Moderating Effects of Gender and General Self-Efficacy on the Relationship Between Sensation-seeking and Adolescent Substance Use

Joseph R. Baker, B.Ph.Ed.

Department of Graduate and Undergraduate Studies in Education

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Faculty of Education, Brock University
St. Catharines, Ontario

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DEDICATION

This work is dedicated to my mother.

Carol M.J. Baker

(1945-1995)
Acknowledgements

Completion of this work would not have been possible without the aid of a great number of people.

I would first like to recognize John K. Yardley for his tireless job as my thesis advisor. Thank you John, for your time, energy, and guidance. I would also like to thank the members of my thesis committee, William J. Montelpare and Coral Mitchell, for their input and advice.

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Abstract

This study performed a secondary data analysis of information collected during the Youth Leisure Study (YLS). The purpose of this study was to examine the potential moderating influences of gender and general self-efficacy on the relationships among sensation-seeking and various forms of substance use in adolescents. Specifically, the predictive ability of sensation seeking on five adolescents substance use outcomes (alcohol, tobacco, and marijuana use; binge drinking; and number of times drunk) was examined.

Moderated hierarchical multiple regression (MHMR) analyses were used to examine the relationships among study variables. The results for this study indicate that the relationships among sensation-seeking and forms of adolescent substance use are more complex than literature suggests. Main effect relationships were found consistently for sensation-seeking and general self-efficacy with each of the outcome variables. Results for gender were not consistent across the substance use outcomes. Gender was a significant predictor for marijuana use only.

The moderating effects of general self-efficacy (GSE) on the sensation-seeking-substance use relationship were inconsistent. While no significant interactions were found for tobacco or alcohol use outcomes, GSE was found to moderate the relationship between sensation-seeking and marijuana use indicating that feelings of high general self-efficacy act as a buffer or guard against marijuana use.

A consistent pattern was found among the alcohol use variables (alcohol use, binge drinking, and number of times drunk). Gender was found to moderate each of these variables indicating that higher levels of sensation seeking are more predictive of higher levels of adolescent alcohol use in males only.

Implications of this study on the field of education, are discussed further, and suggestions for future research are presented.
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CHAPTER ONE: INTRODUCTION TO THE PROBLEM

Introduction

This study examines whether gender, general self-efficacy, and sensation-seeking predict adolescent substance use. According to Adlaf, Ivis, Smart, and Walsh (1995), more than 65% of adolescents and young adults (12 to 24 years), in Ontario, had been involved in some level of substance use during the previous twelve months. These substances may include, but are not limited to, alcohol, tobacco, and marijuana. In addition, research also indicates that alcohol related behaviour problems (Barnes and Welte, 1986) and alcohol abuse (Yardley, McFadden, et al., 1996) are also significant adolescent problems.

Background of the Problem

Adolescent substance use is a multifaceted behaviour. For instance, many psychological constructs have been strongly implicated in adolescent substance use. Two constructs which have been extensively researched in the substance use literature are sensation-seeking and self-concept. For instance, several studies (e.g., Ahlgren & Norem-Hebeisen, 1979; Butler, 1982; Kinnier, Metha, Okey & Keim, 1994) have shown negative relationships among measures of self-concept and substance use i.e., as self-concept decreases, substance use increases. In addition, other studies have demonstrated that levels of sensation-seeking are positively related to adolescent substance use (e.g., Bates, Lobouvie, & White, 1986; Newcomb & McGee, 1991; Peterson, 1991). Research also indicates significant gender differences in measures of sensation-seeking (Ball, Farnill, & Wangeman, 1894; Zuckerman, Ball, & Black, 1990), self-concept (Dusek & Flarety, 1981; Rosenberg & Simmons, 1975), and substance use (Newcomb & McGee, ...
1989; Yardley, McFadden, et al., 1996). These earlier studies suggest that sensation-seeking, self-concept, and gender are important variables in understanding adolescent substance use.

However, these studies primarily examine direct relationships among predictor and outcome variables. In examining only the simple direct relationships, researchers fail to explore potential interactions among the predictor variables which means their results may be misleading. Zuckerman, Ball, and Black (1990) suggest that examination of relationships between sensation-seeking and substance use should consider the possible interaction of moderating variables. However, the review of literature presented in Chapter Two suggests that the interaction of these variables in predicting adolescent substance use is rarely addressed.

Statement of the Problem

Research relating gender, self-concept, and sensation-seeking to adolescent substance use have generally studied direct or main effect relationships. A main effect relationship examines the 'effect' of one variable or several variables (predictors) on another variable (outcome). A simple example of this type of relationship is the relationship between predictor and outcome expressed in the form of a correlation coefficient. The drawback of this type of research is that it examines only the relationship between the predictor and outcome variables without considering the interactions of other influences.

A less well researched substance use area is the interaction of these important predictors. The review of literature indicates no research has examined how the relationships among sensation-seeking and types of adolescent substance use may be
affected by different levels of self-efficacy (i.e., the moderating effects of self-efficacy on sensation-seeking-substance use relationships). For instance, a high belief in one's skills and abilities (i.e., high self efficacy) may buffer or reduce the strength or direction of the relationship of sensation-seeking with substance use. In addition, differing societal pressures on male and female adolescents affect participation in "risky" activities. Traditionally males have been more free to pursue sensation-seeking drives through activities which are deemed less acceptable for females (e.g., substance use). Therefore, one might expect that the strength and/or direction of relationships among sensation-seeking and forms of substance use may differ for males and females. These types of differences would indicate gender as a moderator in the relationship. No studies have examined these specific moderating relationships, and if these relationships exist current research may under-represent the complexity of these relationships.

Purpose of the Study

The primary research problems being examined are "Does general self-efficacy moderate the predictive relationship of sensation-seeking on adolescent substance use and abuse?" and "Does gender affect the predictive relationship of sensation-seeking on adolescent substance use and abuse?"

Rationale

The main effect relationships among sensation-seeking and substance use and self-concept and substance use have been extensively researched. Literature indicates that low self-concept (see, for example, Ahlgren and Norem-Hebeisen, 1979; Bonaguro and Bonaguro, 1987; Butler, 1982; Rosenberg, Schooler, and Schoenback, 1989) and high
sensation-seeking (see, for example, Bates, Lobouvie, and White, 1986; Peterson, 1991; Zuckerman, Ball, and Black, 1990) predict adolescent substance use. However, these studies dealt exclusively with main effects and did not address the moderating effect that gender and general self-efficacy may have for those relationships.

In addition, most research has used gender as a demographic main effect which also may be misleading. For instance, by using gender as a demographic variable, researchers overlook the potential interaction of gender with other important variables, (e.g., sensation-seeking). Reporting that male and female adolescents respond to sensation-seeking motivations similarly in their substance use is problematic if a gender interaction exists. Cohen and Cohen (1983) argue that identification of an interaction among variables decreases the significance of a main effect relationship in the interpretation of data analyses. Studies examining the interaction of both gender and general self-efficacy on sensation-seeking have the potential for developing a greater understanding of behaviours which underlie adolescent substance use.

The majority of studies examining measures of self-concept and substance use have examined self-esteem, a general measure of well being. General self-efficacy has been chosen as the measure of self-concept due its more specific focus. General self-efficacy focuses on how the adolescent perceives his/her ability to accomplish tasks. In addition, no studies have examined the role of self-efficacy in predicting adolescent substance use.

Importance of the Study

Adolescence is the stage of transition from child to adult. It is also the stage where the adoption of many negative health behaviours are initiated. By examining and identifying the potential moderating relationships of gender, and general self-efficacy,
with sensation-seeking and adolescent substance use, researchers may better understand the initiation of these behaviours.

The importance of this research to the field of education is considerable. Firstly, due to the number of hours spent in school, the educator is in a crucial position to influence the lives of adolescents. In addition, research has identified that alcohol has a positive relationship with negative school behaviours such as dropout (Eggert & Hering, 1993; Fagan & Pabon, 1990; Schulenberg, Bachman, O'Malley, & Johnston, 1994; Van Kammen, Loeber, & Stouthamer-Loeber, 1991; Windle, 1991). By better understanding the relationships among factors that contribute to the initiation of these forms of substance use, an educator is able to recognize his/her role in their prevention. In addition, by broadening the definition of education to include arenas outside the classroom, this study has considerable relevance to other educational systems such as substance use treatment and counseling centers, and boy and girls clubs (e.g., Boy Scouts). Further, results from this study have implications in other areas such as psychology and law enforcement which may be influential in developing education and prevention programs about adolescent substance use.

Outline of the Remainder of the Document

Subsequent chapters include the following:

Chapter Two contains the review of relevant literature. The review presents the theoretical foundation for each of the independent variables (i.e., gender, self-concept, and sensation-seeking) in substance use research.

Chapter Three contains the methodology and procedures for the study. The hypotheses, sample characteristics, instrumentation, data collection, and analyses
descriptions and methodological assumptions are presented. This chapter familiarizes the reader with the procedures used to administer the study.

Findings of the study are presented in Chapter Four. Section one contains the results of the various analytical procedures (i.e., factor analyses, reliabilities, correlations, and hierarchical moderated regressions). Section two contains the interpretation and discussion of the results. Evidence for the support, or rejection, of the study's hypotheses are presented and discussed.

Chapter Five contains a summary of the results given in Chapter Four and provides conclusions and recommendations for adolescent substance use research. Considerations for treatment and education programs are also discussed.
CHAPTER TWO: REVIEW OF RELATED LITERATURE

Adolescence is the important stage of transition from child to adult and is typified as a period of unrest. Whether the adolescent period is characterized as the period of "storm and stress" as is traditionally thought, or as a time of gradual and deliberate change, most researchers agree that adolescence is an important period of human development (Dusek and Flaherty, 1981).

This review has been designed to present findings for predictor variables (i.e., self-concept, sensation seeking) and outcome variables (grouped together as substance use) independently before examining the inter-relation between the predictors and outcomes. Gender differences in each of these areas of research (substance use, self-concept, and sensation seeking) have also been included.

