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The Relationship of Family Structure, Family Functioning, and Parental Supervision to Adolescent Substance Use

By

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ABSTRACT

Family structure, family functioning, and parental supervision were examined in relation to adolescent heavy drinking, marijuana use, and illicit drug use. Data from 2001 Alberta junior and senior high school students was analyzed using analysis of variance, and regression. Both types of analyses showed that both functioning and supervision were negatively related to the frequency of adolescent heavy drinking, marijuana use, and illicit drug use. Analysis of family structure was more ambiguous, with those from intact families reporting the lowest frequency of all three substance use behaviours, but variation in which families had adolescents with the highest reported frequencies. Structure, functioning, and supervision were also found to be inter-related, meaning that in addition to their main effects, they also influenced substance use indirectly and moderated other direct relationships. The adolescent's sex and school level were found to have significant effects on certain relationships.

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DEDICATION

To my parents, Karen and Jack Phelps,

for always believing in me

and for supporting me throughout this long process.

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CHAPTER 1 - INTRODUCTION

Since the early 1990's, there has been an increase in adolescent substance use (Adlaf, Paglia, Ivis, & Ialomiteanu, 2000). While between 26.8% and 36.0% report no use of alcohol or drugs in the last year, the majority (64.0% to 73.2%) of adolescents have used at least one substance (Adlaf, et al., 2000; Barcelo, Chhatre, Jones, & Grobe, 1998). These figures are troubling because of the potentially serious, and in some cases fatal, consequences that substances can have on an adolescent's health and functioning. In order to reduce the rates of adolescent substance use, it must first be understood why some adolescents choose to abstain from substance use, while others do not. Factors influencing adolescent substance use have therefore been the subject of a great amount of interest, and thus research.

It has been suggested that the adolescent's family, peers, school, community, and personality may all play a role in increasing or decreasing the likelihood that he or she will use substances (Substance Abuse and Mental Health Services Administration (SAMHSA), 2001a). Even within the area of family alone, there are numerous factors that have been explored with relation to their influence on adolescent substance use. As it is not within the scope of this study to examine factors related to all of the areas of an adolescent's life, only the area of family will be examined. The area of family was chosen because it is one of the first influences a child experiences and the ties to family are long term. Family was also chosen because parents often wish to know how to keep their adolescents away from substances. For this study, only three factors were chosen to be explored: family structure, family functioning, and parental supervision. Therefore, the broad research question that will be addressed in this study is: How do family

structure, family functioning, and parental supervision impact adolescent substance use, or more specifically, adolescent heavy drinking (consuming five or more drinks on a single occasion), marijuana use and the use of other illicit drugs?

By examining these variables, the intent is not to place blame on certain families for their adolescents' substance use. Adolescent substance use is a complex phenomenon and results from far more than family factors alone. The intent of examining these three factors is to clarify for families what factors could potentially lower the risk of adolescent substance use. By exploring patterns related to family structure, it is hoped that it will become apparent what combination of factors place some adolescents at a higher risk of substance use, and whether supervision and functioning play different roles depending on family structure. While whether a family is intact or not is not something that can be changed to decrease the risk of adolescent substance use, family functioning and parental supervision are very much elements that with effort can be changed. An understanding of how family structure, family functioning, and parental supervision interact and affect adolescent substance use could prove to be useful for initiatives that aim to decrease the prevalence of adolescent substance use by focusing on what the family can do.

In order to examine the way that family structure, family functioning, and parental supervision relate to adolescent substance use, a review of the literature (chapter 2) will first be presented in order to describe what is currently known. This review will first address North American prevalence rates and the consequences of adolescent substance use. This will be followed by the influence of family structure, parental supervision, and family functioning. Where possible, only literature relating the family variables to substance use will be examined. However, in the case of family functioning and one of

the components of parental supervision there is a lack of research relating to substance use, thus necessitating the inclusion of research investigating other types of outcomes. A short description of Social Control Theory will be given, followed by related literature, and an explanation of its relevance to the study. A list of specific research questions will conclude the review of the literature. Following this, the methodology (chapter 3) for the study will be laid out, including a description of the sampling procedures, subjects, instrumentation, and the planned approach to the data analysis. The results (chapter 4) of the study will be described next, and will include a brief examination of the data obtained for each of the variables, followed by the analysis for specific questions and the regression analysis. The results of the questions will then be integrated, and the chapter will conclude with a discussion of the limitations of the study. The final section, the discussion (chapter 5), will involve a discussion of the study's implications, including some comparisons to previous research findings, as well as suggested directions for future research.

CHAPTER 2 – REVIREW OF THE LITERATURE

Adolescent Substance Use

Since the early 1990s, there has been an increase in adolescent substance use reported (Adlaf, et al., 2000). Alcohol and drugs are more available to adolescents than some people may think. An American study reported that over a year, 63.4% of adolescents aged 12 to 17 were approached by someone selling alcohol, 51.8% by someone selling cigarettes, 41.5% by someone selling marijuana, and 31.7% by someone selling other forms of illicit drugs (SAMHSA, 2001c).

Among adolescents, alcohol is the most common substance used, with 95.2% of adolescents who use substances using alcohol (Fulkerson, Harrison, & Beebe, 1999). As a result of the relative popularity of alcohol among adolescents, literature related to alcohol use prevalence rates will be discussed first, followed by prevalence rates for tobacco, marijuana, inhalants, and finally illicit substances other than marijuana. Canadian studies will be discussed separately from American studies to ensure that an accurate picture of adolescent substance use in North America is obtained. Some of the rates are difficult to compare between the two countries because data is often collected for different time frames. In Canada, rates primarily reflect use over the year prior to the study, whereas in the United States, rates often reflect use during the month prior. Where available, past month, past year, and lifetime rates will be given, but the reader should be aware that in some cases Canadian literature is being compared directly to only one American study.

Alcohol

Although some might view alcohol use as harmless experimentation, it is not without damaging effects. Of adolescents in Atlantic Canada who report drinking alcohol, 10.3% to 24.2% have damaged things, 9.6% to 23.1% have injured themselves after drinking, 9.2% to 21.8% gave up buying things in order to buy alcohol, 3.1% to 7.6% had trouble with the police and 2.8% to 5.3% had problems with school work or exams because of their alcohol use (Barcelo, et al., 1998; MacDonald & Holmes, 1998; Poulin & Elliot, 1997; Van Til, MacMillin, & Poulin, 1998).

Heavy alcohol use can also potentially affect an adolescent's health. The greatest effect of alcohol on health is the high prevalence of automobile accidents involving impaired adolescent drivers (Heischober & Dellenbaugh Hofmann, 1997). During the course of the year before they were surveyed, between 7.8% and 36% of adolescents in grades 7, 9, 10 and 12 have driven within an hour of consuming two or more drinks of alcohol (Poulin & Baker, 1998; VanTil, et al., 1998). Chronic alcohol use affects the brain, can alter personality and behaviour, and can arrest normal development or maturation (Heischober & Dellenbaugh Hofmann, 1997). Adolescent chronic alcohol use has been found to be related to increased depression and suicide, increased involvement in violent crime, decreased academic achievement, and heightened learning difficulties, although the direction of causality is not clear (Heischober & Dellenbaugh Hofmann, 1997). Once heavy alcohol use becomes sustained, adolescents face increased likelihood of developing gastrointestinal pain and bleeding (gastritis), peptic ulcers, liver inflammation (acute transient hepatitis), liver damage and destruction leading to liver disease (Heischober & Dellenbaugh Hofmann, 1997). They are more likely to experience

increased fatigue with exercise (Heischober & Dellenbaugh Hofmann, 1997). Males may experience decreased testicular size and a decreased libido, while females may experience altered menstrual cycles (Heischober & Dellenbaugh Hofmann, 1997).

The prevalence rates for alcohol use which follow include only consumption greater than a few sips of alcohol.

Canadian Studies

Several recent Canadian studies have been done to estimate the prevalence of adolescent alcohol use. For students in junior and senior high, it has been estimated that between 53% and 76.5% used alcohol during the year prior to the study (Van Til, et al., 1998; Addictions Foundation of Manitoba (AFM), 1997). When lifetime use is examined, the figure climbs to between 72.7% and 84.6% of adolescents in that age group (Adlaf, Paglia, & Ivis, 1999; AFM, 1997). According to Adlaf, Paglia, Ivis, and Ialomiteanu (2000) who conducted bi-yearly studies on adolescent substance use, over the last decade there has been a significant increase in the number of junior and senior high students who reported having used alcohol within the year prior to the study (from 56.5% to 65.7%). Older adolescents are more likely to report having used alcohol than younger ones (AFM, 1997). Between 17% and 39.7% of grade seven students consumed alcohol within the year prior to being surveyed, compared to 78% to 84.6% of grade twelve students (Adlaf, et al., 1999; Van Til et al., 1998). Of adolescents who did drink, the average age that they began drinking was 13.5 years (AFM, 1997).

Not all junior and senior high students who drink drink frequently. Of this age group, 29.1% reported having consumed alcohol only a few times a year. However, 14.3% to 19.7% drank once a week, and a further 9.6% drank more than once a week

(AFM, 1997; Adlaf, et al., 1999). Older adolescents tended not only to be more likely to drink than younger ones, but they were also likely to drink more frequently than younger ones. Males drank more frequently than females, and also tended to pass out more often than females, suggesting that they drank more heavily (AFM, 1997). Among junior and senior high school students, 28.2% have taken part in heavy drinking, defined as drinking five or more drinks on a single occasion, at least once during the month prior to the survey (Adlaf, et al., 2000). This indicates an increase in heavy drinking among adolescents from the 22.0% who reported the same behaviour in 1991 (Adlaf, et al., 2000). Frequent heavy drinking has also increased, although to much less an extent. In 1999, 7% of junior and senior high students reported heavy drinking on four or more occasions during the month prior to the study (Adlaf, et al., 2000). In 1991, 5.5% reported the same behaviour, and in 1993, only 3.7% did (Adlaf, et al., 2000).

American Studies

Compared to the recent Canadian studies, fewer American studies have been completed examining alcohol use during the year prior to the study. One study that did use this comparable time frame to the Canadian studies, found that approximately 33.0% of adolescents aged 12 to 17 (junior and senior high school students) consumed alcohol during the year before the study was conducted (SAMHSA, 2001b). This prevalence rate seems quite low, compared to other studies which found that during the year 2000, 43.1% of eighth graders, 65.3% of tenth graders, and 73.2% of twelfth graders, and 58% of those in grades seven through twelve had used alcohol (Johnston, O'Malley & Bachman, 2001; Partnership for a Drug Free America (PDFA), 2000). Lifetime use rates tend to be a bit higher, with 81.0% of students in grade nine to twelve saying that they had at one point

used alcohol (Kann, et al., 2000). Although this study does not include younger adolescents in grades seven and eight, the rate of lifetime use is comparable to the alcohol use rates for Canadian junior and senior high school students (84.6%) (AFM, 1997). American adolescent alcohol use rates are similar for large metropolitan, small metropolitan, and nonmetropolitan areas, and are slightly lower in rural areas (SAMHSA, 2001b).

More often in the American literature are prevalence rates based on use during the thirty days before the study was conducted. As with the prevalence rates reported for the year prior to the study, one study found the rate of alcohol use within the month prior to the study to be considerably lower than reported in other similar studies. In this study only 16.4% of students in junior and senior high school reported alcohol use during this time frame (SAMHSA, 2001b). According to other studies, approximately 50% of students in grades nine to twelve used alcohol within the 30 days prior to the study, with 43.1% of eighth graders, 65.3% of ninth graders, and 73.2% of twelfth graders doing so (Johnston, et al., 2001; Kann, et al., 2000). This indicates that like Canadian adolescents, older American adolescents are more likely to have used alcohol than younger ones. Also similar for youth from the two different countries are that males tended to consume more alcohol than females (AFM, 1997; Welte, Barnes, Hoffman, & Dintcheff, 1999), and the age that alcohol is first used is approximately the same. Canadian studies have estimated it to be approximately 13.5 years, while American ones find it to be 13.3 years (AFM, 1997; Lewinsohn, Rohde, & Seeley, 1996). In the United States, 32.2% of adolescents first consumed alcohol before the age of 13 (Kann, et al., 2000). However, Canadian and American youth have not experienced the same increase in alcohol use

over the last decade. While Canadian prevalence rates have increased over the last decade, American rates have remained relatively stable (Adlaf, 2000; Johnston, et al., 2001). For eighth grade students, 45.4% reported alcohol use during 1993, whereas 43.1% reported the same activity for the year 2000. For twelfth graders, the rates were 72.7% and 73.2% for 1993 and 2000 respectively (Johnston, et al., 2001).

