeking and have more school behavior problems than females. Thus, the present study may be an underestimate of the effect high negative SSAS scores have on school behavior problems and GPA. Generally, interpretation of the study's results when applied to populations that differ from that of the people living in small Southeastern United States towns as well as to those that may include younger participants, should be made with caution. Additional studies containing the basic major assumptions of the present study and varied populations are required prior to making further predictions.

Recommendations for Future Research

This study reports on the development and psychometric evaluation of the Sensation Seeking Attention Scale (SSAS) as a self-report instrument purporting to

identify adolescents with a negative sensation seeking tendency manifest through inappropriate behavior. Based on field or face validity and the statistical analysis presented herein, the SSAS items appear to be straightforward, relevant, and interesting enough for the current study sample of high school students to have honestly rated the items. Of course, only additional samples of participants can confirm the SSAS as a viable measurement tool.

Further study is warranted to verify the construct and concurrent validity of the SSAS. A longitudinal study, wherein middle school adolescents (ages 12 to 15) are administered the SSAS and studied as a cohort through high school, would be the most powerful psychometric and applied research paradigm. This researcher's assertion is that those younger adolescent students who scored high on the negative sensation seeking items would evidence significantly more office behavioral referrals in high school than those with lower scores. Additional refinement of the SSAS is necessary to establish psychometrically valid and practically useful cut-off scores. Based on dividing the present study's SSAS negative items scores into Low, Medium, and High groups, an estimated score could be determined that would identify which student is at risk for behaviors that could result in school office behavioral referrals. Upon the scoring of the students' SSAS, the high scoring group could be given positive attention in a proactive program where praise and exciting activities replace the standard adult response to punish the student with the "Make my day" attitude.

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APPENDICES

APPENDIX A

THE SENSATION SEEKING ATTENTION SCALE

SSAS©

(Sensation Seeking Attention Scale)

(NOTICE: DO NOT WRITE ANY NAMES ON THIS FORM.)

CIRCLE ONE:
AVERAGE GRADES: **A B C D or F**
GUARDIAN: **PARENT or RELATIVE**

FILL IN:
PARENT/GUARDIAN'S JOB:
(Father)_____
(Mother)_____

BROTHERS' AGES:_____
SISTERS' AGES: _____

PHYSICAL ACTIVITY OR SPORT:
_____

ORGANIZED GROUP OR TEAM:
_____

PAYING JOB:
_____

CAREER CHOICE:
_____

THIS YEAR, HOW MANY TIMES HAVE YOU:
HAD OFFICE REFERRALS? _____
WHY? _____
HAD IN-SCHOOL SUSPENSION? _____
WHY? _____
HAD SATURDAY SCHOOL? _____
WHY? _____
BEEN SUSPENDED? _____
WHY? _____
BEEN ARESTED? _____
WHY? _____

*On the rest of this page and on the **BACK**, you will find some items to rate. Answer each item truthfully. Go down the page and write a **number**:*

Choose the answer that is most like how you really are.

"I WOULD LIKE TO....."

1 = NEVER 2 = SOMETIMES 3 = OFTEN 4 = ALWAYS

___ 1.Cheat to win.	___8.Sneak out of the house.
___ 2.Jump off of high places.	___9.Shoot rifles or pistols.
___ 3.Play on a sports team.	___10.Do anything if it's a dare.
___ 4.Go to new places even if I might get lost.	___11.Change jobs just to learn new things.
___ 5.Go hear loud music concerts.	___12.Ignore pain if I'm having fun.
___ 6.Do more than one thing at a time.	___13.Show off.
___7.Compete in everything.	___14.Smash things.

>>CONTINUE ON BACK>>

"I WOULD LIKE TO....."

1 = NEVER 2 = SOMETIMES 3 = OFTEN 4 = ALWAYS

___15.Pick on someone so they cry.
___16.Write dirty words on walls.
___17.Sneak on somebody's land.
___18.Have body piercings.
___19.Play football, skate/other sport/ activity.
___20.Take a dare even if it's illegal.
___21.Give policemen a hard time.
___22.Surf the internet for hours.
___23.Get high with people who break the law.
___24.Go parachute jumping.
___25.Try different drugs at the same time.
___26.Go see fights or wrestling matches.
___27.Hang around exciting people.
___28.Sell illegal drugs.
___29.Go to wild, crazy parties.
___30.Cheat on tests.
___31.Watch movies of people making love.
___32.Argue with people who might disagree.
___33.Get hypnotized for fun.
___34.Cuss out strangers on the phone
___35.Get people excited when I'm bored.
___36.Jump from one activity to another.
___37.Play violent video games.
___38.Ski or mountain bike down a big hill.
___39.Get wasted on alcohol.
___40.Go out often so I don't get bored.
___41.Drive a car without a license.
___42.Get a tattoo.
___43.Hang out with people who break the law.
___44.See how fast a car will go.
___45.Get high and go out.
___46.Leave my seat belt off in the car.
___47.Do things that scare other people.
___48.Race cars on the public highway.
___49.Hurt animals for fun (not hunting).
___50.Do things to see people get mad.
___51.Cuss out a teacher.
___52.Get in fights.
___53.Make people fall down.
___54.Hear people say I'm tough.
___55.Hit somebody before they hit me.
___56.Steal money/things.
___57.Skip places in line.
___58.Carry a hidden gun or knife.
___59.Tease someone until they cry.
___60.Listen to new and unusual music.