Self-concept During Adolescence

Self concept has been defined by Bandura (1997) as "a composite view of oneself that is presumed to be formed through direct experience and evaluations adopted from significant others" (p. 10). Self-concept is a measure based upon a number of components. In the literature, the most commonly researched components of self-concept appear to be self-esteem and more recently self-efficacy. Self-esteem is referred to as an evaluation of personal feelings concerning one's own value, importance, and competence (Kalliopuska, 1984). On the other hand, Bandura (1986) defined self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses"
(p. 391). Bandura’s original scale of self-efficacy was domain specific, however, Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, and Rogers (1982) postulated that feelings of efficacy in one domain positively influenced feelings of efficacy in other domains. The authors contended that “an individual’s past experiences with success and failure in a variety of situations should result in a general set of expectations that the individual carries into new situations” (Sherer et al., 1982, p. 664). Therefore, a measure of general self-efficacy would be effective in determining an adolescent’s perception of self-efficacy. While a measure of general self-efficacy is more general than the domain specific measures of Bandura, it remains more specific than self-esteem. One could characterize self-esteem as a general measure of self-concept while general self-efficacy could be characterized as a more specific measure of self-concept, namely self-judgments regarding abilities and competencies.

Research indicates that adolescence is a period characterized by changing levels of self-esteem. In their review of studies measuring self-esteem in adolescents, O’Malley and Bachman (1983) indicate that measures of global self-esteem increased through adolescence. Simmons, Rosenberg, and Rosenberg (1973) postulated that self-esteem levels during adolescence would be lower than before adolescence. Their study examined the self esteem of students in grades three to twelve (N=1917) and indicated that during early adolescence subjects had lower self-esteem than both older adolescents (>15 years) and those not yet classified as adolescents (8-11 years). The authors suggest that this low self esteem may be due to stress associated with environmental changes of the adolescent period, such as leaving elementary school, rather than with age. An adaptation to the new environment (i.e., secondary school) may account for the increase in self-concept throughout adolescence.
In examining self-efficacy, Bandura (1977) indicated that the development of self-efficacy is based upon self perceptions determined from situations which are potentially threatening. Effective self-efficacy is determined "most readily by experience of mastery arising from effective performance" (Bandura, 1977, p. 191). Adolescence, as a period of change, provides the opportunity for negative and positive development of self-efficacy based upon the experiences of the adolescent.

It would appear that there are gender differences regarding self-concept. For instance, Dusek and Flaherty (1981) examined 330 students from grades 5 to 12 and proposed that males and females develop self-concept differently throughout adolescence. The authors suggested that the development of the self-concept is a result of growth, development and realization of skills and attributes through experience and education throughout adolescence. Males and females due to differing educational and experiential opportunities may develop in different dimensions of self-concept.

The above mentioned studies indicate that adolescence is a critical period in the development of adolescent self-concept and specifically self-efficacy. In addition, some research (Dusek and Flaherty, 1981, Rosenberg and Simmons, 1975) indicated that the development of self-concept is different for males and females and, therefore, researchers should consider the effect gender may have on any analyses examining self-concept.

**Sensation-seeking During Adolescence**

Zuckerman (1994) defines 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" (p 10). The sensation-seeking trait is not confined to a specific area of risk. Zuckerman (1971) found that
sensation-seeking was a broad trait that encompassed a variety of sensational modalities including cognitive and sensory stimulation, social interactions, and risky sporting activities.

In order to more fully understand the concept of sensation-seeking it is useful to examine the factors that affect participation in different types of sensation-seeking activities (e.g., substance use). Farley (1973, 1981) postulates that sensation-seeking starts as a deficit in physiological arousal from which a sensation-seeking need arises in order to raise arousal levels. The manifestation of this sensation-seeking desire is then determined by the subject's environment, e.g., socioeconomic environment (Farley, 1973).

Researchers have long debated the specific cause of the sensation seeking trait. It is now believed that genetic influences on the nervous system coupled with environmental factors are the most likely cause of the development of this characteristic (Zuckerman, 1994). While the debate over the biological and psychological origins of the sensation-seeking trait continues, it is clear that this trait is a significant predictor of behaviours including general deviance (Newcomb & McGee, 1991) and various types of substance use (Newcomb & McGee, 1991, Zuckerman, 1979, Zuckerman, Ball & Black, 1990). Furthermore, Ball, Farnill, & Wangeman (1984) examined sensation-seeking values through a sample ranging in age from 17 to 60 years (N=698) and found that during adolescence, the need for experiences that satisfy sensation-seeking drives are common.

Research has also indicated significant gender differences for sensation-seeking. Ball et al. (1984) found that males reported higher sensation-seeking values than females. This finding is supported by Bates, Labouvie, and White (1986), Newcomb and McGee,
1991, and Ratliff and Burkhart (1984) who also found that males were significantly higher sensation seekers than females. Further, Ball, Farnill, and Wangeman (1984) also indicate that sensation-seeking values reach a zenith during late adolescence-early adulthood and that they decrease with age from this point on. These findings indicate that gender and age are important variables to be considered in sensation-seeking research.

Substance Use During Adolescence

Adolescence is typically a period of experimentation (Santrock, 1991). It is commonly the period in which the initiation of substance use occurs. Adolescence is an important period of study for substance use research in that for most adolescents, the use of substances is illegal. While experimentation with substances may vary widely, the following section will examine specifically alcohol, tobacco, and marijuana use in adolescents.

A study by Adlaf, Ivis, Smart, and Walsh (1995) reported greater than 65% of Ontario adolescents had used substances in the twelve months prior to the study. The primary substances used were alcohol, tobacco, and marijuana. Adlaf et al. (1995) also found that frequency of alcohol use increases with age. However, they reported no significant differences between male and female frequency of alcohol use. The importance of substance use research for adolescents, is further substantiated by Barnes and Welte (1986) whom examined alcohol use in 27,000 students in grades 7 through 12 and reported that alcohol was the most widely used drug by adolescents.

Therefore, these independent studies provide strong evidence that alcohol use is widespread during adolescence, tobacco and marijuana are used by substantial minorities
of adolescents and that the behaviours are consistent across the last 10 years. In addition, the studies indicate that rates of use are substantially different for each substance and, therefore, each substance should be considered separately in research analyses.

While the frequency of substance use statistics presented above indicate that substance use is a significant behaviour problem for adolescents, the misuse or abuse of substances is also a significant issue. Adlaf et al. (1995) reported that 35% of adolescents misuse alcohol (i.e., drink 5 or more drinks per occasion or get drunk). These findings are substantiated by Barnes and Welte (1986) who reported that approximately 30% of adolescents misuse or abuse alcohol. Abuse in their study was determined by the occurrence of negative social consequences from drinking. These studies clearly indicate that large percentages of adolescents misuse or abuse substances and that substance use research should not be limited to frequency of use statistics.

Further, many studies have indicated gender differences in the use of substances. For example, Newcomb and McGee (1989) examined adolescent alcohol use in 847 high school students and found that males were significantly higher users of alcohol than were females. As well, the authors also identified that males were significantly higher abusers (i.e., more than 5 drinks per occasion) than females. These results are confirmed by Yardley, McFadden, et al. (1996) who indicated that males report higher levels of alcohol and marijuana use than females. These results indicate that gender is an important variable in understanding the substance use activities of adolescents.

Self-concept and Substance Use During Adolescence

Low self-concept has been linked with many adolescent behaviours, including substance use (Bonagoro & Bonagoro, 1987; Butler, 1982; Kinnier, Metha, Okey, and
Keim, 1994; Sadowski, Long, & Jenkins, 1993). There are many theories that attempt to explain the relationship between low self-concept and substance use. For instance, the containment theory of delinquency (Reckless, Dinitz & Murray, 1956) suggests “insulators” would be external or internal forces that shield against the adoption of delinquent behaviours. A strong, positive self-concept therefore, acts as a buffer against influences which promote the adoption of negative behaviours.

The need for a positive self-concept is considered an important motivator of human behaviour. Maslow (1970) presents the need for a positive self-concept as a "prepotent" human need. Self-esteem theory (Rosenberg, Schooler, & Schoenbach, 1989) holds that low self-esteem promotes the adoption of behaviours that will increase self-esteem. Therefore, adolescents who have low concepts of self-esteem will be more likely to adopt behaviours such as substance use in hopes that these behaviours will increase self-esteem. Adolescence is typically the period in which substance use is initiated. In order to be more like their peers, adolescents with low self-esteem may conduct themselves in ways they perceive as being helpful to their self-esteem. Those adolescents who possess a high degree of self-esteem will not be motivated to adopt behaviours in the hope of changing self-esteem levels because they are satisfied with their current level. Therefore, in the face of peer pressure, or opportunity, they are less likely to engage in negative behaviours. Rosenberg, Schooler and Schoenbach (1989) examined self-esteem and delinquency and found a negative and reciprocal relationship. In their study of 1886 adolescent males, the authors found that low self-esteem promotes delinquency and that delinquency promotes low self-esteem.

Self-efficacy theory may explain adolescent substance use. Much like self-esteem theory, self-efficacy theory proposes that self-efficacy expectations are fundamental
determinants of behavioural change (Bandura, 1977). This theory is in accordance with Kaplan (1972; 1976) who hypothesized that adolescents with low self-concept perform a self-evaluation and adopt negative behaviours which parallel the negative self-image they possess. Therefore, the adoption of negative behaviours such as substance use, may be linked to low levels of self-concept in adolescents. General self-efficacy, as a measure of self-concept would be expected to be related in a similar way.

One explanation of adolescent use of substances may reflect their need to cope with feelings of low self-efficacy. Bandura (1977) postulates that feelings of personal efficacy determine which coping mechanism will be used in specific situations. Adolescence, which is a period where exposure to substance use and abuse takes place, presents a variety of new situations that require strong levels of self-efficacy in order to be navigated effectively. Adolescents may use coping mechanisms such as substance use to cope with feelings of low self-efficacy. Adolescents with high feelings of self-efficacy do not need these coping mechanisms and therefore have lower levels of substance use.