Many American researchers have attempted to gauge problematic drinking. In one such study, 6.2% of high school students were categorized as having abused or been dependent on alcohol. A further 16.7% were considered to be problem drinkers (Lewinsohn, et al., 1996). Other studies have used heavy drinking (or binge drinking) as an indicator of problematic alcohol use. Nearly a third (31.5%) of students in grades nine through twelve had at least once consumed more than five drinks at one sitting during the 30 days prior to the survey (Kann, at al., 2000). Another study reports that 31% of those in grades seven through twelve had consumed five or more drinks in a row during the two weeks prior to the survey (PDFA, 2000). Males (34.9%) were more likely to partake in heavy drinking than were females (28.1%) (Kann, et al., 2000). Drinking heavily enough to become drunk was more prevalent in older adolescents compared to younger ones. During the 30 days prior to the survey, 32.3% of twelfth graders had been drunk at least once, compared to 23.5% of tenth graders, and 8.3% of eighth graders (Johnston, et al., 2001). These rates have remained relatively stable over the last decade. In 1991, 31.6% of twelfth graders, 20.5% of tenth graders, and 7.6% of eighth graders had been drunk in the 30 days prior to the study (Johnston, et al., 2001).

Summary of Literature on Alcohol

Alcohol is the most commonly used substance by Canadian and American adolescents (AFM, 1997; Adlaf, et al., 1997; Johnston, et al., 2001; PDFA, 2000; Van Til, et al., 1998). Recent studies have shown that anywhere from half to three-quarters of junior and senior high school aged adolescents used alcohol in the year prior to being surveyed (AFM, 1997; Johnston, et al., 2001; Van Til, et al., 1998). There has been an increase in alcohol use by Canadian adolescents over the last decade, but American adolescent alcohol use rates have remained relatively stable (Adlaf, et al., 2000; Johnston, et al., 2001). In both countries older adolescents were more likely to have consumed alcohol than younger ones, and males were more likely to have done so than females (AFM, 1997; Welte, et al., 1999). Roughly a third of Canadian and American students in grades nine through twelve have taken part in heavy drinking (AFM, 1997; Kann, et al., 2000). Although heavy drinking and frequent heavy drinking have increased in Canada, heavy drinking has remained stable in the United States (AFM, 1997; Johnston, et al., 2001).

Tobacco

Adolescent smokers face a range of health problems associated with tobacco use. Some of the health problems youth who smoke cigarettes may encounter are increased coughing, phlegm and wheezing, decreased lung function, reduced lung growth, and increased problems with asthma (U.S. Department of Health and Human Services (USDHHS), 1994). Early signs of heart disease and stroke may also be experienced by youth who smoke (USDHHS, 1994). Smoking in adolescence increases the risk of lung cancer, heart disease, and stroke in adulthood (USDHHS, 1994). Adolescents who choose

smokeless tobacco instead of cigarettes are also subject to health consequences. Such health problems range from bad breath to infection and erosion of the gums and bone around the teeth. Lesions can form in the soft tissue of the mouth, and in adulthood, oral cancer may develop (USDHHS, 1994). Health problems stemming from tobacco use result from both the length of time smoking and the amount smoked. Adolescents who are light smokers for a short period of time will be less likely to suffer from the more serious consequences of tobacco use (USDHHS, 1994). However, youth who begin smoking in early adolescence are much less likely to quit later in life compared to those who begin smoking once they were older, and are also likely to be heavier smokers both in adolescence and adulthood (Alberta Tobacco Reduction Alliance[ATRA], 1999; USDHHS, 1994). This places those who begin smoking in early adolescence at an increased risk of health problems, both in adolescence and adulthood.

Canadian Studies

Reportedly, between 27% and 36.1% of adolescents in grades seven through twelve smoked at least one cigarette during the year before they were surveyed (Poulin & Baker, 1998; Van Til, et al., 1998). This number rises to between 56.7% and 62.4% when students were included who had smoked at some point during their lifetime (AFM, 1997; Poulin & Baker, 1998). In addition to those who smoked cigarettes, approximately 22.9% smoked cigars, 7.7% chewed tobacco, and 3% used snuff (Poulin & Baker, 1998). Tobacco use has increased over the last decade. According to one study, 21.7% of junior and senior high aged adolescents smoked in 1991 compared to 28.3% in 1999 (Adlaf, et al., 2000). Older students are more likely to have smoked than younger ones (Poulin & Baker, 1998). Between 7.4% and 9% of adolescents in grade seven smoked during the

year prior to being surveyed, compared to between 38.6% and 40% of adolescents in grade twelve (Adlaf, et al., 1999; Van Til, et al., 1998). Although males were more likely to report the use of other tobacco products, such as cigars, pipes, chewing tobacco, and snuff, studies suggest that males and females were approximately as likely to have smoked cigarettes, or that females were slightly more likely (Adlaf, et al., 1999; Barcelo, et al., 1998; Poulin & Baker, 1998; Van Til, et al., 1998). Of students who reported smoking, the average age that they began was 12.7 years (Poulin & Baker, 1998). On average, 6.8 cigarettes were smoked daily (Adlaf, et al., 1999). Early onset of smoking, by age 9 has decreased slightly over the last few years. Five percent of grade seven students reported smoking at this early an age in 1999 compared with 7% in 1997 (Adlaf et al., 2000).

Tobacco is often a substance used with fairly high frequency. For example, one study found that 29.2% of junior and senior high school students smoked at least one cigarette within the year prior to being surveyed and 22.6% of them smoked cigarettes daily (Adlaf, et al., 1999). This would indicate that over two thirds of adolescents who use tobacco do so daily. While rates of male and female use of cigarettes are quite similar, males are significantly more likely to have reported heavier levels of smoking. Among males, 9.1% smoked more than ten cigarettes a day, compared to 5.6% of females (Poulin & Baker, 1998). Approximately 31% of students in junior and senior high reported dependence on tobacco and approximately 52% of students who used tobacco attempted to quit within the six month preceding the survey (Adlaf, et al., 1999; Poulin & Baker, 1998).

American Studies

According to American studies of adolescents in grades seven through twelve, 13.4% to 34.8% had smoked at least one cigarette in the 30 days prior to the survey, approximately 20.8% had done so within a year prior to the survey, and 34.6% to 70.4% had done so within their lifetimes (Kann, et al, 2000; SAMHSA, 2001b). Other forms of tobacco were used less frequently, with approximately 7.8% having used smokeless tobacco (chewing tobacco and snuff) and approximately 17.7% having used cigars, cigarillos, or little cigars, within the thirty days prior to the survey (Kann, et al., 2000). In addition, approximately 3.9% of eighth graders, 6.4% of tenth graders, and 9.2% of twelfth graders smoked bidis, a type of flavored cigarette imported from India (Johnston, et al., 2001). Studies of trends in cigarette use have shown that during the early 1990's, smoking rates steadily increased until the mid to late 1990's, when they then began to decrease (Johnston, et al., 2001). For example, one study found that during the thirty days prior to being surveyed, 34% of junior and senior high school students smoked cigarettes in 2000, compared to 37% in 1999 and 42% in 1998 (PDFA, 2000). Like cigarette use, use of smokeless tobacco has declined since the mid 1990's from recent peak levels (Johnston, et al., 2001). Cigarette use increases with age, as can be seen from the findings in one study, which found that during the month prior to being surveyed 14.6% of eighth graders smoked cigarettes compared to 31.4% of twelfth graders (Johnston, et al., 2001). While use of smokeless tobacco is reported almost exclusively by males, and more males than females smoked cigars, rates of cigarette use remained approximately the same for males and females (Johnston, et al, 2001; SAMHSA, 2001b). One study found that cigarette use for females was slightly greater than that for males

(14.1% versus 12.8%) (SAMHSA, 2001b). Cigarette use was greater among adolescents living in rural areas compared to those living in large cities (SAMHSA, 2001b).

As adolescents get older, they are more likely to smoke one or more cigarettes daily, and are more likely to smoke heavily (at least half a pack) daily. Approximately 7.4% of grade eight students, 14.0% of grade ten students, and 20.6% of grade twelve students smoked cigarettes daily during the thirty days prior to being surveyed (Johnston, et al., 2001). Approximately half of them (2.8% of eighth graders, 6.2% of tenth graders, and 11.3% of twelfth graders smoked) smoked at least half a pack of cigarettes daily during the same thirty days (Johnston, et al., 2001). Even with overall rates of smoking increasing and then decreasing over the past decade, rates of heavy cigarette use have remained relatively stable (Johnston, et al., 2001).

Summary of Literature on Tobacco

Fewer adolescents use tobacco compared to those who use alcohol. Approximately a third of Canadian and American junior and senior high school students smoked cigarettes within the year prior to being surveyed (Poulin & Baker, 1998; SAMHSA, 2001b; Van Til, et al., 1998). Rates of use for other types of tobacco products are lower. Approximately one in five Canadian and American adolescents smoked cigars. Additionally, slightly less than one in ten used chewing tobacco or snuff (Kann, et al., 2000; Poulin & Baker, 1998). In both countries, rates of tobacco use have increased throughout the past decade and have in recent years begun to decline (Johnston, et al., 2001; Van Til, et al., 1998). Cigarette use increased with age (Johnston, et al., 2001; Poulin & Baker, 1998). Most studies in both countries concluded that cigarette use was approximately the same for males and females (some Canadian studies

report that use by females was slightly greater), and that males were more likely than females to use cigars, chewing tobacco, and snuff (Adlaf, et al., 1999; Johnston, et al., 2001; Poulin & Baker, 1998; SAMHSA, 2001b). Smoking has been found to increase with age (Adlaf, et al., 1999; Johnston, et al., 2001). Heavy smoking also increased with age and was higher among males than females (Johnston, et al., 2001; Poulin & Baker, 1998). Heavy daily use of cigarettes has remained relatively stable America over the last decade (Johnston, et al., 2001).

Inhalants

According to the Texas Commission on Alcohol and Drug Abuse [TCADA] (1997), it is estimated that one thousand substances are being misused as inhalants. These substances are legally sold, ordinary household products (PDFA, 2001). However, these seemingly harmless products can lead to death for even first time users (TCADA, 1997). Use of inhalants can cause death in several ways. Sudden Sniffing Death (SSD) Syndrome can occur if after using inhalants the adolescent begins a strenuous physical activity or is startled (TCADA, 1997). SSD Syndrome kills adolescents because the inhalants cause a rapid or irregular heart beat. Strenuous activity or fright then causes the heart to stop (National Institute on Drug Abuse [NIDA], 2000). Death can also occur from asphyxiation if high concentrations of fumes displace oxygen in the lungs, or suffocation if the air is blocked from entering the lungs by a bag used to inhale fumes. Users can choke to death on vomit after inhalant use or be injured in accidents while intoxicated (NIDA, 2000). Even if death does not occur, the effects of inhalant use can be long term. Inhalants irreversibly damage the central nervous system, including loss of coordination, balance, and muscle control, as well as causing brain damage. Users may

suffer permanent neurological effects such as memory loss, paranoia, and confusion (TCADA, 1997). Although the direction of causality is not clear, inhalant use has also been found to be related to mood swings, hostility, and depression (TCADA, 1997). Irreversible hearing loss, limb spasms, and damage to the liver can also occur (PDFA, 2001; TCADA, 1997). Reversible, but serious effects include damage to the kidneys and bone marrow, which may lead to problems with the immune system (PFDFA, 2001; TCADA, 1997).