Thank you.**>>PUT SURVEY IN ENVELOPE.**

APPENDIX B

INFORMED CONSENT – PHENIX CITY

Auburn University

Auburn University, Alabama 36849-5226
Department of Rehabilitation & Special Education

1228 Haley Center Telephone: (334) 844-5943

SIGN & RETURN

INFORMED CONSENT
In a Research Study Entitled
The Sensation Seeking Attention Scale

Dear Parent(s),

Your teenager is invited to participate in a research study that seeks to develop a scale that measures sensation seeking behaviors in teens. Your child will be asked to take about 10 minutes in class, supervised by the classroom teacher, to answer sixty questions, such as "I like to think before I act," Because the survey will not include student names, the researcher will never see any personal information that would allow him to identify your child or any child.

The study is being conducted by Warner Britton, a doctoral candidate at Auburn University, under the supervision of Professor Ron Eaves. Mr. Britton is interested in studying sensation seeking behaviors in youth and how this is associated with successful and unsuccessful school experiences.

The school will provide information related to your child's school records (absences, grade point average, discipline referrals, special education, and test scores). Again, as with the survey, the researcher will not have access to personally identifying information, such as the student's name. Thus, though there is a small risk of breach of confidentiality, the safeguards taken by the school and the researcher have all but eliminated this risk, as no personal information (name, date of birth) will leave the school. There is no direct benefit to your child, though the information from this study may assist schools in understanding academic success more fully.

_____
Participant's Initials
(required for all non-signature pages)

Please complete back of page.

Findings from this study will be used by Mr. Britton to complete the requirements for his dissertation; they may also be presented at professional meetings or published in journals. No personal information will be included as none is available to the researcher. You may withdraw your child from participation at any time. Your decision whether or not to allow your child to participate will not jeopardize future relations with your child's school or Auburn University.

If you have questions, Warner Britton (334-728-2139; Brittwh@auburn.edu) or Dr. Ron Eaves (334-844-5943) will be happy to answer them. You will be provided with a copy of this form.

For more information regarding your rights as a research participant you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone
(334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU ALLOW YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PERMIT YOUR CHILD TO PARTICIPATE.

_____

Parent/Guardian Signature Date

_____

Print Name

_____	_____
Investigator Date	**School Data Manager** Date
Warner Britton _____	Angie Anderson _____
Print Name	Print Name

(Side 2 of 2)

APPENDIX C

INFORMED CONSENT – OPELIKA

Auburn University

Auburn University, Alabama 36849-5226
Department of Rehabilitation & Special Education

1228 Haley Center Telephone: (334) 844-5943

SIGN & RETURN

INFORMED CONSENT
In a Research Study Entitled
The Sensation Seeking Attention Scale

Dear Parent(s),

Your teenager is invited to participate in a research study that seeks to develop a scale that measures sensation seeking behaviors in teens. Your child will be asked to take about 10 minutes in class, supervised by the classroom teacher, to answer sixty questions, such as "I like to think before I act," Because the survey will not include student names, the researcher will never see any personal information that would allow him to identify your child or any child.

The study is being conducted by Warner Britton, a doctoral candidate at Auburn University, under the supervision of Professor Ron Eaves. Mr. Britton is interested in studying sensation seeking behaviors in youth and how this is associated with successful and unsuccessful school experiences.

The school will provide information related to your child's school records (absences, grade point average, discipline referrals, special education, and test scores). Again, as with the survey, the researcher will not have access to personally identifying information, such as the student's name. Thus, though there is a small risk of breach of confidentiality, the safeguards taken by the school and the researcher have all but eliminated this risk, as no personal information (name, date of birth) will leave the school. There is no direct benefit to your child, though the information from this study may assist schools in understanding academic success more fully.

_____
Participant's Initials
(required for all non-signature pages) Please complete back of page.

Findings from this study will be used by Mr. Britton to complete the requirements for his dissertation; they may also be presented at professional meetings or published in journals. No personal information will be included as none is available to the researcher. You may withdraw your child from participation at any time. Your decision whether or not to allow your child to participate will not jeopardize future relations with your child's school or Auburn University.

If you have questions, Warner Britton (334-728-2139; Brittwh@auburn.edu) or Dr. Ron Eaves (334-844-5943) will be happy to answer them. You will be provided with a copy of this form.

For more information regarding your rights as a research participant you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU ALLOW YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PERMIT YOUR CHILD TO PARTICIPATE.