The relationships among different measures of self-concept and substance use have been extensively studied. For instance, Ahlgren and Norem-Hebeisen (1979) indicated that drug abusing adolescents have lower self-esteem than typical adolescents. This finding is also supported for alcohol use in a study by Butler (1982) who found that low self-concept was related to alcohol consumption in 12-13 year old adolescents (N=388) and for tobacco use in a study by Bonaguro and Bonaguro (1987) who found that low measures of self-concept are significantly related to increased tobacco use. Further, Kinnier, Metha, Okey and Keim (1994) performed a comparison study which examined the relationship between psychological health and substance use in adolescents from two populations (high school and psychiatric facilities). Their study of 161
adolescents indicated that increased substance use was positively and significantly
correlated to increased depression, decreased self-esteem, and a deterioration of purpose
in life in adolescent high school students but not in adolescents attending psychiatric
facilities. Finally, Penny and Robinson (1986) examined the relationship between self-
estee m and smoking in 1225 adolescents from grades 10-12 and found that adolescents
who smoked had lower self-esteem than non-smokers. These studies demonstrate that
self-concept and measures of self-concept, e.g., self-efficacy are important variables in
understanding adolescent substance use. Therefore, the following null hypothesis is
postulated:

Null Hypothesis 1

H₀: There is no relationship between general self-efficacy and substance use.

There is some evidence that the relationship of self-concept with substance use
may be different for males and females. For instance, Abernathy, Massad and Romano-
Dwyer (1995) examined the relationship between smoking and self-esteem in adolescents
between the 6th and 10th grades (N=3567). Their findings indicate self-esteem was a
significant predictor for females but not for males. These findings suggest that though
self-concept is related to adolescent substance use its relationship may be different for
males and females. Therefore, the following null hypothesis is presented:

Null Hypothesis 2

H₀: There is no relationship between gender and substance use.
Sensation-seeking and Substance Use During Adolescence

The need for altered sensations may be a strong motivating force for substance use. For instance, Peterson (1991) and Bates, Lobouvie, and White (1986) examined the effect of sensation-seeking desires on substance use in 584 adolescents aged 15 to 18. Levels of sensation-seeking were significantly and positively related to substance use for both males and females. Teichman, Barnea and Rahav (1989) also found that sensation-seeking levels were higher in adolescent substance users.

Sensation seeking needs may be linked to a general syndrome of deviance in adolescents. Newcomb and McGee (1991) examined the relationship between sensation seeking and general deviance in 595 adolescents followed longitudinally from grades 10-12 to early adulthood. The researchers examined sensation seeking and substance use at three stages of life: early and late adolescence and early adulthood. The authors found strong relationships at each stage of life among sensation seeking and a variety of substances (i.e., alcohol, tobacco, and marijuana) indicating that sensation seeking was a significant predictor of drug use at each of the stages.

Researchers have also examined the role of sensation-seeking and different forms of substance use in college students. Zuckerman, Ball, and Black (1990) found that high levels of sensation-seeking were significantly related to the proportions of male and female college students who smoked tobacco. In a related study, Ratliff and Burkhart (1984) examined alcohol use in college students and found significant positive relationships for sensation-seeking and alcohol use indicating that as sensation seeking increases, alcohol use increases. Therefore, the literature reveals strong relationships among sensation seeking and several different substances. Furthermore, the relationships
have been demonstrated to hold from adolescence through to adulthood. Therefore, the following null hypothesis is presented:

Null Hypothesis 3

H₀: There is no relationship between sensation-seeking and substance use.

Moderating Relationships

Moderating variables affect the strength and/or direction of the relationship between a predictor variable and an outcome variable (Barron and Kenny, 1986). While the studies mentioned above clearly indicate that sensation-seeking is an important predictor of substance use in male and female adolescents, very few of the studies consider the effect of potential moderating influences (e.g., general self-efficacy, gender). Much of the research outlined above presents the sensation-seeking-substance use relationship as being independent of other influences. This relationship is presented in Figure 1 below. Note that while there are differences between the groups in the graph, denoted by the parallel lines, these groups are still assumed to have the same predictive relationship between substance use and sensation seeking. This is shown by the similar slopes for the two lines.
Figure 1: Main effect relationship between sensation-seeking and substance use.

Zuckerman, Ball, and Black (1990) consider the interaction of sensation seeking with gender but found no significant interaction relationships. However, the researchers used an analysis of variance (ANOVA) model to probe for interaction effects that may be problematic. Aiken and West (1991) suggest that the use of a regression procedure is a more accurate way to examine interaction relationships in continuous variables. Separating continuous variables using a median or tripartite split, as required in an ANOVA model, may have a considerable cost on analyses. Aiken and West argue that "splits of continuous variables throw away information, reducing the power of the statistical test: They make it more difficult to detect significant effects when in fact they do exist" (p. 4). This may explain the lack of interactions for Zuckerman et al. (1990).
The use of a regression model in probing interactions was done by Teichman, Barnea, and Rahav (1989). The researchers used a moderated hierarchical multiple regression analysis similar to the procedure used in this study to examine the interaction of sensation seeking by age in 1900 adolescents, aged 14 to 19. They found no significant interactions for age.

As outlined in the review of literature, the need for high self-concept is a primary motivator of human behaviour. Further, feelings of low self-efficacy may be manifested by the use of substances as a coping behaviour. In addition, sensation-seeking is significantly and positively related to substance use. One might theorize that feelings of high self-efficacy, might differentially affect (i.e., buffer) the sensation-seeking-substance use relationship. Under conditions of low self-efficacy it is hypothesized that the sensation-seeking substance use relationship would be maintained. Those with low feelings of self-efficacy may be more likely to respond to sensation-seeking motivations for novel activities (e.g., substance use) in a desire to either positively influence or cope with their low feelings of self-efficacy. This hypothetical relationship is shown by the rising slope of the line for low self-concept in Figure 2. However, under conditions of high self-efficacy, it is hypothesized that the sensation-seeking substance use relationship will be buffered. Those with higher feelings of self-efficacy, would be less influenced by sensation-seeking motivations because they possess the necessary self-efficacy to withstand the pressures associated with adolescence, therefore, the slope of the line for high self-concept in Figure 2 is significantly lower.

**Null Hypothesis 4**

Hₐ: General self-efficacy will not moderate the relationship between sensation-seeking and adolescent substance use.
Figure 2: Sensation-seeking and substance use moderated by self-concept

In addition to self-efficacy, gender may also play a moderating role in the relationship between sensation-seeking and substance use. It is theorized that the sensation-seeking-substance use relationship may be stronger for males than for females. Socially, males attain more freedom to participate in risky activities (e.g., substance use) than females. Therefore, males could feel more freedom to respond to sensation-seeking desires such as substance use. However, these societal constraints may very well reduce the substance use behaviours of high sensation-seeking females. This relationship is hypothesized in Figure 3. It is hypothesized that the relationship between sensation-seeking and substance use hypothesized by the slopes of the lines in Figure 3 would be more positive for males and more level or flat for females (i.e., moderated by gender). To examine the effect of gender on the sensation-seeking substance use relationship, the following null hypothesis is presented:
Null Hypothesis 5

$H_0$: Gender will not moderate the relationship between sensation-seeking and adolescent substance use.

Figure 3: Sensation-seeking and substance use moderated by gender

Summary

Previous research has examined the development of self-concept during adolescence. Studies indicate that the adolescent period is characterized as a period of changing levels of self-concept and that these changes differ for males and females. In addition, research indicates that measures of self concept (e.g., self-efficacy) are negatively related to adolescent substance use. This is support for a main effect relationship between self-efficacy and substance use in adolescents.
Sensation-seeking is another measure which has been found to be positively related to adolescent substance use. The need for experiences which are sensational in nature is common during adolescence and may influence the initiation of activities such as substance use. As with self-concept, research has identified significant differences between males and females for their levels of sensation seeking. Therefore, as the research indicates, there are main effect relationships for gender by sensation seeking and sensation seeking by substance use.

Studies examining the relationship between sensation seeking, self-concept, and substance use have primarily considered main effect relationships or the relationships among variables without considering the moderating influence of other variables. A minority of studies have identified that the influence of moderating variables may be an important consideration.

As presented above, due to societal pressures and constraints for females, it is expected that being female buffers or constrains the relationship between sensation-seeking and substance use. In addition, high feelings of self-efficacy may also act as a buffer of the sensation-seeking substance use relationship in adolescents. It is hypothesized that this may be because they do not feel the same desire to improve their self-concept as those with low feelings of self-efficacy. The consideration of moderating influences is important in further understanding the sensation-seeking substance use relationship in adolescents.
CHAPTER THREE: METHODOLOGY AND PROCEDURES

Overview

The moderating effects of gender and general self-efficacy on sensation-seeking-substance use relationships are examined using the hierarchical regression procedures outlined below. Measures of validity, internal consistency, and pre-analytic procedures are presented at the end of this chapter.

Research Design

This study is a secondary analysis of data conducted during the Youth Leisure Study (Yardley, Baker, et al., 1996). Participants completed the Youth Leisure Study Questionnaire (Appendix 1) created by Yardley, Baker, et al. (1996). The questionnaire is a multivariate instrument addressing a wide range of adolescent leisure behaviours, school performance measures, and psychological variables. Many of the constructs used in the instrument were taken from existing scales, others were created by the research team through consultation with various external resources. Each construct is reviewed below.

Measures

The measures used in this study include: the General Self-efficacy Scale (Sherer & Adams, 1983); Cooper’s (1994) Sensation-seeking Scale; the Substance Use Scale and individual items dealing with binge drinking, the number of times drunk in the last month, gender, age, part-time job, and importance of religion (Yardley, Baker, et al., 1996).
Study Variables

Covariate demographic variables

The demographic variables: age, part-time job, and importance of religion, were used to control for the variance these variables share with substance use. Gender, age, and part-time job were measured using single item questions. Importance of religious faith was measured using a scale ranging from 1 (not important) to 4 (very important). Copies of these items can be found in Appendix A. Questions 1, 2, 8, and 16 respectively.

Predictor variables

Sensation-seeking, gender, and general self-efficacy were used to determine their predictive relationships with each of the outcome variables. The moderating relationships of general self-efficacy and gender on the relationship of sensation-seeking and adolescent substance use were also investigated. For analyses where gender was not considered as a significant predictor, (i.e., general self-efficacy analyses), the influence of gender was statistically controlled by entering it along with the other demographic variables on Step 1 of the regression procedure.