Canadian Studies

According to Canadian studies, between 5.9% and 7.2% of adolescents in grades seven, nine, ten, and twelve used inhalants during the year before they were surveyed (Barcelo, et al., 1998; Poulin & Baker, 1998). A recent Toronto study of junior and senior high school students suggested that although a percentage of students do sniff glue (4%), a greater percentage reported the use of other solvents (9%) (Research Group on Drug Use [RGDU], 2000). Use of solvents has increased over the past decade, as well as the past few years. Between 1997 and 1999 the use of glue and other solvents increased for both males and females, and increased for students in grades seven and nine (Adlaf, et al., 2000). Among students in grade eleven, an increase was seen in the percentage who used other solvents, but not in the percentage who used glue (Adlaf, et al., 2000). Inhalants are a unique substance in that they are the only substance for which rates of use decrease notably with age (Poulin & Baker, 1998). A study of students in Prince Edward Island found that 11% of seventh graders, 9% of ninth graders, 6% of tenth graders, and 2% of twelfth graders had used inhalants within the year prior to being surveyed (Van Til, et al., 1998). Reports of whether males or females are more likely to use inhalants

vary. One study reports that 8.1% of females used inhalants during the year prior to the study, compared to 6.1% of males, while another study reports that 6% of females and 7% of males participated in the same activity over the same time frame (Adlaf, et al., 1999; Van Til, et al., 1998). Unfortunately, inhalants do not seem to be studied to the extent that other substances are. No information was found regarding the frequency with which adolescents use inhalants. This would be an important area for research in the future.

American Studies

American studies suggest that use of inhalants by American adolescents is comparable to that of Canadian youth. While one study suggested that 13% of adolescents in grades seven through twelve had used inhalants in the year prior to being surveyed, another reported that 9.4% of eighth graders, 7.3% of tenth graders, and 5.6% of twelfth graders had done so (Johnston, et al., 2001; PDFA, 2000). Approximately half as many students in grades eight, ten, and twelve reported the same behaviour during the month prior to the survey (Johnston, et al., 2001). These rates show that like in Canada, inhalant use decreased with age. The recent trends in use differ, however. Inhalant use in the United Stated increased during the first half of the past decade, and then decreased significantly between 1995 and 1999 (Johnston, et al., 2001; PDFA, 2000). Studies on the trend between 1999 and 2000 vary. According to one study, rates have again been increasing, whereas according to another, they simply stayed the same (Johnston, et al., 2001; PDFA, 2000). Similar to Canadian studies, no American studies were found which estimated frequency of inhalant use.

Summary of Literature on Inhalants

Inhalants are the only substance for which rates of use decrease notably as age increases (Johnston, et al., 2001; Poulin & Baker, 1998;Van Til, et al., 1998). Slightly fewer than one in ten adolescents used inhalants over the course of a year (Barcelo, et al., 1998; Johnston, et al., 2001; PDFA, 2000; Poulin & Baker, 1998; RGDU, 2000). While inhalant use increased throughout the past decade in Canada, the United States saw an increase over the first half of the decade, followed by a decrease throughout the second and either a leveling off or an increase of use between 1999 and 2000 (Adlaf, et al., 2000; Johnston, et al., 2001; PDFA, 2000). No information was found relating to frequency of use for either of the two countries.

Marijuana

Most casual and intermittent marijuana users never experience adverse effects resulting from their marijuana use. For most of these adolescents, the main health risk associated with marijuana use involves driving while intoxicated (Heischober & Dellenbaugh Hofmann, 1997). However, like chronic, heavy alcohol users, those who use marijuana frequently on an ongoing basis face the potential of other effects to their health. Frequent marijuana use can lead to increased incidence of bronchitis and reversible bronchospasm, weight gain resulting from appetite stimulation, reversible abnormalities in sperm structure, count, and motility, acute panic and psychotic reactions (Heischober & Dellenbaugh Hofmann, 1997). Frequent marijuana use has also been found to be associated with chronic depression (Heischober & Dellenbaugh Hofmann, 1997). The direction of causality is not entirely clear, as is the case with the syndrome, amotivation syndrome, which has been linked to marijuana use. This syndrome involves

general apathy and passivity, loss of desire to work, lack of concern about poor work performance, tiredness and lack of energy, increased frustration, lack of ability to concentrate or memorize new information, and lack of interest in personal hygiene and appearance, all of which hamper an adolescent's ability to become an independent adult (Heischober & Dellenbaugh Hofmann, 1997).

Canadian Studies

While alcohol is the most frequently used licit substance, marijuana (cannabis) is the most frequently used illicit one (AFM, 1997). Marijuana use rates by Canadian adolescents in junior and senior high school have been estimated to be between 22% and 37.7% for use during the year prior to the study (Poulin & Baker, 1998; Van Til, et al., 1998). Canadian adolescents' use of marijuana has increased over the last decade, with between 17.2% and 21.7% having used marijuana during 1991 (Adlaf, et al., 2000; Poulin & Elliot, 1997). However, the percentage of adolescents who began using marijuana by grade six (about the age of eleven) declined over the last couple of years and decades, with 2% of grade seven students starting this early in 1999, 5% in 1997, and 8% in 1981 (Adlaf, et al., 2000). As with alcohol and tobacco use, marijuana use increased with age. Between 3.6% and 4% of grade seven students smoked marijuana within the year prior to being surveyed, compared to between 34% and 39.4% of twelfth graders (Adlaf, et al., 1999; Van Til, et al., 1998).

As with alcohol, frequent use of marijuana is a concern. Over the last decade the percentage of adolescents who used marijuana more than once a month increased. In 1991 approximately 4.4% of junior and senior high school students used marijuana once or more per month, whereas in recent years the number has climbed to between 12.3%

and 13.5% (Poulin & Baker, 1998; Poulin & Elliot, 1997). Approximately 3% of students used marijuana daily (Adlaf, et al., 1997). Males were more likely than females to have used marijuana (33.4%-33.5% versus 25.1%-28.3%) and were more likely to have used it more than once per month (17.5% versus 9.3%) (Barcelo, et al., 1998). Reportedly one-fifth (19%) of students have experienced at least one of the three indicators of marijuana dependence (it was not mentioned what these indicators are) (Adlaf, et al., 1999).

American Studies

As with the studies of American youth regarding alcohol use, studies examining marijuana use often do not collect data on use during the previous year, making them difficult to compare to many of the Canadian studies. One study that deviates from this norm, found that during the year 2000, 15.6% of eighth graders, 32.2% of tenth graders, and 36.5% of twelfth graders had used marijuana (Johnston, et al., 2001). Another found that approximately 33% of students in grades seven through twelve used marijuana over the last year (PDFA, 2000). These rates seem more or less comparable to the rates found in Canadian studies that reported that between 22% and 37.7% of junior and senior high school students had used marijuana over a year (Poulin & Baker, 1998; Van Til et al., 1998). Similar to their Canadian counterparts, American adolescents are more likely to use marijuana now than they were a decade earlier (Adlaf, et al., 2000; Johnston, et al., 2001; Poulin & Elliot, 1997).

American studies show that, as expected, rates of use during the previous month were less than annual rates, and annual rates were less than lifetime rates. Marijuana use within the 30 days prior to the survey, was estimated to be between 21% and 26.7% of

those adolescents in grades nine through twelve (Kann, et al., 2000; PDFA, 2000). Another study broke up prevalence rates by grade level, and use was slightly lower, with 9.1% of eighth graders, 19.7% of tenth graders, and 21.6% of twelfth graders having used marijuana in the month prior (Johnston et al., 2001). On the other hand, approximately 40% to 47.2% of American adolescents in grades nine through twelve used marijuana at least once during their lifetime, with 20.3% of eighth graders, 40.3% of tenth graders, and 40.8% of twelfth graders reportedly having done so (Johnston, et al., 2001; Kann, et al., 2000; PDFA, 2000;). Among the older adolescents in grades nine through twelve, males (51.0%) were significantly more likely than females (43.4%) to have used marijuana at some point in their lives (Kann, et al., 2000). Among those in grades nine through twelve, older adolescents were significantly more likely to have used marijuana than younger ones (Kann, et al., 2000). Onset of marijuana use before the age of thirteen was less common than early use of alcohol, with 11.3% of students reporting having used it at this early an age, compared to 32.2% for alcohol (Kann, et al., 2000).

Although compared to Canadian studies, fewer American studies have explored frequent marijuana use, one study examined the prevalence of daily marijuana use over a thirty-day period. It was found that 1.3% of eighth graders, 3.8% of tenth graders, and 6.0% of twelfth graders used marijuana daily during the month before the study (Johnston, et al., 2001). While a greater percentage of adolescents used alcohol than marijuana, approximately half as many used alcohol daily than used marijuana daily (Johnston et al., 2001). In addition to being more likely to have used marijuana than females, males were also more likely to have used marijuana with greater frequency compared to females (Welte, et al., 1999).

Marijuana is seen as being the most accessible illicit substance, in addition to being the most popular one. Among adolescents surveyed during the year 2000, 47.0% of eighth graders, 77.7% of tenth graders, and 88.5% of twelfth graders stated that marijuana would be fairly easy or very easy for them to obtain (Johnston, et al., 2001). This indicates an increase over the last decade in the percentage of eighth and tenth graders who considered this to be the case (Johnston, et al., 2001).

Summary of Literature on Marijuana

While fewer adolescents used marijuana than alcohol, marijuana was the most frequently used illicit substance (AFM, 1997; Johnston, et al., 2001). Within the year prior to being surveyed, approximately one third of Canadian junior and senior high school students used marijuana (Johnston, et al., 2001; Poulin & Baker, 1998; Van Til, et al., 1998). The percentage of adolescents who used marijuana has increased over the last decade in both Canada and the United States (Adlaf, et al., 2000; Poulin & Elliot, 1997). Studies show that older adolescents were more likely to have used marijuana than younger ones, and males were more likely than females to have used it (Adlaf, et al., 1999; Barcelo, et al., 1998; Kann, et al., 2000; Poulin & Baker, 1998). In Canada, 12.3% to 13.5% of junior and senior high school students used marijuana more than once a month, and approximately 3% used it daily (Adlaf, et al., 1999; Poulin & Baker, 1998; Poulin & Elliot, 1997). This is an increase in high frequency use (Poulin & Elliot, 1997). Of American adolescents 1.3% of eighth graders, 3.8% of tenth graders, and 6% of twelfth graders used marijuana daily, and were thus considered to be highly frequent users (Johnston, et al., 2001). American adolescents saw marijuana as being the most accessible illicit drug (Johnston, et al., 2001).

Other Illicit Drugs

While adolescent use of illicit drugs other than marijuana has not reached the same levels as use of alcohol, tobacco, and marijuana, it remains a concern to society and to parents because of the potentially serious consequences. Although the direction of causality is unclear, while using illicit substances, adolescents are more likely to injure themselves, become violent or depressed, and are more likely to commit homicide (Heischober & Dellenbaugh Hofmann, 1997). Illicit drug users put themselves at risk for rapid heart beat (tachycardia), high blood pressure, loss of oxygen to part of the heart (myocardial infarction), cardiac arrhythmia, seizures, stroke, hypothermia, psychosis, personality changes, and hypersensitivity to light and sound (Heischober & Dellenbaugh Hofmann, 1997). HIV (human immunodeficiency virus) and other infections become a risk if drugs are taken intravenously (Heischober & Dellenbaugh Hofmann, 1997). Death can occur resulting from varying levels of substance purity, miscalculations of amounts, or aggressive or irrational behaviour caused by some substances (Heischober & Dellenbaugh Hofmann, 1997). Even low use rates of these substances are not insignificant numbers for society. As Johnston, O'Malley, and Bachman (1998) point out, even a low prevalence rate of only 3.3% equates to one student in every 30-student classroom.

The rates of use for illicit substances that follow do not include use for medical purposes, under the supervision of a doctor. To simplify, the phrase "illicit drugs" will be used to refer to illicit substances other than marijuana, which is a substance that stands apart because of the comparatively high prevalence rates.