_____

Parent/Guardian Signature Date

_____

Print Name

_____		_____	
Investigator	Date	**School Data Manager**	Date
Warner Britton _____		Ottis Stephenson _____	
Print Name		Print Name	

APPENDIX D

DATA MANAGER PROCEDURE/DATA FORM

SSAS©

(SENSATION SEEKING Attention SCALE)

Data Manager Procedure/Data Form

1. Distribute blank SSAS ***INFORMED CONSENT Forms*** to teachers.
2. Collect the SSAS signed ***INFORMED CONSENT Forms***.
3. Assign a coded ID to each student and create a ***MASTER*** **CODE ID List**.
4. Inform Mr. Britton of number of ***SSAS*** **Surveys** needed.
5. Distribute to teachers:
    - *a.* copy of their **CODE ID List.**
    - *b.* ***SSAS*** **Surveys.**
    - *c.* envelope for each survey.
6. Collect from teachers:
    - *a.* **CODE Lists.**
    - *b.* completed ***SSAS*** **Surveys** in sealed envelopes.
7. Send Mr. Britton completed ***SSAS*** **Surveys** in sealed envelopes.
8. **Collect DATA (see below).**

DATA

Download individual coded ID data for each participating student including:

- *a.* Grade Point Average
- *b.* SAT and AHSGE scores
- *c.* Absences
- *d.* Discipline referrals (Number and reasons)
- *e.* Eligibility category if special education

9. Destroy **MASTER** and all **CODE Lists**.
10. Send matched coded ID student's **DATA** to Mr. Britton.

Thank you for your help,

Warner Britton

APPENDIX E

TEACHER PROCEDURE/SCRIPT

SSAS©

(SENSATION SEEKING ATTENTION SCALE)

Teacher Procedure/Script

Dear Teacher:

Thank you for your assistance. Please follow these procedures for administering**:**

FIRST PHASE

I. DISTRIBUTING the **INFORMED CONSENT Form**

- 1. Pass out an **INFORMED CONSENT Form** to ALL students.
- 2. Ask students to **PRINT** THEIR NAME on the **front** of the **Form.**
- 3. Ask students to get their **parents** to sign the **Form** on the **back**.
- 4. Ask students to **return** the signed **Form** tomorrow (ASAP) for a
- 5. **FREE ICE CREAM!!**

II. COLLECTING the **PARENT CONSENT Form**

- 1. Collect ALL signed **INFORMED CONSENT Forms.**
- 2. Seal all returned **Forms** in the Large SSAS Envelope.
- 3. Return the SSAS Envelope to **ANGIE ANDERSON**.

SECOND PHASE

III. ADMINISTERING the **SSAS Survey**
(Angie Anderson will provide a Coded (numbered) student LIST and SSAS Survey form.)

- 1. Distribute the SSAS Coded (numbered) ID Survey to the **correctly (numbered)** student.
- 2. Require that no student talk during the SSAS administration and that no names be written on the SASS survey OR their envelope. (Students will take about 10 minutes to complete the **SSAS**.)
- 3. Tell the students to place their completed survey in the envelope and to **seal their envelope**.
- 4. Collect all sealed SSAS survey envelopes.
- 5. Place all completed SSAS surveys in your Large SSAS Envelope.
- 6. Return the Large SSAS Envelope to **ANGIE ANDERSON.**

Thank you for your help,
Warner Britton, Investigator

APPENDIX F

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD (IRB)

APPROVAL LETTER FOR STUDY

Auburn University

Auburn University, Alabama 36849

Office of Human Subjects Research
307 Samford Hall

Telephone: 334-844-5966
Fax: 334-844-4391
hsubjec@auburn.edu

September 7, 2006

MEMORANDUM TO: Warner Britton
RSED

PROTOCOL TITLE: "The Sensation Seeker Arousal Scale (SSAS): A Measure of Sensation Seeking by Adolescents"

IRB AUTHORIZATION NO.: #06-066 MR 0612
APPROVAL DATE: December 13, 2006
EXPIRATION DATE: December 12, 2007

The referenced protocol was approved as "Minimum Risk" at the IRB Meeting on December 13, 2006. Please reference the IRB authorization number in any correspondence regarding your project.

Please remember that any anticipated change in the approved procedures must be submitted to and approved by the IRB prior to implementation of the planned activity. Any unanticipated problems involving risk to subjects or others requires immediate suspension of the activity and an immediate written report of the occurrence to the IRB.

If you will be unable to file a Final Report on your project before December 12, 2007, you must submit a request for an extension of approval to the IRB no later than November 20, 2007. If your IRB authorization expires and/or you have not received written notice that a request for an extension has been approved prior to December 12, 2007, you must suspend the project immediately and contact the Office of Human Subjects Research.

A Final Report will be required to close your IRB project file. You are reminded that you must use the stamped, IRB-approved informed consents when you consent your participants. The signed consent forms must be retained at least three years after completion of your study.

If you have any questions concerning IRB procedures or this Board action, please contact the OHSR at 844-5966.

Sincerely,

Peter W. Grandjean, Chair
Institutional Review Board for the Use of
Human Subjects in Research

cc: Dr. Phil Browning
Dr. Ron Eaves