The Sensation-seeking Scale (Cooper, 1994) measures respondents' engagement in activities for the sensation they provide. The instrument uses a 4 point scale, ranging from 1 (not at all like me) to 4 (a lot like me) and the respondents react to the stem "for each statement, respond by filling in the circle that best describes you." Sample items include: "I like to test myself now and then by doing something a little chancy" or "I like to try new things just for excitement." From the 12 items of the Sensation-seeking Scale, a mean score was computed to provide an overall measure of sensation seeking. This
scale has been validated previously (Cooper, 1994). A copy of the scale is located in Appendix B.

General self-efficacy refers to one's perception of one's capabilities to perform desired actions. Self-efficacy is not concerned with specific skills but rather with the perception of the effectiveness of acquired skills (Bandura, 1986). Bandura's original self-efficacy scale was situation specific. The General Self-efficacy Scale (Sherer et al., 1982; Sherer & Adams, 1983), however, provides a general profile of self-efficacy perceptions than the more common domain specific perceptions. This scale has been validated previously (Sherer et al., 1982; Sherer & Adams, 1983).

Respondents were asked to choose the response which, "best represented their level of agreement or disagreement" with the items. The items were measured on a scale from 1 (strongly disagree) to 5 (strongly agree) and contained such items as "if I can't do something the first time, I keep trying until I can" and "I feel secure about my ability to do things." From the 8 items of the General Self-efficacy Scale, a mean score was computed to provide a measure of general self-efficacy. A copy of the scale is located in Appendix C.

Outcome variables

Five substance use outcomes were measured including: frequency of alcohol, tobacco, and marijuana use; frequency of times more than five drinks were consumed per occasion; and the number of times drunk. Each outcome variable was reported over the last month.

The Substance Use Scale was developed by the YLS research team with the assistance of field practitioners (Yardley, Baker, et al., 1996). The Substance Use Scale
measures respondents' frequency of use of 13 substances over the last month. The Substance Use Scale contains a 6 point scale, ranging from 1 (never used) to 6 (every day). Respondents react to the stem, "How often did you use the following substances in the last month?" For this study, only the responses to the alcohol, tobacco, and marijuana/hashish items were used. A copy of the scale is located in Appendix D.

Binge drinking, and number of times drunk, in the last month were measured using frequency based single item questions. A copy of the items is located in Appendix E.

Sampling Procedure

This study uses a sub-sample from the Youth Leisure Study (YLS). The original sample contained 1097 students from secondary schools in the Niagara Region of Ontario, Canada who completed the YLS. The original sample completed one of two forms of the YLS questionnaire. Sherer and Adams' (1983) scale of General Self-efficacy was only included on Form B and therefore, to ensure that the number of respondents remained consistent for each of the variables, only those students who completed Form B of the YLS questionnaire were included in this study. As a further exclusion criterion, respondents that did not complete at least 75% of the items in each construct were not selected. Consequently, the sample was a subset of the original and was composed of 420 respondents. Descriptive statistics for this sub-sample are provided in Table 1 (p.32). For a more detailed description of the data collection and sampling procedures from the YLS please refer to Appendix F.
Delimitations

The study was delimitated to:

1. Adolescent secondary school students from the Region of Niagara, Ontario, Canada.
2. Those students who consented to take part in the YLS study and were present during data collection.
3. A subsample of the YLS sample, i.e., those respondents who completed Form B of the YLS questionnaire and answered at least 75% of the items of the constructs being examined.

Limitations

The study was limited by:

1. The consent procedures used. Active consent procedures were used and research has indicated that this form of consent procedure yields a sample which may undersample specific groups. For example, active consent procedures may contribute to the under representation of minorities; under achievers; children with less educated parents; dissatisfied students; and students who are at risk for engaging in problem behaviours (Dent et al., 1993; Ellickson & Hawes-Dawson, 1989; Severson & Ary, 1983).
2. The testing environment. The presence of research assistants, and other students, during the completion of the questionnaire may have affected the accuracy of the data given by the respondents.
3. Self report measures. The questionnaire was a self-report instrument, which may not present an accurate profile of behaviour due to memory limitations. Respondents were required to recall events for up to 31 days in the past.
4. Questionnaire readability. The reading level of the questionnaire may have created misinterpretation of some items by some adolescents.

5. The reliability and validity of the measures used.

6. Confounding variables may inflate or deflate the true relationships among the variables being examined. This is partially controlled by statistically removing variance associated with demographic covariates in the first step of the analyses used in this study.

Assumptions

1. The selected sample is representative of a normal adolescent population.

2. Participants have responded truthfully to the questionnaire.

3. The instruments chosen to measure this study's constructs accurately measure the constructs.

4. Research assistants administered the questionnaire in a standard manner.

Pre-Analysis Procedures

The constructs (sensation-seeking and general self-efficacy) were submitted to reliability and factor analyses to ensure the constructs correspond to their theoretical models. Results of the factor and reliability analyses are presented in Table 1 (p.32) and were well above acceptable levels (i.e., alpha >.70).

Examination of the residuals of the outcome variables (i.e., the differences between obtained and predicted values) provide an effective illustration of the distribution of the data. This information allows the researcher to make the appropriate data transformations in order to address problems of normality, linearity,
homoscedasticity which then allow the researcher to perform more effective analyses. Examination of the residuals for this study's dependent variables (i.e., alcohol, tobacco, and marijuana use, binge drinking, and number of times drunk) revealed a departure from normality for each of the variables. As well, the distribution of tobacco use was bimodel in nature due to the influence of daily smokers.

Based upon the problematic distributions of these data, an inverse transformation was done for all outcome variables (with the exception of tobacco use) according to procedures outlined in Tabachnick and Fidell (1989). Outliers were then removed from the data set. Parallel analyses were then performed using both the transformed and untransformed variables to determine if there were any differences among the two procedures for each outcome. In cases where the transformation of the variable had no effect on the analyses, the untransformed variable was used (tobacco and marijuana use). Cases identified as outliers were removed from the analyses. Variables which required the use of their transformed counterpart included; alcohol use, binge drinking, and number of times drunk. The residuals for marijuana use were unaffected by the transformation and continued to be problematic.

The Moderated Hierarchical Regression Procedures Used in this Study

This study uses moderated hierarchical multiple regression (MHMR) analyses to examine relationships among predictor, moderating, and outcome variables. MHMR analyses are linear regression procedures that contain several steps (Aiken and West, 1991). In this study there were three steps to the MHMR analytical procedure: Step 1, demographic covariates; Step 2, substantive predictors; and Step 3, interaction terms.
In Step 1, the demographic covariates (age, part-time job, importance of religion) were entered. This step is entered first to statistically remove the variance associated with these variables on the predictive relationships to be examined. Based upon significant gender relationships reported in the literature, in these analyses gender was considered as a demographic variable and was entered in Step 1 to statistically control for its influence in the general self-efficacy-sensation-seeking relationship.

In Step 2, the substantive predictors were entered (sensation-seeking, general self-efficacy, and gender). This step allows for the examination of the unique predictive strength of the substantive predictors on the substance use outcome variables.

In Step 3, the interaction terms (i.e., gender x sensation-seeking and general self-efficacy x sensation-seeking) were entered. Prior to the regression analyses, each of the substantive predictor variables underwent a centering transformation before the interaction term was computed. This process ensured that the interaction term created by the cross product of the moderating and substantive predictor variables would not be highly correlated with the individual variables. Failure to perform this transformation presents problems of multicollinearity (Aiken & West, 1991). By entering the interaction term on Step 3, after the covariates and substantive predictors, the unique predictive relationship of the interaction term may be measured.
CHAPTER FOUR: FINDINGS

This chapter is divided into two sections. The first section contains the results of the various analyses. The second section contains the interpretation and discussion of the results.

Section One: Results

Descriptive Statistics

In Table 1 below, the percentages, means and standard deviations, and estimates of internal consistency (alpha coefficients) are provided for the demographic, substantive predictor, and outcome variables. The descriptive analyses revealed that the sample was 56% female and 44% male with a mean age of 15.53 years (SD=1.46). Seventy-one percent of respondents were between the ages of 14 and 16. Forty-four percent of the sample had a part-time job. There is a fairly even distribution of respondents for each level of importance of religion. Thirty-one percent felt that religion was not important in their lives while 24%, 24%, and 20% felt that it was mildly, moderately, and very important respectively.

For the substantive predictor variables, values for sensation-seeking and general self-efficacy were approximately normally distributed with means in the mid ranges of their respective scales (M=2.41, SD=.75 for sensation-seeking and M=3.75, SD=.61 for general self-efficacy).

Examination of the descriptive statistics of the outcome variables indicated the following: mean alcohol use was 1.80, SD=.97; mean tobacco use was 2.15, SD=1.91; and mean marijuana use was 1.46, SD=1.03, suggesting low levels of each of the substance use activities (less than 2.15 on a 6 point scale). For binge drinking, the mean
Table 1:

Descriptive statistics of variables for the research sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>Percent</th>
<th>Mean</th>
<th>S.D.</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic Covariates (N=420)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>2.4%</td>
<td>15.53</td>
<td>1.46</td>
<td>--</td>
</tr>
<tr>
<td>14</td>
<td>30.5%</td>
<td></td>
<td></td>
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<tr>
<td>15</td>
<td>20.0%</td>
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</tr>
<tr>
<td>16</td>
<td>20.7%</td>
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<tr>
<td>17</td>
<td>13.6%</td>
<td></td>
<td></td>
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<tr>
<td>18</td>
<td>11.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>1.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-time Job</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>43.6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>56.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance of Religion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>not important</td>
<td>31.4%</td>
<td>2.33</td>
<td>1.12</td>
<td>--</td>
</tr>
<tr>
<td>mildly important</td>
<td>24.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderately important</td>
<td>24.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>very important</td>
<td>20.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Substantive Predictor Variables (N=420)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensation-seeking</td>
<td>--</td>
<td>2.41</td>
<td>.75</td>
<td>.92</td>
</tr>
<tr>
<td>General Self-efficacy</td>
<td>--</td>
<td>3.75</td>
<td>.61</td>
<td>.83</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>44%</td>
<td></td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Female</td>
<td>56%</td>
<td></td>
<td></td>
<td>--</td>
</tr>
<tr>
<td><strong>Outcome Variables (N=420)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol Use</td>
<td>--</td>
<td>1.80</td>
<td>.97</td>
<td>--</td>
</tr>
<tr>
<td>Tobacco Use</td>
<td>--</td>
<td>2.15</td>
<td>1.91</td>
<td>--</td>
</tr>
<tr>
<td>Marijuana Use</td>
<td>--</td>
<td>1.46</td>
<td>1.03</td>
<td>--</td>
</tr>
<tr>
<td>Binge Drinking</td>
<td>--</td>
<td>1.36</td>
<td>2.91</td>
<td>--</td>
</tr>
<tr>
<td>Number of Times Drunk</td>
<td>--</td>
<td>1.11</td>
<td>2.60</td>
<td>--</td>
</tr>
</tbody>
</table>
was 1.36, $SD = 2.22$; and mean number of times drunk was 1.11, $SD = 1.35$. These results, measured over the last month, also indicate low levels of each activity.