Canadian Studies

During the year prior to being surveyed, Canadian adolescents used hallucinogens, including LSD, more than any other group of illicit drugs (Adlaf, et al., 2000; Poulin & Elliot, 1997; RGDU, 2000). Between 6% and 12.4% of junior and senior high school students reported having used lysergic acid diethylamide (LSD), and 9.3% to 13.6% used hallucinogens other than LSD, such as psilocybin and mescaline (Adlaf, et al., 2000; Barcelo, et al., 1998; Poulin & Elliot, 1997; RGDU, 2000;). Stimulants were used by 7.6% to 10.5%, methamphetamine ("speed") by 5.1% to 7%, and crystal methamphetamine ("ice") by approximately 1.5% of adolescents (Adlaf, et al., 2000; Poulin & Baker, 1998; RGDU, 2000). Between 1.3% and 4.4% used barbiturates, 4% used sedatives, and between 2.4% and 4% used tranquilizers (Adlaf, et al., 2000; Barcelo, et al., 1998; RGDU, 2000). Cocaine was used by 4.1% to 6% of adolescents, and 2% to 2.3% used crack cocaine (Adlaf, et al., 2000, RGDU, 2000). Between 4.8% and 7% of adolescents used ecstasy (Adlaf, et al., 2000; RGDU, 2000). Phencyclidine (PCP) was used by between 2.6% and 3.3% of adolescents, 1.7% to 2.1% used heroin, and 2.3% to 2.8% used anabolic steroids (Adlaf, et al., 2000; Barcelo, et al., 1998; Poulin & Elliot, 1997).

Canadian studies report that the use of these illicit substances has increased over the last decade, as well as the last couple of years (Adlaf, et al., 2000; RGDU, 2000). Since 1997, use of hallucinogens, barbiturates, cocaine, ecstasty, and methamphetamine have all increased significantly (Adlaf, et al., 2000; RGDU, 2000). Use of PCP, hallucinogens, cocaine, and ecstasy have been increasing since 1993 (Adlaf, et al., 2000).

Illicit drug use increased with age. On average illicit drug use frequency was highest amongst students in grade eleven (Adlaf, et al., 1999).

American Studies

Like rates of use of marijuana, rates of use of other illicit drugs are often reported differently than Canadian rates, making direct comparisons difficult. Recent American studies on illicit drug use by adolescents either break the rate up according to grade level, or report the rates as lifetime rates, as opposed to past year rates. However, even the rates reported by grade level should give a general impression of whether the rates are similar to Canadian ones. To simplify the presentation of the rates that follow, rates will only be separated and listed for eighth, tenth, and twelfth grade students when the category "use of any type of illicit drug (not including marijuana)" is reported. In all other places in the section that follows, a range will be given. In almost all cases, the lower end of the range refers to grade eight students, and the upper end refers to grade twelve students. The mean rate for junior and senior high school students will fall somewhere between these extremes.

Similar to Canadian studies, American studies have found that use of illicit drugs is lower than use of alcohol, tobacco, and marijuana. However, approximately 10.2% of eighth graders, 16.7% of tenth graders, and 20.4% of twelfth graders used an illicit substance other than marijuana during the year 2000 (Johnston, et al., 2001). This indicates an increase of 1.8%, 4.5%, and 4.2% in grades eight, ten, and twelve respectively, since 1991 (Johnston, et al., 2001). Unlike their Canadian counterparts who were most likely to use hallucinogens, American adolescents were reportedly more likely to have used amphetamines, a form of stimulant, than any other type of illicit drug.

Amphetamines were used by between 6.5% and 11.1% of adolescents in grades eight through twelve, while between 2.5% and 4.3% used methamphetamine ("speed") (Johnston, et al., 2001). A further 2.2% of twelfth graders used crystal methamphetamine ("ice") (Johnston, et al., 2001). Hallucinogens were the next most commonly used group of illicit substances. During the year 2000, 2.8% to 8.1% of adolescents in this age group used hallucinogens, with 2.4% to 6.6% having used LSD, and 1.4% to 4.4%, having used a hallucinogen other than LSD (Johnston, et al., 2001). Barbiturates were used by 6.2% of twelfth graders, and tranquilizers were used by between 2.6% and 5.7% of eighth through twelfth graders (Johnston, et al., 2001). Between 3.1% and 8.2% of those in grades eight through twelve used ecstasy within the year 2000 (Johnston, et al., 2001). Between 2.6% to 5.0% of adolescents in this age group used cocaine, 1.8% to 2.2% used crack cocaine and 1.9% to 4.5% used other forms of cocaine (Johnston, et al., 2001). Heroin was used by 1.1% to 1.5% of students in grades eight through twelve, and PCP was used by 2.3% of twelfth graders (Johnston, et al., 2001). Finally, between 1.7% and 2.2% of students in grades eight through twelve used steroids, with students in grade ten having used them more frequently than those in grade twelve (Johnston, et al., 2001).

While rates of overall use of illicit drugs have increased over the last decade, they declined slightly from 1996 though 1999, and held relatively stable between 1999 and 2000 (Johnston, et al., 2001). Use of amphetamines, hallucinogens other than LSD, tranquilizers, and barbiturates also remained relatively stable (Johnston, et al., 2001). Illicit substances that increased in use between 1999 and 2000 include ecstasy, steroids, and heroin (Johnston, et al., 2001). The only significant decrease in any substance was for the use of LSD by twelfth graders (Johnston, et al., 2001).

As with alcohol and marijuana use, rates of use tend to vary among particular groups. Males were found to generally have higher rates of illicit substance use than females, and tended to use illicit substances more frequently than females (Johnston, et al., 2001; Welte, et al., 1999). This difference in illicit drug use between males and females is minimal at younger ages, but noticeable as adolescents become older (Johnston, et al., 2001). Those adolescents who plan to go to college are less likely to have used illicit drugs than those who do not plan on continuing their education (Johnston, et al., 2001).

Summary of Literature on Other Illicit Drugs

Rates of use for illicit drugs other than marijuana seem quite low compared to the prevalence of alcohol, tobacco, and marijuana use. The most popular type of illicit drug used by Canadian adolescents was hallucinogens, with LSD being the most popular type of hallucinogen (Adlaf, et al., 2000; Poulin & Elliot, 1997; RGDU, 2000). Approximately one in ten adolescents have used LSD, and roughly the same number have used other types of hallucinogens (Adlaf, et al., 2000; Barcelo, et al.,, 1998; Poulin & Elliot, 1997; RGDU, 2000). Fewer than 10% Canadian adolescents used other illicit substances. A higher number of adolescents used stimulants and methamphetamine than used crystal methamphetamine, barbiturates, sedatives, tranquilizers, PCP, heroin, and crack cocaine (Adlaf, et al., 2000; RGDU, 2000). The number of adolescents who used cocaine and ecstasy fell somewhere in between (Adlaf, et al., 2000; RGDU, 2000). In comparison, the most commonly used type of illicit substance in the United States was amphetamines, with between one in ten students in grades eight through twelve using them (Johnston, et al., 2001). Like adolescents in Canada, less than 10% of American

adolescents tended to use the other types of illicit substances. Hallucinogens were one of the next most frequently used substances, while fewer adolescents used heroin, PCP, steroids, crack cocaine, and crystal methamphetamine (Johnston, et al., 2001). The number of adolescents who used barbiturates, tranquilizers, ecstasy, methamphetamine, and cocaine fell within the two extremes (Johnston, et al., 2001). Among American adolescents, 10.2% of eighth graders, 16.7% of tenth graders, and 20.4% of twelfth graders used any illicit substance during the year prior to being surveyed (Johnston, et al., 2001). Rates of illicit drug use have increased in both Canada and the United States over the last decade (Adlaf, et al., 2000; Johnston, et al., 2001; RGDU, 2000). However, midway through the last ten years, American rates began to decline, and they have remained relatively stable over the last couple of years (Johnston, et al., 2001). American studies have shown that males are more likely to use illicit substances than females (Johnston, et al., 2001). Illicit drug use tended to increase as adolescents got older (Adlaf, et al., 1999; Johnston, et al., 2000).

Use of Multiple Substances

Of course, not all substance users use one substance exclusively. Unfortunately, the use of substances in various combinations leads to increased intoxication, poisoning, and overdoses (World Health Organization, 1996). While no studies could be found examining concurrent use, some were found that looked at whether adolescents reported using more than one substance over the given time period. When use of more than one substance was reported, adolescents most often reported alcohol, tobacco, and marijuana use (Fulkerson, et al., 1994; MacDonal & Holmes, 1998; Van Til, et al., 1998).

Canadian Studies

According to studies recently conducted in the Atlantic provinces, between 14% and 22.7% of students in grades seven through twelve had used alcohol, tobacco and marijuana within the year prior to being surveyed (MacDonald & Holmes, 1998; Van Til, et al., 1998). In addition, 10% to 11.3% had used both alcohol and tobacco (without marijuana), approximately 6% used alcohol and marijuana (without tobacco), and less that 1% used tobacco and marijuana (without alcohol) (MacDonald & Holmes, 1998; Van Til, et al., 1998).

American Studies

An American study says that of those who use at least one substance, 18.4% used alcohol and marijuana, 11.5% used alcohol and a drug other than marijuana, and 42.9% used alcohol, marijuana, and at least one other drug (Fulkerson, et al., 1994).

Alcohol appears to be the first substance many adolescents use. Adolescents who have not used alcohol are very unlikely to have used other substances, including cigarettes. Those who used illicit drugs tended to try marijuana before moving on to other types of illicit drugs (Welte & Barnes, 1985). While cigarette use did not necessarily lead to the use of illicit drugs, the two were highly correlated. Of those who reported past month cigarette use, 41.1% also reported past month illicit drug use, compared to 5.6% of non-smokers who reported illicit drug use over the same period (SAMHSA, 2000b). One study found that the progression to greater and greater frequencies of use of alcohol and cigarettes was predictive of multiple substance use (Bailey, 1992).

Summary of Adolescent Substance Use Literature

In both the United States and Canada, alcohol was the most prevalent substance used by adolescents (AFM, 1997; Adlaf, et al., 1997; Johnston, et al., 2001; PDFA, 2000; Van Til, et al., 1998). Between half and three-quarters of adolescents in junior and senior high school used alcohol over a year (AFM, 1997; Johnston, et al., 2001; Van Til, et al., 1998). Tobacco and marijuana were the next most frequently used, with approximately one-third of adolescents using each (Johnston, et al., 2001; PDFA, 2000; Poulin & Baker, 1998; SAMHSA, 2001b; Van Til, et al., 1998). Approximately one in ten adolescents used inhalants and the most popular types of illicit drugs (hallucinogens and amphetamines) (Adlaf, et al., 2000; Barcelo, et al., 1998; Johnston, et al., 2001; PDFA, 2000; Poulin & Baker, 1998; Poulin & Elliot, 1997; RGDU, 2000). Other types of illicit drugs tended to be used by fewer adolescents (Adlaf, et al., 2000; Barcelo, et al., 1998; Johnston, et al., 2001; Poulin & Baker, 1998; RGDU, 2000). When multiple substances were used, either separately or concurrently, alcohol, tobacco, and marijuana were the most frequently used (Fulkerson, et al., 1994; MacDonal & Holmes, 1998; Van Til, et al., 1998).

Although the current studies provide an estimate of substance use prevalence rates, additional research would be helpful in several areas. As mentioned earlier, the variation in the period over which substance use is measured often makes direct comparisons problematic. It would be helpful if future studies measured prevalence over both the past month and the past year, and possibly lifetime prevalence. This would allow a better comparison of rates in the United States and Canada, and in some cases make comparisons of studies done within the same country easier. It would also provide

richer information. Monthly and yearly use are both important to get a clear picture of substance use. Secondly, more research needs to be undertaken in the area of inhalant use. While there is currently some data available relating to the percentage of adolescents who use inhalants, the frequency with which inhalants are used remains unclear. Finally, it appears that much could be done with research into multiple substance use. Research should be done involving the use of illicit drugs (other than marijuana) in combination with alcohol, tobacco, marijuana, and inhalants. Additional research correlating the use of one type of substance with another would also be useful. It would also be interesting to see if those who use multiple substances are distinct from adolescents who only use one type of substance. Most importantly, research is needed into concurrent substance use. The percentage of adolescents who use multiple substances concurrently, as well as the consequences they face because of their multiple substance use, would both be useful to investigate.