The zero-order correlations among each of the study variables are presented in Table 2 (see p. 33). The correlations among the covariate demographic variables show weak but statistically significant negative correlations for part-time job with age ($r = -0.20, p < 0.01$) and part-time job with importance of religion ($r = -1.4, p < 0.01$). Among the substantive predictor variables there is a significant negative correlation for sensation-seeking and gender ($r = -0.25, p < 0.01$) indicating males report higher levels of sensation-seeking than females. In spite of the presence of several significant correlation coefficients, the sizes of the coefficients among demographic covariates and substantive predictor variables were small and, therefore, indicated a high degree of discrimination among the predictor variables.

Among the outcome variables there was a strong positive correlation ($r = 0.85, p < 0.01$) between binge drinking and number of times drunk. Due to the strength of this coefficient, caution should be used when interpreting the results for these variables. Binge drinking and number of times drunk should be considered as very similar constructs. For the other outcomes (alcohol, tobacco, and marijuana use) there were several moderate positive coefficients ($r = 0.40$ to $0.70$). However, the amount of shared variance is still low (less than 50% for the strongest coefficient) indicating a reasonable degree of discrimination among the outcome measures.
Table 2:

Zero-order correlations among the study variables

<table>
<thead>
<tr>
<th>Covariates</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Part-time job</td>
<td>.20**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Imp of Relig</td>
<td>-.00</td>
<td>.14**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Substantive Predictor Variables

| 4. Sensat         | .05  | -.04 | -.09 |      |      |      |      |      |      |      |
| 5. Self-efficacy  | .02  | -.04 | .06  | -.04 |      |      |      |      |      |      |
| 6. Gender         | -.11*| .01  | .07  | -.25**| -.08 |      |      |      |      |      |

Outcome Variables

| 7. Alcohol Use    | .25**| -.09 | -.17**| .37**| -.12*| -.09 |      |      |      |      |
| 8. Tobacco Use    | .16**| .03  | -.24**| .24**| -.15**| -.05 | .41**|      |      |      |
| 9. Marij Use      | .14**| .03  | -.15**| .29**| -.18**| -.13**| .41**| .46**|      |      |
| 10. Binge Drink   | .21**| -.09 | -.09  | .29**| -.14**| -.13**| .68**| .35**| .44**|      |
| 11. # times drunk | .17**| -.07 | -.09  | .30**| -.12*| -.08 | .63**| .35**| .44**| .85**|

For all coefficients N=420 and * is sig. at .05 level, ** is sig. at .01 level
Among the predictor and outcome variables there were several highly \( (p<0.01) \) significant correlations. However, the coefficients were reasonably small (i.e., none higher than .37) indicating a high degree of discrimination among these variables. These results indicate that all correlations between the predictor and outcome variables were within reasonable limits and therefore it was assumed that there is a reasonable degree of discrimination between predictor and outcome measures.

**Regression Analyses for General Self-efficacy by Sensation-seeking**

Results for the moderated hierarchical multiple regression (MHMR) analyses exploring the sensation-seeking-general self-efficacy relationships are presented in Table 3 below.

**Demographic covariates.** Significant variance was accounted for on Step 1 by the demographic covariates for all substances (i.e., alcohol use, binge drinking, number of times drunk, tobacco use, and marijuana use). Age was a statistically significant positive predictor of each of the substance use outcomes indicating that as age increased, substance use increased. Importance of religion was a statistically significant negative predictor for each of the substances. This finding indicates that as importance of religious faith increased, substance use decreased. Gender was a statistically significant negative predictor for marijuana use only (\( \beta = -0.098, p<0.05 \)) indicating that being male was more strongly associated with the use of marijuana than being female. Part-time job did not account for significant variance for any of the outcome measures.
Table 3:
Sensation-seeking and general self-efficacy moderated hierarchical regression analyses predicting substance use outcomes

<table>
<thead>
<tr>
<th></th>
<th>Alcohol Use</th>
<th>Binge Drinking</th>
<th># of Times Drunk</th>
<th>Tobacco Use</th>
<th>Marijuana Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\Delta R^2$</td>
<td>$\beta$</td>
<td>$\Delta R^2$</td>
<td>$\beta$</td>
<td>$\Delta R^2$</td>
</tr>
<tr>
<td><strong>Step 1 Covariates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.113***</td>
<td>.129***</td>
<td>.075***</td>
<td>.082***</td>
<td>.069***</td>
</tr>
<tr>
<td>Part-time Job</td>
<td>.235***</td>
<td>.263***</td>
<td>.211***</td>
<td>.158***</td>
<td>.149**</td>
</tr>
<tr>
<td>Importance of Religion</td>
<td>-.201***</td>
<td>-.210***</td>
<td>-.158***</td>
<td>-.233***</td>
<td>-.173***</td>
</tr>
<tr>
<td>Gender</td>
<td>-.059</td>
<td>-.063</td>
<td>-.025</td>
<td>-.014</td>
<td>-.098*</td>
</tr>
<tr>
<td><strong>Step 2 Substantive Predictors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensation-seeking</td>
<td>.118***</td>
<td>.127***</td>
<td>.121***</td>
<td>.061***</td>
<td>.110***</td>
</tr>
<tr>
<td>General Self-efficacy</td>
<td>.369***</td>
<td>.345***</td>
<td>.334***</td>
<td>.215***</td>
<td>.287***</td>
</tr>
<tr>
<td></td>
<td>-.086*</td>
<td>-.109*</td>
<td>-.113*</td>
<td>-.125**</td>
<td>-.154***</td>
</tr>
<tr>
<td><strong>Step 3 Interactions</strong></td>
<td>.002</td>
<td>.003</td>
<td>.002</td>
<td>.002</td>
<td>.012*</td>
</tr>
<tr>
<td>sensat x selfeff</td>
<td>-.044</td>
<td>-.052</td>
<td>-.040</td>
<td>-.048</td>
<td>-.112*</td>
</tr>
<tr>
<td><strong>TOTAL $\Delta R^2$</strong></td>
<td>.233***</td>
<td>.259***</td>
<td>.198***</td>
<td>.145***</td>
<td>.191***</td>
</tr>
</tbody>
</table>

* = $p<.05$,  ** = $p<.01$,  *** = $p<.001$
**Substantive predictors.** For each substance use equation, significant additional variance was accounted for, on each of the second steps, by sensation-seeking (ranging from 6% to 12% of variance). Positive relationships of high significance (p<.001) were found for sensation-seeking indicating that as sensation-seeking increases substance use and abuse increases.

For general self-efficacy, significant negative relationships were found with each of the outcome variables, though they were weaker than for sensation seeking. The beta values were strongest for tobacco use and marijuana use which may be due to the similarities between the two substances (e.g., both are inhaled).

**Interaction effects.** Among the five moderated multiple hierarchical regression (MMHR) analyses for interactions between sensation-seeking (SS) and general self-efficacy (GSE) (SSXGSE), significant (p<.05) variance was accounted for on Step 3 for only one substance use outcome variable (marijuana use ΔR²=.012). Using methods outlined in Aiken and West (1991), a graphical representation of the interaction has been created. This interaction is plotted in Figure 1 (p. 36). The interaction plot indicates that the slope of the sensation-seeking marijuana use relationship for adolescents with low GSE is considerably greater than the slope of the relationship for adolescents with high GSE. Low GSE and high SS has much higher levels of marijuana use than high GSE and high SS resulting in an ordinal or noncrossover interaction (Aiken & West, 1991; Lubin, 1961). This indicates that high GSE buffers the sensation-seeking-marijuana use relationship.
Figure 4: Interaction of general self-efficacy by sensation-seeking for marijuana use

**Regression Analyses for Gender by Sensation-seeking**

Results for the moderated hierarchical regression analyses exploring the sensation-seeking-gender relationships are presented in Table 4 below. For these analyses gender was a substantive predictor and was, therefore, entered on Step 2.

**Demographic covariates.** The findings indicate significant variance was accounted for by the demographic covariates for all substances (i.e., alcohol use, binge drinking, number of times drunk, tobacco use, and marijuana use). Age was a statistically significant ($p<.01$) positive predictor of each of the substance use outcomes indicating that as age increased, substance use increased. Importance of religion was a statistically significant ($p<.01$) negative predictor for each of the substances indicating,
The optimization of the system occurs at a specific point, as shown in the graph. To achieve this, several factors must be considered. First, the relationship between input and output must be carefully analyzed. Secondly, the constraints of the system must be respected, ensuring that the solution is feasible. Finally, the goal of minimizing or maximizing a particular metric (e.g., cost, efficiency) must be achieved. The diagram illustrates the optimal point, indicating the balance between these factors. This point represents the most effective configuration of the system, balancing performance with constraints.
that as importance of religious faith increased, substance use decreased. Holding a part-time job was not a statistically significant predictor for any of the substance use outcomes.

**Substantive predictors.** Significant additional variance is accounted for in Step 2 of each of the regression procedures. Statistically significant \((p<.001)\), positive relationships were found for sensation-seeking and each of the substance use outcome variables indicating that as sensation-seeking increases, substance use increases. However, there were no significant gender substance use findings.

**Interaction effects.** On Step 3, the interaction construct accounted for significant additional variance for alcohol use in the last month \((\Delta R^2=.011, \ p<.05)\), binge drinking \((\Delta R^2=.012, \ p<.01)\), and number of times drunk \((\Delta R^2=.024, \ p<.001)\). These interactions are plotted in Figures 2, 3, and 4 respectively. For each of the interaction plots the slope is less steep for females than it is for males. Under conditions of low sensation-seeking, males and females have comparable alcohol use frequencies relative to high sensation seekers. However, under conditions of high sensation-seeking, males have significantly higher frequency of alcohol use than females resulting in a disordinal or crossover interaction (Aiken & West, 1991; Lubin, 1961). This trend continues for the alcohol abuse variables. Males with high sensation-seeking have a higher frequency of binge drinking and number of times drunk in the last month resulting in crossover interactions. The gender by sensation-seeking interaction is not significant for the tobacco and marijuana use outcomes.
Table 4:

Sensation-seeking and gender moderated hierarchical regression analyses predicting substance use outcomes

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Alcohol Use</th>
<th>Binge Drinking</th>
<th># of Times Drunk</th>
<th>Tobacco Use</th>
<th>Marijuana Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ΔR²  β</td>
<td>ΔR²  β</td>
<td>ΔR²  β</td>
<td>ΔR²  β</td>
<td>ΔR²  β</td>
</tr>
<tr>
<td><strong>Step 1 Covariates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.242***</td>
<td>.270***</td>
<td>.214***</td>
<td>.160***</td>
<td>.160***</td>
</tr>
<tr>
<td>Part-time Job</td>
<td>-.076</td>
<td>-.061</td>
<td>-.042</td>
<td>.027</td>
<td>.046</td>
</tr>
<tr>
<td>Importance of Religion</td>
<td>-.205***</td>
<td>-.214***</td>
<td>-.160***</td>
<td>-.234***</td>
<td>-.180***</td>
</tr>
<tr>
<td><strong>Step 2 Substantive Predictors</strong></td>
<td>.134***</td>
<td>.119***</td>
<td>.109***</td>
<td>.047***</td>
<td>.092***</td>
</tr>
<tr>
<td>Sensation-seeking</td>
<td>.375***</td>
<td>.352***</td>
<td>.341***</td>
<td>.223***</td>
<td>.297***</td>
</tr>
<tr>
<td>Gender</td>
<td>.032</td>
<td>.022</td>
<td>.057</td>
<td>.040</td>
<td>-.026</td>
</tr>
<tr>
<td><strong>Step 3 Interactions</strong></td>
<td>.011*</td>
<td>.012**</td>
<td>.024***</td>
<td>.000</td>
<td>.001</td>
</tr>
<tr>
<td>Sensat x gender</td>
<td>.105*</td>
<td>.113**</td>
<td>.158***</td>
<td>-.015</td>
<td>.034</td>
</tr>
<tr>
<td>TOTAL ΔR²</td>
<td>.254***</td>
<td>.257***</td>
<td>.207***</td>
<td>.128***</td>
<td>.153***</td>
</tr>
</tbody>
</table>

* = p<.05, ** = p<.01, *** = p<.001
**Figure 5.** Interaction of gender by sensation-seeking for alcohol use in the last month

**Figure 6.** Interaction of gender by sensation-seeking for binge drinking
Figure 7. Interaction of gender by sensation-seeking for number of times drunk

Section Two: Interpretation

A summary of the results according to the hypotheses presented in Chapter Two are presented below.

Summary of Analyses

Null Hypotheses 1. There will be no relationships among general self-efficacy and substance uses.

The MHMR analyses revealed that General Self-Efficacy is consistently a significant negative predictor of adolescent substance use and abuse (5 of 5 outcomes). Therefore Null Hypothesis 2 is rejected.
The graph shows a relationship between two variables. As one variable increases, the other decreases. This relationship can be described by the equation:

\[ y = mx + b \]

where \( m \) is the slope and \( b \) is the y-intercept. The graph indicates a negative correlation between the variables.

In conclusion, the data suggests that as variable A increases, variable B decreases, and vice versa. This finding is supported by further analysis and statistical tests.
Null Hypotheses 2. There will be no relationship among gender and substance uses.

No significant relationships were found for gender with any of the substance use variables. Therefore, Null Hypothesis 3 is supported.

No significant relationships were found in this study for gender with any of the substance use variables. This finding is curious considering previous research (e.g., Newcomb & McGee, 1989; Yardley, McFadden, et al., 1996) which identified clear differences in male and female substance use patterns.

Null Hypotheses 3. There will be no relationships among sensation-seeking and substance uses.

The results of the MMHR analyses revealed that Sensation-seeking is a statistically significant predictor of adolescent substance use and abuse (5 of 5 outcomes). Therefore, Null Hypothesis 1 is rejected.

Null Hypotheses 4. General self-efficacy will have no effect on the relationships among sensation-seeking and adolescent substance uses.

The MHMR analyses reveal only one significant interaction among 5 possible interactions (i.e., general self-efficacy on sensation-seeking with each of the substance use outcome variables) for general self efficacy moderating the sensation-seeking-marijuana use relationship. Therefore, Hypothesis 4 is retained for 4 substances and rejected for marijuana use.
Null Hypotheses 5. Gender will have no effect on the relationship among sensation-seeking and adolescent substance uses.

Significant interactions were found for three of the five substance use outcomes. In each case the significant findings were for the alcohol outcomes (i.e., alcohol use, binge drinking-number of times drunk). This consistency across the alcohol outcomes suggests that gender moderates the relationship among sensation-seeking and alcohol uses, but not tobacco or marijuana use. Therefore, Null Hypothesis 5 for alcohol use is rejected, but supported for tobacco and marijuana use.
Previous research has indicated that sensation-seeking is a strong predictor of substance use in adolescents (e.g., Bates et al., 1986; Newcomb & McGee, 1991). However, most of this previous research has examined sensation-seeking-substance use main effects only. The purpose of this study was to examine the possible moderating effects of general self-efficacy and gender on sensation-seeking-substance use relationships. Five substance use variables were examined including alcohol, tobacco, and marijuana use, as well as number of times drunk in the last month and binge drinking. Using data collected from the Youth Leisure Study (see Appendix F), relationships among the predictor and the substance use variables were explored.

Significant main effect relationships were found for two of the demographic covariates. Age was a statistically significant ($p<.001$) positive predictor of each of the substance use outcomes. These study finding indicate substance use increases as age increases which is consistent with previous literature (e.g., Adlaf et al., 1995). Importance of religious faith was a statistically significant ($p<.001$) negative predictor for each of the substance use outcomes. Results indicate that for all substances measured, as importance of religious faith increases, substance use decreases. Part-time job was not a significant predictor for any of the substance use outcomes.

The results indicate that sensation-seeking is positively and significantly related to each of the substance use measures in this study. This finding extends previous research (e.g., Bates, Lobouvie, & White, 1986; Peterson, 1991; Teichman, Barnea, & Rahav, 1989; Zuckerman, Ball, & Black, 1990) by including substance abuse (i.e., binge
drinking and number of times drunk) which was found to also have a positive relationship with sensation seeking. This significant relationship among sensation-seeking and forms of substance use is consistent across each of the substance use outcomes (alcohol, tobacco, and marijuana use, binge drinking and number of times drunk). A positive relationship with sensation-seeking may indicate that adolescents use and abuse substances simply for the sensation they provide.

The findings for general self-efficacy with the substance use variables indicate that substance use decreases as general self-efficacy increases. This finding supports previous research that found relationships among self-concept variables and substance uses. In this study, the consistent pattern across all substance use variables (alcohol use, tobacco use, marijuana use, number of times drunk, and binge drinking) shows that general self-efficacy is an important variable in understanding adolescent substance use and abuse. Higher levels of general self-efficacy are associated with lower levels of substance use in adolescents. This may be due to adolescents using substance use as a means of coping with a low self-evaluation, i.e., low self-efficacy (Bandura, 1977; Cooper, 1994).

No significant relationships were found in this study for gender with any of the substance use variables. This finding is curious considering previous research (e.g., Newcomb & McGee, 1989) which identified clear differences in male and female substance use patterns. The lack of significant relationships found in the current study may be due to the complexity of the analytical procedure used. By entering gender either with the other demographic variables on the first step (as was the case in general self-efficacy analyses) or with other substantive predictors on the second step (as was the case with gender analyses), shared variance may have accounted for the lack of significant
main effect findings. The variance shared between gender and the other demographic variables (i.e., importance of religion, age, and part time job) may have removed enough variance so that gender main effects were not significant. Previous studies that considered gender independently of potential confounding variables will have had a greater amount of variance for gender to account for and thereby achieved a significant main effect. While the procedure used in this study is a more complex method of establishing relationships, it may better reflect the complexity of 'real life' relationships. Previous studies have capitalized on greater variance for predictor variables to account for due to less complex analytical procedures.

General self-efficacy predicts the use of these substances but in this study it does not moderate the influence of sensation-seeking-alcohol use and abuse relationships, or the sensation-seeking-tobacco use relationship. Therefore, it appears that, with the exception of marijuana use, the prediction of substance use by sensation-seeking is not moderated by general self-efficacy. High sensation seekers with high levels of general self-efficacy were less likely to be marijuana users than high sensation seekers with low levels of general self-efficacy. The nature of marijuana use may be important in understanding this relationship. The other substance use variables in this study (alcohol use, tobacco use, number of times drunk, and binge drinking) may not hold the same sensational quality that marijuana use does. In marijuana use, the risk of legal repercussions are more serious and, therefore, one might argue that the activity is more sensational. While for many adolescents, the use of alcohol and tobacco is still illegal, they result in a less severe criminal penalty than the penalty for marijuana use. This supports the hypothesis that for adolescents, high levels of general self-efficacy may provide a buffer or insulate against sensation-seeking drives toward deviance.
In addition, the finding supports self-efficacy theory, which postulates that the need for feelings of self-efficacy are a primary motivator of human behaviour. Therefore, those adolescents who already possess higher feelings of self-efficacy may be less likely to be affected by sensation-seeking drives to activities such as marijuana use, simply because they are happy with their present state. In comparison, those adolescents who possess low feelings of general self-efficacy may use substance use as a means of coping with low self evaluations of their capabilities.