While all of these elements are important for future research, they will not be addressed in this study. Since the study will involve secondary data analysis certain limitations are present. The data set being analyzed does not contain information on either tobacco, inhalants, or concurrent substance use. As the data set does not include information of individual illicit drugs (other than marijuana), analysis of "other illicit drugs" as a entire group will be conducted rather than looking at each illicit drug separately. It includes data on lifetime use and, like most Canadian studies, past year use as opposed to past month use. While the percentage of adolescents who use single versus multiple substances will be determined and reported, space and time limitations prevent further exploration in the area of multiple substance use.

Influence of the Family

Within the area of family, there are numerous factors that have been explored with relation to their influence on adolescent substance use. Possible influential factors in this area include: substance use/abuse modeling from family members, closeness of the parent-adolescent relationship, willing involvement of parents in the adolescent's life, parental support, trust and praise, styles of disciple/control, conflict and communication within the family, religiosity, parental attitudes about/disapproval of adolescent substance use, and family income level (Anderson & Henry, 1994; Bahr & Hawks, 1993; Barnes, Farrell, & Cairns, 1986; Barnes, Reifman, Farrell, & Dintcheff, 2000; Coombs & Landsverk, 1988; De Wit & Silverman, 1995; Fletcher & Jefferies, 1999; Flewelling & Bauman, 1990; Garis, 1998; Hundleby & Mercer, 1987; Jurich, Polson, Jurich, & Bates, 1985; Le Croy, 1988; Longmore, Manning, & Giordano, 2001; Lopez, Redondo, & Martin, 1989; Murray, Kiryluk, & Swan, 1985; Needle, McCubbin, Wilson, Reineck, Lazer, & Mederer, 1986; Newcomb & Felix-Ortiz, 1992; Sheeber, Hops, Alpert, Davis, & Andrews, 1997; SAMHSA, 2001a; Thompson & Wilsnack, 1987; Vicary & Lerner, 1986; Welte, Barnes, Hoffman, & Dintcheff, 1999). Family structure, parental supervision, and family functioning, the factors focused on in this study, have also been examined in relation to adolescent substance use.

Family Structure

With a recent Statistics Canada study showing that approximately one-third of adolescents live in non-traditional family structures, it is important to consider what influence living in different family forms might have on problematic adolescent behaviour (Housing, Family, and Social Statistics Division, Statistics Canada, 1997).

While some studies have found that family structure has no bearing on adolescent problem behaviour or substance use, these studies are in the minority (Barnes & Farrell, 1992; Barnes, Farrell & Banerjee, 1994; Barnes, Farrell & Dintcheff, 1997; Fawzy, Coombs, Simon, & Bowman-Terrell, 1987; Wade & Brannigan, 1998). A couple of studies which have found a lack of association between family structure and substance use have identified the caveat that there were no differences in substance use between adolescents from intact families and single-parent families, provided the biological father remained involved in the lives of the children/adolescents (Garis, 1998; Thomas & Farrell, 1996). These findings would suggest that it is parental involvement, rather than family structure, that is related to substance use. One study which found that there were significant differences in substance use among different family structures still concluded that family structure played only a minimal role. This study found that family structure explained very little of the variance of whether substances were used or not (Blum, Beuhring, Shew, Bearinger, Sieving, & Resnick, 2000).

While the aforementioned studies have found little or no relationship between family structure and adolescent substance use, for the most part, the opposite has been the case. In general, studies have shown that compared to adolescents who lived with both parents, those from single-parent and step-parent families were more likely to be considered delinquents, to have participated in risky sexual behaviour, and to have used substances (Dornbusch, et al., 1985; Flewelling & Bauman, 1990; Gove & Crutchfield, 1982; Jacobson, 2000; Jenkins & Zunguze, 1998; Stern, Northman, & VanSlyck, 1984; Sutherland & Shepherd, 2001; Thomas, Reifman, Barnes, & Farrell, 2000; Van Nelson, Thompson, Cooley, & Henriksen 1993). It has been found that the relationship of family

structure to substance use remains after age, race, and sex are controlled for (Flewelling & Bauman, 1990). However, it has also been found that the results were most pronounced for males, particularly males fifteen years of age and older (Stern, et al., 1984; Turner, Irwin, & Millstein, 1991). Furthermore, it has been found that family structure may have the greatest impact on behaviours viewed as extreme. Svensson (2000) suggested that while structure had only a non-significant relationship with minor or moderate substance use, it had a significant one with more serious use. Similarly, Flewelling and Bauman (1990) found that structure was the most strongly associated with less frequent problem behaviour, namely marijuana use in the case of this particular study.

Adolescents from Single-Parent Families

Compared to adolescents from intact homes with two biological parents, adolescents who lived in single-parent (usually single-mother) families were more likely to have used tobacco, marijuana, and other illicit drugs (Blum, et al., 2000; Cookston, 1999; Dornbusch, et al., 1985; Flewelling & Bauman, 1990; Hoffmann, 1993; Hoffmann, 1995; Murray, et al., 1985; Stern, et al., 1984; Svensson, 2000; Turner, et al., 1991). Although one of the studies reviewed found that adolescents from single-parent families were no more likely to use alcohol than those from intact families (Svensson, 2000), other studies have found that as with other types of substances, adolescents from single-parent families were more likely to use alcohol (Flewelling & Bauman, 1990; Stern, et al, 1984; Turner, et al., 1991).

Studies examining whether single-mother or single-father homes were more likely to have adolescents involved with substances have been less conclusive. It has been

found that adolescents who lived with single-mothers were at less risk of alcohol, marijuana, and other illicit drug use, compared to those who lived with single-fathers (Cookston, 1999; Hoffmann & Johnson, 1998; Jenkins & Zunguze, 1998). Another study found that the sex of the parent was related to different outcomes for males and females. Girls in single-parent homes were most likely to smoke if they lived with single-fathers, whereas boys were most likely if they lived with single-mothers (Murray, et al., 1985). Finally, one study conflicts with the others in this area, finding that there was no difference between single-mother and single-father homes on alcohol, cigarette, and marijuana use for either sex (Flewelling & Bauman, 1990).

The point in the adolescent's life span when a parental divorce takes place may influence the risk of substance use in adolescence (Needle, Su, & Doherty, 1990). Needle, et al. (1990) found that the timing of the divorce only affected males. They found that for boys, substance use and substance use consequences (trouble with friends or family, problems at school or work, health problems, or problems with the law because of substance use) were greater when the divorce took place during adolescence, as opposed to childhood. Adolescent boys whose parents had divorced in childhood seemed to experience no more negative consequences, with regard to substance use than those boys whose parents remained married (Needle, et al., 1990).

While single-parent families have been shown to have a disadvantage when it comes to substance use among adolescents, the presence of another relative, for example a grandparent, in the home may reduce the likelihood of problem behaviour. Adolescents from these types of homes were found to be less likely than those from single-parent

homes to smoke. These differences were significant only for girls, although the result was in the same direction for boys (Dornbusch, et al., 1985).

Adolescents from Step-Parent Families

Like adolescents who lived in single-parent families, those who lived in step-parent families were more likely to drink, smoke cigarettes, and smoke marijuana, as compared to adolescents in intact families with two biological parents (Flewelling & Bauman, 1990; Jenkins & Zunguze, 1998). One study found that step-parent families, whether the adolescent was living with his or her biological mother or father, had the same relationship with adolescent substance use as single-mother and single father families (Flewelling & Bauman, 1990). It has also been suggested that having lived in a step-parent family was related to different outcomes for males than on females. Once a remarriage takes place, females' drug use increased, whereas males' drug use remained the same but the consequences (trouble with friends or family, problems at school or work, health problems, or problems with the law because of substance use) brought on by their drug use decreased (Needle, et al., 1990).

A Comparison of Adolescents from Non-Traditional Family Types

Of the studies reviewed, few compared the likelihood of substance use among adolescents of different non-traditional family types (intact versus single-parent versus step-parent etc.), rather than simply comparing all non-traditional families to intact families. One such study found that adolescents who lived with single-fathers, fathers and step-mothers, or with other relatives (but neither parent) had the worst results with regards to substance use (Hoffmann & Johnson, 1998). Those who lived in intact homes had the best results, and those in homes with single-mothers or with mothers and step-

fathers fell in between the two extremes (Hoffmann & Johnson, 1998). Compared to those from intact families, those who lived with mothers and step-fathers were one and a half times as likely to have used marijuana in the past year, and those form single-father or father and step-mother homes were twice as likely. Those from single-father and father and step-mother homes were also twice as likely as those from intact families to report problem drug use, which is relatively rare in adolescence (Hoffmann & Johnson, 1998). Based on the findings of this study, it would appear that single-parent families and step-parent families are equally as likely to have adolescents who use substances, but adolescents who live with their fathers, either alone or with step-mothers, are more likely to use substances than those living with their mothers.

Another study, reporting data on intact, single-parent, and step-parent families, as well as families where the adolescent was living with neither parent came up with somewhat different results. Although whether the adolescent was living with his or her biological mother or father was not examined, it was found that adolescents who lived with neither parent were the most likely to use substances. Adolescents from single-parent and step-parent families faired approximately the same, and tended to have lower rates of use. Those from intact families were the least likely to use substances (Van Til, et al., 1998). Whether these results were significant was not examined.

Finally, two studies which compared intact families to single-parent and step-parent families found that there were differences in substance use between single-parent and step-parent families. It was found that adolescents from intact families were the least likely to use substances, followed by those from step-parent families. Those from single-parent families had the highest levels of use of the three family types studied (National

Center on Addiction and Substance Abuse at Columbia University [CASA], 2001; Van Nelson, Thompson, Rice, & Cooley, 1991)

Summary of Family Structure Literature

While the results of studies looking at the relationship between family structure and adolescent substance use are mixed, the majority of studies indicate that an association exists between the two (Flewelling & Bauman, 1990; Jenkins & Zunguze, 1998; Van Nelson, et al., 1993). Adolescents from non-intact families are more likely to use alcohol, cigarettes, marijuana, and other illicit drugs (Blum, et al., 2000; Cookston, 1999; Hoffman & Johnson, 1998). It has been found that the association remains after controlling for age, sex, and race (Flewelling & Bauman, 1990). It has been suggested that structure might have a stronger association with more serious and less common types of substance use (Flewelling & Bauman, 1990; Svennson, 2000). From the very few studies that have been conducted comparing adolescents from single-mother and single-father families, it appears that those from single-mother families are at less risk of substance use (Cookston, 1999; Hoffman & Johnson, 1998; Jenkins & Zunguze, 1998). Whether adolescents from step-parent families are at lower risk than those from single-parent families is unclear. Few studies have looked into this matter. Two of the studies reviewed here found that those from single-parent families were at somewhat higher risk of substance use than those from step-parent families (CASA, 2001; Van Nelson, et al., 1991), but a third study found little difference between the two family types, although significance was not examined (Van Til, et al., 1998). Finally a fourth study examining the difference between these two family types found that it was not the family type that was related to lower risk, but the sex of the natural parent that the adolescent was living

with. Those who lived with their mother or mother and step-father fared better than those who lived with their father or father and step-mother (Hoffman & Johnson, 1998). Other variables that have been found to be possibly involved in the relationship between family structure and adolescent substance use are the point in the adolescent's life when the divorce took place, as well as the attachment and involvement the adolescent has with his or her family (Hoffman, 1995; Needle, et al., 1990).