In contrast to the findings for general self-efficacy, significant gender interactions were found for the sensation-seeking-alcohol use outcomes (i.e., sensation-seeking-alcohol use, sensation-seeking-binge drinking and sensation-seeking-number of times drunk). High sensation-seeking males report much greater alcohol use than high sensation-seeking females, whereas low sensation-seeking males and low sensation-seeking females report similar alcohol use.

Future research examining the sensation-seeking-alcohol use relationships should explore the moderating effect of gender. Most previous research has failed to test this relationship and has, therefore, overlooked that possibility. Further, previous alcohol use research where no gender effects were found will have missed this important interaction. The interaction graphs indicate differences between high sensation-seeking males and high sensation-seeking females for alcohol (i.e., alcohol use, number of times drunk, and binge drinking). In Figures 5 to 7 (p. 40-41), the slopes are greater for high sensation-seeking males indicating that being female buffers or constrains sensation-seeking-alcohol use relationships. A possible explanation of this is that females are restricted by societal pressures, such as the greater pressure to demonstrate responsible alcohol use, and while they may be high sensation seekers, they are unable to indulge in these
motivations for fear of societal repercussions (e.g., peer group alienation). The greater slope of the lines presented in Figures 5 through 7 indicate that high sensation-seeking males are particularly at risk for alcohol use and abuse. However, the more level slope for adolescent females indicates that both high and low sensation seeking females report similar levels of alcohol use.

Results also indicate that the moderating role of gender is not significant for the sensation-seeking-tobacco use and the sensation-seeking-marijuana use relationships. This finding indicates that a general trend across all substances does not exist. This finding supports the examination of each type of substance independently. However, the findings are consistent for all alcohol use variables suggesting a trend across this type of substance.

The results of this study also highlight the importance of moderator research. Results found no significant main effects for gender while in the presence of other important demographic variables (i.e., age, part-time job, importance of religion). Previous research which has failed to control for these demographic variables may have found gender results that were spurious due to shared variance among gender and these demographics. Therefore, researchers should guard against these misleading results by using partial correlations if using bivariate procedures such as those used in this study or by adopting multivariate procedures.

Conclusions

Based upon the results presented in Chapter Four and summarized above, the following conclusions are presented:
1. Gender is an important moderating variable in sensation-seeking-alcohol use, sensation-seeking-number of times drunk, and sensation-seeking-binge drinking relationships. Research which does not consider these relationships may, therefore, be misleading. As has been typical in past research, failing to test for the moderating influence of gender over simplifies sensation seeking-alcohol relationships.

2. The moderating effects of gender are not consistent for sensation-seeking with all substances. This indicates that no general pattern of sensation-seeking-substance use is present. It also supports the examination of each substance independently in substance use research.

3. General self-efficacy is an important moderating variable in the sensation-seeking-marijuana use relationship. Research which does not consider this relationship (e.g., entering GSE as a covariate in a regression or ANOVA strategy) may, therefore, be misleading. As mentioned earlier, research which does not consider the moderating effects of important variables may over simplify sensation-seeking-substance use relationships.

4. Sensation-seeking is a strong predictor across all substance use outcomes. The influence of sensation-seeking should be measured or controlled for in substance use research.

5. General self-efficacy is a strong predictor across all substance use outcomes. The influence of general self-efficacy should be measured or controlled for in substance use research.
Implications

The implications of this research are considerable and influence many fields including education; substance use prevention, assessment, and treatment; psychology; and law enforcement. Specific implications for educational practice, theory, and further research are presented below.

Implications for Education: Policies and Practice.

This study was designed to further examine the relationship between sensation-seeking and adolescent substance use. Specifically, the role of gender and general self-efficacy as moderators of sensation-seeking substance use relationships was examined. An outcome of this study is the provision of a foundation of information from which to educate both adolescents and educators about prevention, assessment and treatment of adolescent substance use. As stated in Chapter 1, education is interpreted in its broadest sense, including educational systems such as treatment and counseling centers and boys and girls clubs (e.g., Boy Scouts).

One must first consider the role of the educator in its traditional sense. Teachers have the distinction of being the primary means of communicating information to adolescents. It is, therefore, important that teachers and educators have an understanding of the complexity of adolescent substance use. These results play an important role in understanding this behaviour. If a causal relationship exists between sensation-seeking and substance use in adolescents, then it is necessary to provide activities which will meet the needs of such desired sensations or, otherwise, substance use might be substituted for those activities. Zuckerman (1979) indicates that sensation-seeking is a motivator which can be satisfied in a variety of ways. Therefore, in health and physical
education classes, educators should consider alternative methods of addressing sensation-seeking needs.

In addition, by identifying the role that positive feelings of general self-efficacy has on behaviours such as substance use, educators are better able to recognize their position to impact the behaviours of their students. Educators need to improve their efforts to increase or maintain high levels of adolescent general self-efficacy since it is clearly negatively related to substance use. If a causal relationship exists between general self-efficacy and adolescent substance use, then important school outcomes may be affected. For instance, the effects of substance use are reflected in academic performance and in school behaviours (e.g., Eggert & Herting, 1993; Fagon & Pabon, 1990).

For substance use prevention and treatment specialists, these results are significant. They clearly, identify the role of sensation-seeking in adolescent substance use. Therefore, programs need to be developed which may find more acceptable ways to indulge the sensation-seeking drives that adolescents clearly possess. In addition, by identifying that the influence of sensation-seeking on adolescent substance use is different for males and females as well as those with high and low levels of general self-efficacy, programs can be modified to accommodate these relationships. For instance, leisure education and treatment programs should consider program objectives in order to ensure that all students develop increased feelings of self-efficacy. More importantly, the mistake of assuming that patterns of substance use are consistent across gender and general self-efficacy groups can be averted.

An understanding of the complexity of adolescent substance use is also useful in other less traditional arenas of education such as sporting organizations (e.g., YMCA). This knowledge could be used to further refine and develop programs to address
prevention, assessment, and treatment issues relative to substance use and abuse. By identifying that the relationship between sensation-seeking and substance use is not as simple as is presented in the literature, programs based around these simplistic models may be refined or modified. For instance, programmers should consider the special needs of high sensation seeking males. High sensation seeking males are at particular risk for substance use and abuse. By creating programs which provide more appropriate outlets for these sensation seeking needs, programmers can prevent the initiation or continuation of substance use. In addition, high sensation seeking females would also benefit from such programs.

The information is also important for boys and girls clubs, such as the Boy Scouts and Girl Guides. While considering the implications for educators outlined above, these groups exist in an environment conducive to the clear communication of information relative to substance use. These groups traditionally deal with distinct gender groups and thus are able to present information in a form most suitable to that group. For example, Guide leaders will be able to present information in a form more applicable to female adolescents without having to consider how male adolescents will interpret the information. This results in a more influential educational program.

Implications for Future Research.

When examining the relationships among gender, general self-efficacy, and sensation-seeking in predicting adolescent substance use a number of patterns emerged which may be valuable in future study. Of chief importance is the identification of gender as a moderator for sensation-seeking-alcohol use relationships. These results indicate that the influence of gender is significant and should be considered in alcohol research. It also suggests that research which does not consider this influence will be
missing a very important finding. This is also found for the sensation-seeking-marijuana use relationships where general self-efficacy was found to moderate. The examination of multiple independent variables using regression, or multiple independent and dependent variables using ANCOVA, or LISREL analyses is preferable over simplistic procedures such as correlation coefficients. Based upon the results of this study, the use of analytical procedures that consider interactional relationships is strongly advised.

Identifying general self-efficacy and gender as moderators of the predictive relationship of sensation-seeking on various substances, supports that the sensation-seeking-substance use relationship is not simple. Indeed, other influences (e.g., age,) should be examined to determine their influence on this relationship. The present study was restricted to adolescents, therefore, further research needs to be carried out to determine if these results are consistent across different age groups (e.g., adult populations) and other demographic groups (e.g., low socioeconomic status).

As well, in this study general self-efficacy, a more general measure of self-efficacy was used. It is possible that different dimensions of the self-concept may influence sensation-seeking-substance use relationships in different ways. Therefore, the moderating effects of other measures of self-concept (e.g., self esteem, self confidence, physical self-concept) should be examined to determine their influence on sensation-seeking-substance use relationships.

This study also found no consistent relationship for gender and substance use (a significant result was found for marijuana use only) which is contrary to previous research. Future research may examine more closely the relationship between gender and different forms of substance use to more fully explain this relationship.
A possible limitation of the present study may be that socio-economic status was not statistically controlled and may have confounded the analyses. Future research should consider this influence.

**Implications for theory.**

Relative to previous research, this study has supported some previous findings and refuted other that have been previously presented. This study supports that gender and general self-efficacy are important variables to consider when examining substance use in adolescents as has been previously presented by Abernethy, Massad, and Romano-Dwyer (1995). However, the study also identifies that previous research which examined sensation-seeking as a predictor of substance use without examining the influences of gender and general self-efficacy may under-represent the complexity of this relationship. The identification of interactions for gender with the alcohol use variables and general self-efficacy with marijuana use, suggests that this relationship is more complex than most previous research indicates. While indeed the predictive nature of sensation-seeking and general self-efficacy on adolescent substance use are significant, theorists must consider the effects of moderating influences in order to better understand adolescent behaviours.

The findings of the current study further extend research in the area of sensation seeking. Zuckerman’s (1979) definition of 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” (p. 10) is supported. The statistically significant main effect findings for sensation seeking for all substance use outcomes strongly suggests that the need for desired sensations is a strong
motivator toward substance use even though substance use for adolescents carries criminal and societal consequences.