Parental Supervision

Ideas about parental supervision have been conceptualized very differently in different studies, making interpretation difficult. Definitions of parental supervision range from having an adult present with the adolescent, to knowing the whereabouts of the adolescent (Baumer & South, 2001; Cookston, 1999; Harker, 2001; Jang & Smith, 1997). A third definition, which is less commonly used, will be used in this study. Based on this definition, parental supervision involves parental knowledge about the adolescent's life, in addition to the setting of limits (Carter & Wojtkiewicz, 2000; Kurdek & Fine, 1993). Based on this definition, there are then two sets of concepts that make up parental supervision. The first of these concepts is parental monitoring. Most researchers would agree that monitoring involves parental knowledge of the adolescent's whereabouts (Hartos, Eitel, Haynie, & Simons-Morton, 2000; Jacobson, 2000; Steinberg & Fletcher, 1994). Individual researchers then sometimes choose other elements to add to this definition, such as knowledge of the adolescent's activities, or friends (Jacobson, 2000). For this study, monitoring includes checking to see where the adolescent is going and who he/she will be with, in addition to checking to make sure homework has been completed. The second of these two concepts which are involved in parental supervision,

described previously as the setting of limits, is not labeled by only one term in the literature. Instead, the same general concept of parents having rules and setting limits for behaviour has been most often labeled as parental control (Bulcroft, Carmody, & Bulcroft, 1998; Hartos, et al., 2000). Unfortunately, control too has been defined differently, in some cases including several additional elements, including coercive (hitting, yelling, taking away privileges or grounding for rule violation) and inductive control (explaining why it was wrong to break the rules, warning not to do it again, explaining proper future behaviour) (Barnes & Farrell, 1992). When these elements are considered, the concept of control is far broader than simply having rules and limits. Therefore, for the purpose of this study, the term parental limit setting, although less frequently used in the literature, will be used to describe the general concept of parents setting limits and rules for adolescent behaviour. In the rest of this section, literature related to each of the two sub-components of parental supervision, parental monitoring and limit setting, will be discussed, followed by literature that combines the two, as will be done in this study, into the broader concept of parental supervision.

Parental Monitoring

As with the association between family structure and adolescent substance use, studies looking into the association between parental monitoring and substance use, drug trafficking, delinquency, recidivism, and high risk sexual behaviour have primarily found that parental monitoring is related (Bogenschneider, Wu, Raffaelli, & Tsay, 1998; Brown, Mounts, Lamborn, & Steinberg, 1993; Coombs & Landsverk, 1988; DiClemente, Wingwood, Crosby, Sionean, Cobb, Harrington, et al., 2001; Flannery, Williams, & Vazsonyi, 1999; Herman & Dornbusch, 1997; Jacobson, 2000; Li, Stanton, & Feigelman,

2000; Metzler, Noell, Biglan, Ary, & Smolkowski, 1994; Patterson & Stouthamer-Loeber, 1984; Weintraub & Gold, 1991;).

With regards to substance use, researchers have found that parental monitoring is related to heavy drinking, frequent heavy drinking, cigarette use, marijuana use, and the use of other illicit drugs (Aseltine, 1995; Barnes, et al., 1997; DiClemente, et al., 2001; Garis, 1998; Small, 1995; SAMHSA, 2001a; Svensson, 2000). To quantify this, one study found that adolescents with the least amount of monitoring were four times more likely than those with the highest amount of monitoring to have reported being drunk (Small, 1995). Adolescents whose parents monitored their television viewing, internet usage, and CD purchases were half as likely to use substances as those adolescents whose parents did not (CASA, 2001). Adolescents were also half as likely to use substances if their parents knew, and expected to know, where they were after school and on weekends (CASA, 2001). While all of these studies have shown that adolescents who received a high level of monitoring from their parents were less likely to initiate substance use, it has also been found that monitoring was related to lesser increases in alcohol misuse after initiation had occurred (Barnes, et al., 2000). With high levels of monitoring, males who were heavy users of alcohol, marijuana, and other illicit drugs were more likely to decrease their substance involvement, and females who were experimenting with these same substances were more likely to stop using them (Steinberg & Fletcher, 1994). Monitoring during middle childhood was found to be related to substance use in adolescence. Adolescents who were highly monitored in childhood, were less likely to initiate marijuana, cocaine, and inhalant use, and if they did initiate use of these

substances, it was more likely to be at an older age than those who were not well monitored (Chilcoat & Anthony, 1996).

Surprisingly, parents reported doing more monitoring than adolescents reported receiving (Barnes, et al., 1997). Both parents and adolescents agreed that females received more monitoring than males (Barnes, et al., 1997). It was reported in one study that this lower level of monitoring may be the reason that males were at greater risk of initiating substance use at higher levels (Barnes, et al., 2000). It has also been suggested that males may need higher levels of monitoring. Cookston (1999) found that while high levels of monitoring reduced the risk of substance use for both males and females, females were also able to do well with moderate levels of monitoring, whereas males were not. When given moderate levels of monitoring their risk level for substance use increased (Cookston, 1999).

While males were found to receive less monitoring than females, monitoring was also found to vary depending on the age of the adolescent. Monitoring tended to decrease as adolescents became older (Small, 1995). This was also the time when substance use, or binge drinking in the case of the study which investigated this, tended to increase (Small, 1995). No differences were found between African American and Caucasian adolescents with respect to monitoring (Barnes, et al., 1994). Substance use was negatively correlated with monitoring from both mother and father (Bogenschneider, et al., 1998), and having a stay-at-home mother was not necessary to be highly monitored by her (Jacobson, 2000). One study found that having a mother who was employed full time but provided high levels of monitoring was still associated with decreased levels of problem behaviour (Jacobson, 2000). However, another study found that it was less

likely that children were well monitored, and more likely that they had problematic behaviour, if they spent their time after school with friends or siblings, and without an adult (Flannery, Williams & Vazsonyi, 1999).

Support has been found to be an important variable in conjunction with monitoring. Reportedly the highest levels of problem drinking occurred when support and monitoring were both low, and the lowest levels of problem drinking occurred when the opposite was true (Barnes, et al., 1986; Barnes, et al., 1997). Flannery, et al. (1999) assert that another influential variable to consider in the equation is peers. They suggest that low parental monitoring is related to increased substance use and increased vulnerability to peer pressure (Flannery, et al., 1999). Where peers fit into the equation is not entirely clear, based on previous research. In fact, in literature related to parental monitoring, this seems to be the only subject that researchers are divided on. Studies conducted by both Ary, Duncan, Duncan and Hops (1999) and Bahr and Hawks (1993) found that the relationship between parental monitoring and adolescent substance use was indirect, because of the relationship that monitoring had with deviant peers, and the relationship that those deviant peers had with adolescent substance use. However, Steinberg and Fletcher (1994) found that monitoring was not associated with deviant peers, once the substance use of the adolescent was controlled for, thus indicating a direct relationship, and one that does not include peer substance use. Other researchers would disagree with this stance, having found that poor monitoring was linked with having deviant peers (Snyder, Dishion, & Patterson, 1986). The association of peers and parental monitoring with substance use may also vary depending on the substance being used. One study discovered that after peer deviancy was considered, parental monitoring did

not have a unique relationship with males' alcohol use, but it did with their marijuana use (Dishion & Loeber, 1985).

Parental Limit Setting

Surprisingly, parental limit setting, the second component of parental supervision, has received far less attention by researchers than parental monitoring has. The few studies that have been done seem to support the idea that rules and limits are associated with adolescent problem behaviour. Adolescents who had fewer limitations placed on their behaviour were more likely to be involved in risky driving behaviour within two years of getting their drivers' licenses (Hartos, et al., 2000). Rules and limits were found to inhibit adolescent delinquency, but to a lesser extent for females than for males (Seydlitz, 1991). Parental limit setting in general, in addition to adolescent age and gender, was found to be predictive of adolescent substance use and status violations (skipping school, lying about age or identity, etc.), variables which were combined and analyzed as the general "problem behaviour" variable in this study (Seydlitz, 1991). Limits surrounding clothing and leisure time were not found to be associated with substance use and status violations (Seydlitz, 1991). According to one study, parental limit setting has been found to diminish as adolescents get older, and males were found to have more limits and restrictions compared to females (a surprising finding, considering that Barnes, et al. (1997) found that females received more monitoring than males) (Seydlitz, 1991). Males were significantly more likely than females to have parents instruct them how to spend their leisure time, and were also more likely to have rules they had to follow and less likely to have complete freedom with regard to clothing choice, although these differences were not significant (Seydlitz, 1991). For males, limit setting

was most effective in mid-adolescence (ages 13 to 16), whereas for females it was somewhat later (ages 15 to18) (Seydlitz, 1991). Asian parents reportedly set more limits than Caucasian ones did (Turner, et al., 1991).

Literature Combining Monitoring and Limit Setting

Few research studies have been done which look at the concepts of monitoring and limit setting at the same time. One such study found that higher levels of parental supervision were related to lower numbers of delinquent acts and lower levels of substance use in adolescents (Herman & Dornbusch, 1997). This was the case for both males and females, as well as adolescents who were Caucasian, African American, Hispanic and Asian (Herman & Dornbusch, 1997). Another study that combined these two concepts, to a limited extent, found that extremes in supervision were related to adolescent drinking, but only after parental support was considered (Shucksmith, Glendinning, & Hendry, 1997). Extremes in supervision seemed to be the most strongly related to adolescents from families with little parental support (Shucksmith, et al., 1997), and according to one study, males received significantly more supervision than females (Seydlitz, 1991).

Summary of Parental Supervision Literature

Adolescents who receive high levels of monitoring from their parents have been found to be less likely to drink heavily, and to do so frequently, as well as to use cigarettes, marijuana, and other illicit drugs (SAMHSA, 2001). It has also been found that if adolescents who were highly monitored start using substances, they tended to not increase their consumption to as great a degree as their less monitored peers (Barnes, et al., 2000). Males were found to receive less monitoring than females, although females

were found to fare well even with moderate levels of monitoring, whereas males were not (Barnes, et al., 1997, Cookston, 1999). Older adolescents received less monitoring than younger ones (Small, 1995). While African Americans and Caucasians received approximately the same amounts of monitoring, Asians tended to receive more (Barnes, et al., 1994; Turner, et al., 1991). It has been found that support may be an important variable in conjunction with monitoring (Barnes, et al., 1986; Barnes, et al., 1997). Peers have also been found to play a possible role in the equation. Results, however, differ as to whether monitoring only has an indirect relationship with substance use (through peer deviancy), or whether monitoring has a direct relationship (Ary, et al., 1999; Bahr & Hawks, 1993; Steinberg & Fletcher, 1994).

Based on the very limited literature available, it has been found that adolescents who had more limits and restrictions placed on their behaviour by their parents were less likely to participate in risky driving, delinquency, status violations, and substance use, although it was suggested that general limit setting and limit setting in some areas may be more influential on adolescent problem behaviour than limit setting in others (Hartos, et al., 2000; Seydlitz, 1991). Younger adolescents and males tended to have more limits than did their peers, and for males, limits were most effective at a somewhat younger age than for females (Seydlitz, 1991).

Parental monitoring and parental limit setting have not been combined in many studies, but from the two that they were, it would appear that the composite of the two, parental supervision, does indeed have an association with adolescent problem behaviour. It was found by one research team that adolescents with higher levels of supervision were less likely to participate in delinquent behaviours and to use substances (Herman &

Dornbusch, 1997). Another set of researchers found that either extreme in supervision was related to increased adolescent drinking, but only for adolescents who felt they received little parental support (Shucksmith, et al., 1997).

Family Structure and Parental Supervision

In general, the little research that has been done examining any link between family structure and parental supervision has been inconclusive and divided. Some studies examining monitoring and limit setting among single-parent families, step-parent families and biological families have found no differences in the levels of supervision that adolescents received (Longmore, et al., 2001; Svensson, 2000; Turner, et al., 1991). On the other hand, there are also studies that have found that there is a link between family structure and parental monitoring. It was found by Thomas, Reifman, Barnes and Farrell (2000) that there was a weak correlation between the two, indicating that adolescents from intact families received slightly more monitoring than those from other types of families. Jacobson (2000) found that only girls, not boys, from intact families received more monitoring than those from other family types. A study by Astone and McLanahan (1991) although only examining monitoring with relation to school work and school activities, found that adolescents from non-intact families got less monitoring in these areas. A final study examining the link between monitoring and family structure found that the percentage of adolescents who reported high levels of monitoring was quite similar between intact and single-mother families (29% and 24% respectively) (CASA, 2001). Unfortunately, this study did not report whether the findings were statistically significant. They did, however compare the risk of substance use for

adolescents of different family structures who reported that they received less consistent monitoring as opposed to high levels of monitoring. It was found that having high levels of parental monitoring lowered the risk of substance use for adolescents of all family structures (CASA, 2001). Although highly monitored adolescents from single-parent families were more likely to use substances than highly monitored adolescents from intact families, it was found that they were less likely than the average adolescent from an intact home, who tends to be only inconsistently monitored (CASA, 2001). The results of this study would suggest that even though adolescents from non-intact families are more likely to use substances, with high levels of monitoring, their levels of risk can decrease so much that they become less likely to use substances than the average adolescent in an intact home.