Further, the identification of moderating variables for sensation-seeking-substance use relationships indicates that this relationship is more complex than the relationship presented previously (e.g., Bates et al., 1986; Peterson, 1991). The majority of previous research has presented sensation-seeking as being independent of other influences, whereas this study has indicated that gender and general self-efficacy may moderate the relationship among sensation-seeking and various forms of substance use. Further, these results suggest that other outcomes previously shown to have a significant relationship with sensation-seeking may also be influenced by other factors. Theorists should explore whether interactions exist for other outcomes (e.g., extreme sport participation, vandalism, sexual activity).
Final Conclusions

This study has examined the relationships among gender, general self-efficacy, sensation-seeking, and forms of adolescent substance use (i.e., alcohol, tobacco, and marijuana use; binge drinking; and number of times drunk). Most importantly, it considers the moderating effects of gender and general self-efficacy on the relationship between sensation-seeking and substance uses in adolescents. By considering and identifying the moderating role of these variables, the current study extends previous research. It also identifies to researchers and educators the complexity of adolescent substance use.

Understanding adolescent substance use is an important area of educational research. The educator is in a critical position to positively influence the adolescent. A greater understanding of the mechanisms which influence and contribute to substance use and abuse may lead to the development of educational programs designed to address the complex needs of adolescents. Increased education may lead to decreased adolescent substance use creating beneficial repercussions in many areas, including crime prevention, school performance, as well as psychological and physical health. However, a strong foundation of knowledge regarding the multi-faceted behaviour of adolescent substance use is required before these positive outcomes can occur.


Appendix A

YLS Questionnaire: Demographic Information

1. Are you male or female?
   - Male
   - Female

2. How old are you?
   - 11 yrs or less
   - 12 yrs
   - 13 yrs
   - 14 yrs
   - 15 yrs
   - 16 yrs
   - 17 yrs
   - 18 yrs
   - 19 yrs
   - 20 yrs
   - 21 yrs
   - 22 yrs
   - 23 yrs
   - 24 yrs
   - 25 yrs or more

3. Do you have any children?
   - Yes
   - No

4. In which municipality do you currently live?
   - Fort Erie
   - Grimsby
   - Lincoln Niagara Falls
   - Niagara-on-the-Lake
   - Pelham
   - Port Colborne
   - St. Catharines
   - Thorold
   - Wainfleet
   - Welland
   - West Lincoln
   - Other (specify)

5. Fill in the circle which best describes the location of your home (where you live).
   - Urban area (neighbours close by, subdivisions)
   - Rural area (houses are spread out, outside the city/town)

6. To which ethnic background do you first belong?
   - Canadian (English background)
   - Canadian (French background)
   - Canadian (Aboriginal/Non-Aboriginal background)
   - Canadian (Other background, specify)
   - Other (specify)

7. Who do you live with?
   - Both parents
   - One parent (mother)
   - One parent (father)
   - One parent and one step family
   - Neither parent
   - Other

8. Do you currently have a part-time job?
   - Yes
   - No

9. In the LAST MONTH, on average how many hours a week did you work?
   - ______ hours per week in the last month

10. In the LAST MONTH, on average, how much money did you have available?
    - ______ $ per week in last month

11. On average, in the LAST MONTH, how much “free time” or “leisure time” have you had every week?
    - ______ hours per week in the last month

12. In the LAST MONTH, how often have you been involved in any form of gambling (e.g., betting on sports, cards, lotteries, proline, etc.)?
    - ______ times last month

13. On average, how much money do you spend on gambling per occasion?
    - ______ $ per occasion

14. On average, in the LAST MONTH, what is the total amount of money you have spent on gambling per week?
    - ______ $ per week in the last month

15. Within what main religious faith were you raised? Specify (write “none” if this applies to you)

16. How important is having a religious faith to you? [ ] Not at all important
                                              [ ] Moderately important
                                              [ ] Moderately important
                                              [ ] Very important
The following items make some general statements that may or may not be true for you personally. For each statement, respond by filling in the circle that best describes you.

1. I don't let the risk of getting hurt a little stop me from having a good time
2. I often act on the spur-of-the-moment without stopping to think
3. I get a real kick out of doing things that are a little dangerous
4. You might say I act impulsively
5. I like to test myself every now and then by doing something a little chancy
6. Many of my actions seem to be hasty
7. I'm always up for a new experience
8. I like the feeling of being giddy or woozy
9. I like to try new things just for excitement
10. I go for the thrills in life when I get a chance
11. I like to experience new and different sensations
12. In general, I enjoy the feeling of having an altered consciousness or state of mind
### Appendix C

**YLS Questionnaire: General Self-efficacy Scale**

Fill in the circle that best represents your level of agreement or disagreement with each of the following statements.

<table>
<thead>
<tr>
<th></th>
<th>STRONGLY DISAGREE</th>
<th>DISAGREE</th>
<th>NEUTRAL</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>If I can't do something the first time, I keep trying until I can</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I give up on things before completing them</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>When I set important goals for myself, I achieve them</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>If something looks too complicated, I will not bother to try it</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>When trying to learn something new, I give up if I am not initially successful</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td>When unexpected problems occur, I handle them well</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>I avoid trying to learn new things when they look too difficult for me</td>
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<td></td>
<td></td>
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<tr>
<td>8</td>
<td>I feel secure about my ability to do things</td>
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</tbody>
</table>
Appendix D

YLS Questionnaire: Substance Use

How often did you use the following substances in the LAST MONTH? Also, compare yourself to the "typical" person in your age group and tell us, on average, how high your level of consumption is compared to the typical person.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Never Used</th>
<th>Almost Every Month</th>
<th>Once a Week</th>
<th>More Than a Week</th>
<th>Compared to the &quot;typical&quot; person in your age group, your average level of consumption for this substance is...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beer, wine, hard liquor (alcohol)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cigarettes, chewing tobacco (tobacco)</td>
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<tr>
<td>Hashish, marijuana (cannabis)</td>
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<tr>
<td>Cocaine/Crack</td>
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<td></td>
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<tr>
<td>Uppers, beans (stimulants)</td>
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<tr>
<td>Downers, valium (depressants)</td>
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<tr>
<td>Heroin, painkillers (narcotics)</td>
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<tr>
<td>Acid/LSD, mushrooms, ecstasy (hallucinogens)</td>
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<tr>
<td>Gasoline, glue (inhalants)</td>
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<tr>
<td>Gravol, diet pills (over-the-counter medication)</td>
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<tr>
<td>Prescription medication (not used as prescribed)</td>
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<tr>
<td>Body builders (anabolic steroids)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Coffee, Coke, Chocolate (caffeine)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Appendix E

YLS Questionnaire: Binge Drinking and Drunkenness

The term "drinks" refers to any of the following:
- one bottle of beer or glass of draft (12 oz.), or
- one glass of wine (5 oz.) or a wine cooler (12 oz.), or
- one straight or mixed drink containing one ounce and a half of hard liquor

How many times in the LAST MONTH have you had 5 or more drinks on any one occasion?
answer

How often did you drink to the point of getting drunk in the LAST MONTH?
answer
Appendix F - YLS Collection Procedures

The present study conducts a secondary data analysis of the data collected from the Youth Leisure Study (YLS; Yardley, Baker, et al., 1996). The sample data used for this study is a sub-sample of the original YLS sample. Sampling, data collection, and anonymity procedures used in the YLS are outlined below.

Sample Collection

This study uses a sample from the Youth Leisure Study (YLS). All secondary schools (N=44) from the Niagara Region of Ontario, Canada were contacted to participate in the study. Five schools refused to participate and a final sample of 39 schools was obtained. From the student enrollment lists of these schools a random sample of 2968 adolescents was drawn based on 20% of grade nine students and 10% of all other grades.

Parents of each of the 2968 selected adolescents were mailed an information package containing consent forms and a letter describing the study. Signed consent forms were returned to the school by the student and then couriered to the researchers. Two subsequent mailouts to the parents improved overall response and the final sample number was 1481. Refusals and absenteeism on the day of data collection reduced the final sample to 1097, which corresponds to 37% of the original sample. Of this sample, 43.6% were male and 53.4% were female.

Data Collection

Schools were contacted to establish dates for questionnaire completion by the selected students ranging from November 9 to December 3, 1995. On the day the researchers went to the school, the participants were excused from class and completed the questionnaire in a common location (e.g., cafeteria or gymnasium). No teachers or administrators were present during the completion of the questionnaire, however, trained research assistants monitored the process. In 12 locations, where the percentage of
consenting students in attendance was low, a second data collection process was conducted within two weeks of the originally scheduled collection time.

At the beginning of the data collection process, the students were provided with an explanation of the study and given the opportunity to decline to take part. All volunteering students were then required to fill out a student consent form and ID card, which contained the student name and the ID number on the questionnaire. Students were randomly assigned to complete a Form A or Form B Youth Leisure Study Questionnaire. In order to increase the number of constructs measured, the Form A and Form B questionnaires differed in the constructs measured on pages four and seven.

Upon completion, the students placed the questionnaires in the collection box and then placed their ID cards in an envelope. The envelope was kept in view of the remaining students. As students left the data collection room they were provided with a debriefing form containing a contact phone number for the researchers and for their school counselors. The final student to leave the room sealed the ID card envelope and placed his/her signature across the flap. The sealed ID card envelopes were then given to a third party (Niagara Region Health Department) to hold in safe keeping, in order to provide the necessary link to school records. The third party has provided a letter indicating that all envelopes were returned to the Niagara Region Health Department in untampered condition which means that the research group goes not have a record of the names and ID numbers. The ID cards remained in the possession of the Niagara Region Health Department. This process allowed the researchers to link the questionnaire data with school records yet keep the questionnaire information anonymous to the researchers.

**Anonymity/Confidentiality**

Due to the sensitive nature of the information required from the respondents, anonymity was a critical issue. As outlined above, a third party (Niagara Region Health Department) controlled the linking cards containing students' names and questionnaire numbers. There data remain in their possession and the appropriate links to school
information have been made. At no point did either party have possession of both elements of information. The third party was responsible for providing school record information which was entered into a file using the questionnaire number. Once completed, the data file was then given to the researchers for analysis, i.e., without names, but with the linking ID number.