With respect to family structure and parental limit setting, there appears to be only a weak relationship. One study found that while single-parents were less likely than intact families to have rules about television viewing and chores, they were more likely to set early curfews for their adolescents (Bulcroft, et al., 1998). This relationship was stronger for girls than it was for boys. No differences were found across different age and racial groups (Bulcroft, et al., 1998). Adolescents with step-parents had more restrictions placed on them in early adolescence than their peers from intact families, but had fewer restrictions than their peers in late adolescence (Bulcroft, et al., 1998). This study indicates that although there may be some differences in the limits that parents from different family types place on their adolescents, these differences are not consistent.

Summary of Family Structure and Parental Supervision Literature

While a few studies have shown that family structure and parental supervision may be associated, the division in the results of studies on both monitoring and limit setting, as well as the general lack of research on the topic make it difficult to be able to clearly determine whether an association exists. One study does provide some evidence that if differences in monitoring do exist between different family types, higher monitoring is related to less substance use for adolescents from all family types (CASA, 2001). This is encouraging because while having a non-intact family cannot be changed, the level of monitoring provided to adolescents can be.

Family Functioning

According to Walsh (1993, p.9), the term functional means workable, and is a "judgement about the utility of a family pattern in achieving family goals." Determining the criteria for whether a family or behaviour pattern is functional, however, is a difficult task. Different researchers have different theories about precisely what family functioning entails.

The McMaster Model of Family Functioning

The authors of one model, the McMaster Model, which will be the model used in this study, seem to freely admit that their model does not cover all of the aspects of family functioning (Epstien, Bishop, Ryan, Miller & Keitner, 1993). The McMaster Model places emphasis on the factors that the authors see as having the most impact on the emotional and physical health of family members (Epstein, et al., 1993). The authors view the role of the family primarily as developing and maintaining its' members. In order to do this, the family will carry out basic, instrumental tasks, developmental tasks

as a family system and on an individual level, and hazardous tasks, which have been defined as the tasks necessary to deal with crises that arise (Epstein, et al., 1993). To accomplish these tasks, effectively, families need to have skills in six areas:

Problem-solving. According to the McMaster Model, the problem-solving dimension involves "the family's ability to resolve problems to a level that maintains effective family functioning" (Epstein, Bishop & Levin, 1978, p.21). A problem is then seen as being an issue that threatens the integrity or function of the family. Problems can be both instrumental (related to everyday life, housing, financial issues, etc.) and affective (related to feelings). Effective families should follow problem-solving steps to deal with their problem. The problem should be identified, and then communicated to appropriate people. Alternate plans of action should be explored, a decision should be made on which alternative is most appropriate, and then action should be taken. Finally, the action taken should be monitored and later evaluated to determine its success. It is theorized by the authors of this model that the more effective the family's functioning is in the area of problem solving, the more stages of the problem solving process they are able to work through. However, it is also acknowledged that only exceptional families will carry out all of the steps (Epstein, et al., 1978).

Communication. Communication has been defined as "how the family exchanges information" and for the purposes of this model deals only with verbal communication (Epstein, et al., 1978, p.23). Similar to problem-solving, communication takes place regarding both instrumental and affective issues. Communication is further broken down in two other ways. Communication may be clear or masked, with regard to the content of the message, and it may also be either direct or indirect, with regard to whether the

message is given to the person it was intended for. It is theorized that families that have more effective and functional communication patterns will use more clear and direct communication, and more poorly functioning families will have communication patterns that are more masked and indirect (Epstein, et al., 1978).

Roles. The Roles dimension involves "repetitive patterns of behaviour by which individuals fulfill family functions" (Epstein, et al., 1978, p.23). As with the first two areas, roles are divided into instrumental and affective areas. They are then broken down into being either necessary or "other" family functions. As the name would suggest, necessary family functions, are those that the family must address if they are to be functional. They are also things that the family will have to address repeatedly. These necessary family functions are grouped into five main categories: 1) Provision of resources, including food, clothing, and money; 2) nurturance and support; 3) sexual gratification of marital partners; 4) life skills development for both children and adults; and 5) maintenance and management of the family system, including leadership, decision-making, and maintaining boundaries and standards. Functions that do not fall into the category of being necessary are grouped into being "other" family functions. In fulfilling the necessary functions, families must consider role allocation and role accountability. Important elements of role allocation to consider are whether the division of roles is appropriate, whether the division was carried out implicitly or explicitly, and whether the responsibilities are appropriately spread out amongst family members. Role accountability involves how the family makes sure that the tasks or functions are fulfilled (Epstein, et al., 1978). Elements to consider in this area are whether family members have a sense of responsibility for their duties, how the completion of the tasks or

functions is monitored, and what actions are taken when the tasks or functions have not been fulfilled. To be the most functional with regards to this dimension, all necessary functions should be fulfilled, allocation should be reasonable and should not overburden anyone, and accountability should be clear (Epstein, et al., 1993).

Affective Responsiveness. Affective responsiveness is defined as "the ability to respond to a range of stimuli with appropriate quality and quantity of feeling" (Epstein, et al., 1978, p.25). Responses are grouped into two categories: welfare responses and emergency responses. Welfare responses are emotions such as love, tenderness, happiness, and joy, whereas emergency responses are those such as fear, anger, sadness, disappointment, and depression. Family members need to be able to respond with both welfare and emergency emotions and be able to express them in various quantities if the family is to be considered functional in this dimension. It is also important that the response is appropriate given the stimuli (Epstein, et al., 1978).

Affective Involvement. This dimension involves the extent the family "shows an interest in and values the activities and interests of family members" (Epstein, et al., 1978, p.25). A spectrum of possible involvement is used to describe the family. There are six levels of involvement on this spectrum: 1) Lack of involvement, when there is no interest in one another; 2) involvement devoid of feelings, with minimal interest in one another occurring only when demanded; 3) narcissistic involvement, when there is an interest, but only to the extent that the behaviour of other members reflects on the individual; 4) empathic involvement, when there is an interest in one another for the sake of others; 5) over-involvement, when there is excessive interest in one another; and 6) symbiotic involvement, when there is such an extreme, pathological interest in one

another that boundaries blur and it is difficult to differentiate among the members (Epstein, et al., 1978; Epstein, et al., 1993). Empathic involvement is viewed as being the most functional form of affective involvement, and as families move towards either extreme on the spectrum, they are viewed as being more and more dysfunctional (Epstien, et al., 1978).

Behaviour Control. Behaviour control involves "the pattern the family adopts for handling behaviour [of both children and adults] in three specific situations – physically dangerous situations, situations involving the meeting and expressing of psychobiological needs and drives [including sleeping, eating, eliminating, sex, and aggression], and situations involving socializing behaviour both inside and outside the family" (Epstein, et al., 1978, p.26). In each of these three areas, standards of acceptable behaviour are developed, as well as acceptable amounts of latitude that will be allowed from the standards. The standards and amounts of latitude will be determined by the style of behaviour control the family uses. There are four different styles: rigid behaviour control, flexible behaviour control, laissez-faire behaviour control, and chaotic behaviour control. Rigid behaviour control involves narrow standards with minimal negotiation or variation. Flexible behaviour control involves standards that are reasonable and allows for negotiation and change depending on the context. Laissex-faire behaviour control is at the opposite end of the spectrum from rigid behaviour control and involves no standards and complete latitude. Chaotic behaviour control is unpredictable and random, with the family shifting between styles causing family members to never know what standards apply and how much negotiation is permitted. Of these four different styles,

flexible is considered to be the most functional and effective, and chaotic is considered to be the least (Epstein, et al., 1978; Epstein, et al., 1993).

According to the authors of the McMaster Model, none of the six areas or dimensions is more important than any other. If the family is classified as being highly effective on all six dimensions, they are likely to have optimal physical and emotional health (Epstein, et al., 1993). Families may have problems with functioning on only one of the six dimensions, or several dimensions may be affected (Epstein, Baldwin, & Bishop, 1983). The authors do acknowledge that cultural differences exist, however. What is appropriate for a family in one culture may not be appropriate for a family from another. The authors take the approach that it is necessary to understand the family's culture in order to understand the family and be able to determine whether or not their behaviour patterns are functional (Epstein, et al., 1993).

Family Functioning and Children and Adolescents

Likely the reason that people are concerned about how a family functions is because of the possible impact that functioning can have on the health and well-being of family members. As research examining family functioning, as defined by the authors of the McMaster model, and adolescents is relatively limited, research that relates to children will also be reviewed. Furthermore, unlike the other sections related to the family, this section will not focus on only substance use because of the lack of research linking these two variables. Instead, a variety of areas involving family functioning and children and adolescents will be explored. General differences in perception about family functioning will be discussed first, followed by the relationship of functioning to mental health, adjustment to divorce, suicidal behaviour, pregnancy, and finally substance use.

According to previous research, older adolescents tended to view their families as being more dysfunctional than younger ones. Males tended to view their families as being more dysfunctional than females did, although the only dimension on which this difference was statistically significant was the roles dimension (Sawyer, et al., 1988). Caucasian adolescents tended to view their families as being more dysfunctional than did either African American or Hispanic adolescents (Corcoran, 2001). This may indicate that when studying family functioning it is important to control for factors such as age, sex, and race.

There are several areas that have been studied related to children and adolescents and family functioning, but the most frequently studied area is likely mental health. While one study found that family functioning was not related to the mental health of children and adolescents (John, Offord, Boyle, & Racine, 1995), the majority of the research points in the other direction. It has been found that children and adolescents who received treatment for mental health issues tended to come from families that rated themselves as being less functional than the general population (Bagley, Bertrand, Bolitho, & Mallick, 2001; Kline, 1995; Sawyer, et al., 1988). It has also been found that family functioning could be used as a fairly strong predictor of which children developed mental disorders. This study involved families with children who had sustained a brain injury, and found that family functioning prior to the injury was associated with the children later developing a disorder that was unrelated to their injury. Of the disorders that were later developed by these children (attention deficit-hyperactivity disorder, oppositional defiant disorder, organic personality syndrome, simple phobia, separation anxiety disorder, mania, hypomania, and adjustment disorder with depressed mood, and

marijuana dependence), 76% could be predicted based on pre-injury family functioning (Max, et al., 1997). Another study looked at children who were considered to have difficult temperaments. Among these children, more dysfunctional families at the age of seven predicted clinical disorders at the age of twelve (Maziade, et al., 1985). Family functioning was also found to be predictive of the mental health of young Arab adolescents who lived in an area with an ongoing blood feud (the family of a murder victim gets revenge by killing a certain number of the murderers' family members). The adolescents in this study were found to have fewer mental health problems when they came from more highly functioning families (Al-Krenawi, Slonim-Nevo, Maymon, & Al-Krenawi, 2001). The authors concluded that having a high level of family functioning helped adolescents to cope with stressful and traumatic events (Al-Krenawi, et al., 2001).

Unfortunately, research examining specific psychiatric problems, as opposed to using general clinical samples or general psychiatric criteria, is limited. For example, although attention deficit-hyperactivity disorder was among the disorders that were developed by the brain injured children in an aforementioned study, because the disorders were studied as a group, there is no way to know if family functioning would have been predictive of attention deficit-hyperactivity disorder. Two studies were found that looked at specific disorders. One study looked at attention deficit-hyperactivity disorder. Contrary to the research studying disorders in groups, it was found that levels of functioning in families with a child diagnosed with attention deficit-hyperactivity disorder were not significantly different than in families with children without the disorder (Cunningham, Bennes, & Siegel, 1988). The second study examined the recovery from anorexia nervosa, an eating disorder. It was found that adolescents who

had more highly functioning families were more likely to recover from the disorder more quickly (North, Gowers, & Byram, 1997). Family functioning may be more influential for some disorders compared to others.

Child and adolescent patients tended to perceive lower levels of family functioning than their parents (Bagley, et al., 2001; Kline, 1995). However, it has been found that parents and adolescents from a community sample have similar levels of disagreement over their family's level of functioning (Sawyer, et al., 1988). This may indicate that such differences in perceived family functioning are normative.

The way a family functions both prior to and after a divorce has been shown to be related to the mental health and adjustment of children and adolescents. The family functioning roles dimension has been found to be particularly strongly related. Children and adolescents from families which had high levels of functioning on the roles dimension prior to the divorce were less likely to develop an emotional or behavioural disorder (the measure of child adjustment in this study) than youth whose families functioned less effectively on this dimension (Saayman & Saayman, 1989). However, affective responsiveness, the only other dimension that was discussed in the article related to the study, was shown to have no relationship with emotional and behavioural disorders (Saayman & Saayman, 1989). When examining family functioning after divorce, the roles, affective responsiveness, and behaviour control dimensions were all found to be related to the adjustment of children and adolescents to divorce. Lower levels of functioning on both the roles and affective responsiveness dimensions were found to be related to the internalization of stress, including depression, social withdrawal, immaturity, and self-destructiveness, in children and adolescents (Portes,

Brown & Howell, 1991). In addition, lower family functioning on the roles dimension was also related to increased externalization of stress, as can be seen in increased aggression, delinquency, inattention, and becoming unpopular, in this same age group (Portes, et al., 1991). Reduced social competence after divorce, in terms of peer and family relationships, quantity and quality of activities, and academic performance, was predicted by lower levels of post-divorce functioning on the behaviour control dimension (Portes, et al., 1991). Of families that had divorced, they tended to rank themselves as being more functional in the six areas of family functioning after the divorce compared to before it (Saayman & Saayman, 1989).

Studies relating family functioning to other areas have thus far received less attention, although the results which follow do appear to indicate that family functioning may be an important factor in other areas, as well. Adolescents who had attempted suicide or who had suicidal ideation perceived their families as being more dysfunctional than did adolescents who had no ideation and had not attempted suicide (Joffe, Offord, & Boyle, 1988). Family functioning was perceived more negatively by adolescents who were pregnant or parenting (Corcoran, 2001).

Finally, there was one study done that looked at the relationship between family functioning and adolescent substance use. Although the sample consisted only of adolescent psychiatric inpatients, the finding may still be relevant. The affective responsiveness and roles dimensions were found to be consistently related to substance use (McKay, et al., 1991). Lower functioning in the area of affective responsiveness was associated with significantly greater consumption of beer and liquor (McKay, et al., 1991). Consumption of marijuana was in the same direction but did not reach

significance (McKay, et al., 1991). Lower functioning in the area of roles was significantly associated with greater beer and liquor consumption and more frequent marijuana use (McKay, et al., 1991). The other dimensions were less consistently related to substance use. Lower functioning in the area of behaviour control was associated with greater beer consumption and more frequent LSD consumption, whereas lower functioning in the areas of communication and problem solving was associated only with greater wine consumption (McKay, et al, 1991). Unfortunately, while these associations were found when examining the dimensions individually, when looking at general family functioning and substance use, no relationship was found, although wine and beer use approached significance (McKay, et al., 1991).

Summary of Family Functioning Literature

The authors of the McMaster Model view the family as a system that is intended to develop and maintain its members. In order to do this well, the family must be able to effectively manage problem solving, communication, roles, affective responsiveness, affective involvement, and behaviour control. When all of these things are done well, the family functions well (Epstein, et al., 1978; Epstein, et al., 1993). Previous research indicates that children and adolescents from families that were functioning well were less likely to have mental disorders (Al-Krenawi, et al., 2001; Bagley, et al., 2001; Kline, 1995; Max, et al., 1997; Maziade, et al., 1985; Sawyer, et al., 1988). Based on the findings of one study, a study of anorexia nervosa, adolescents from families that functioned well recovered from their disorder more quickly (North, et al., 1997). Children and adolescents from families that functioned well tended to adjust better to divorce (Saayman & Saayman, 1989; Portes, et al., 1991). Adolescents perceived their

families as being more dysfunctional if they had suicidal ideation, had attempted suicide, or were pregnant or parenting (Corcoran, 2001; Joffe, et al., 1988). The one study that could be found relating functioning to substance use showed a negative relationship between the two in a sample of adolescent psychiatric inpatients. Of the six dimensions of family functioning, lower levels of functioning in the areas of affective responsiveness and roles were most consistently related with higher levels of substance use, although the other dimensions were found to play a role with individual substances (McKay, et al., 1991).

Family Structure and Family Functioning

Given the limited amount of literature currently available regarding family functioning, as defined by the authors of the McMaster Model, no articles could be found relating functioning and parental monitoring or limit setting, and there was only one article that could be found relating functioning and family structure. According to this study, two-parent families (it was not explained in the study whether this represented only intact families, or if step-parent families were also included) were found to be more functional than single-parent families, although the authors caution that the difference between the two family types may be exaggerated because of association with other variables (Byles, Byrne, Boyle, & Offord, 1988). They suggest that family functioning may be lower in single-parent families because if there was spousal abuse, for example, that would likely lead to lower functioning, and might also be a cause of single-parenthood (Byles, et al., 1988). Given the fact that there is only one study on this topic, it is important to interpret the results with care until such time that they can either be confirmed or refuted.

Summary of Literature on the Family and Adolescent Substance Use

The majority of studies indicate that family structure and adolescent substance use are related (Flewelling & Bauman, 1990; Jenkins & Zunguze, 1998; Van Nelson, et al., 1993). Based on previous studies, adolescents from non-intact families appear to be more likely to use alcohol, cigarettes, marijuana, and illicit drugs, compared to those from intact families (Blum, et al., 2000; Cookston, 1999; Hoffman & Johnson, 1998). It has been suggested that family structure has the greatest association with more serious and less common types of substance use (Flewelling & Bauman, 1990; Svennson, 2000). It is not yet clear whether adolescents from single-parent families face different levels of risk, with regards to substance use, than do those from step-parent families.

Parental supervision, which is composed of parental monitoring and parental limit setting, has also generally been found to be related to adolescent substance use. While research combining these two concepts is sparse, it has been found that either very high or very low levels of supervision were related to adolescent drinking when parental support was low (Shucksmith, et al., 1997). Most research supporting an association between supervision and adolescent substance use results from looking at monitoring and limit setting separately in association with adolescent substance use. Low monitoring has been found to be related to greater heavy drinking, cigarette use, marijuana use, and the use of other illicit drugs (Aseltine, 1995; Barnes, et al., 1997; DiClemente, et al., 2001; Garis, 1998; Small, 1995; Svennson, 2000; SAMHSA, 2001a;). It has also been found that monitoring may be related to lesser increases in alcohol misuse that might take place should adolescents begin using substances (Barnes, et al., 2000). Very few studies have been done concerning parental limit setting. Only one study looked at the relationship

between limit setting and adolescent substance use. That study found that limit setting was related to substance use when it was combined with status violation (Seydlitz, 1991). The results of this study also suggested that parental limit setting in some areas of the adolescents life may be more strongly related to lower levels of substance use than in other areas (Seydlitz, 1991). Research done examining whether there is a connection between parental supervision and family structure has been inconclusive up until this point.

Few studies have examined the association between family functioning, as defined by the authors of the McMaster Model, and adolescent substance use. It has been generally found that family functioning does have a relationship with mental health, and some dimensions of functioning have been found to be related to adjustment to divorce (Al-Krenawi, et al., 2001; Bagley, et al., 2001; Kline, 1995; Max, et al., 1997; Portes, et al., 1991; Saayman & Saayman, 1989; Sawyer, et al., 1988). Only one study could be found that examined the relationship between family functioning and adolescent substance use. While the sample consisted of psychiatric inpatients, as opposed to a general population of adolescents, it was found that the affective responsiveness and roles dimensions were particularly important factors (McKay, et al., 1991). Only one study could be found linking family functioning (according to this definition) and family structure. This study found that single-parent families were less functional than two-parent families, although the term "two-parent" families was not defined (Byles, et al., 1988).

The current literature leaves many gaps that need to be filled with future research. First of all, research needs to be done that looks at specific structures rather than simply

grouping all non-intact families together. More research is needed examining whether the sex of the parent that the adolescent lives with is an important factor, as well as whether there are differences between the different family types for males versus females. Related to the area of supervision, it is important that in the future it is examined whether or not monitoring and limit setting have equal roles to play when parental supervision is studied in relation to adolescent substance use. Much is left to be discovered on whether general limit setting is what is important, or if only limit setting in individual areas is related to problem behaviour. It would also be beneficial to know whether supervision varies according to family structure. Related to family functioning, it would be useful if further research, using the McMaster Model definition of family functioning, would look into adolescent problem behaviour. Much attention has been focused towards mental health, but adolescent problem behaviour can be life altering as well.

This final area will be addressed in this study, focused on the specific problem behaviour of substance use. The link between supervision and family type will also be examined, although it is not within the scope of the study to look at the individual components of supervision. The differences between specific family structures will be examined, as well as whether the substance use of males and females is related to family composition in a consistent manner. Whether the gender of the parent is related to any differences will also be explored.

Social Control Theory

Although many theories have been examined with relation to adolescent problem behaviour and adolescent substance use, the Social Control Theory will be used in this

study, because of its usefulness in relating all of the variables. Social control theories have most often been used in the study of adolescent delinquency. However, since deviation from the norms, rules, and laws of society is at the core of these theories, it would seem that the perspective they provide may also be useful when examining adolescent substance use, particularly heavy drinking and the use of marijuana and other illicit drugs, behaviours which are not considered to be the norm. According to social control theories, people naturally deviate from society's rules, and the question we must ask is why the majority chooses to conform (Hirschi, 1969). At birth, children do not automatically know the norms of their culture. They must be taught, and the child's parents play a vital role (Nye, 1958).

Nye's Social Control Theory

One version of social control theory was conceptualized by F.I. Nye in 1958. According to Nye's version of the theory, four things prevent most people from deviance.

Internal control. The most efficient way for society to obtain conformity from individuals is to have individuals internalize the rules and norms. As a child grows up and internalizes the rules, he or she forms a conscience and therefore a sense of right and wrong. Unfortunately, this alone is not enough to ensure compliance from everyone in society. The norms and rules may not be agreed upon by everyone, they may be in direct conflict with what the individual values, and simply having guilt for doing something wrong is often not effective punishment. As a result, other forms of control are often needed to increase the rate of compliance (Nye, 1958)

Indirect control. Affection for parents and others who conform to the rules is often crucial in ensuring conformity. This affection for others seems to prevent

individuals from engaging in behaviour that would disappoint or embarrass those that they care about (Nye, 1958). Affection also has an impact on internal control. Individuals who have a great deal of affection or respect for their parents (or others who conform) will be much more likely to accept and believe in the rules their parents attempt to teach them (Nye, 1958). Problems arise when parents have beliefs that conflict with society's norms and rules. In this case, children will be more likely to deviate because they have been taught not to value the rules and they have affection for those who don't believe in the rules (Nye, 1958).

Direct control. As important as internal and indirect controls are, direct control is sometimes necessary. Parents use direct control when they place restrictions on when their children can go out, the friends that they can go out with, and the activities they are allowed to partake in. In addition to restrictions, direct control also involves letting children know that breaking the rules will have consequences, and then following through with the punishment should they decide to break the rules. For society in general, police are in charge of direct control. Direct control is only effective, however, to the extent that someone who conforms to the rules might catch the individual and report their deviance to either their parents or the police (Nye, 1958).

Need satisfaction. Deviating from the norms and rules of society is only necessary in so far as it serves a need for the individual. It follows then, that if alternative means are available that adequately meet these needs (eg. status, excitement, etc.) deviance will not occur (Nye, 1958).

Literature Relating the Theory to Adolescent Substance Use

Most of the literature surrounding social control theory has involved adolescent

delinquency, rather that substance use. The few studies that have examined adolescent substance use, used Hirschi's social control theory as opposed to Nye's. The two theories do have some similarities, making some elements of the research into Hirschi's (1969) theory, applicable when examining Nye's (1958). Hirschi's concept of attachment, where attachment to others who conform prevents an individual from deviating, is very similar to the concept of indirect control that Nye presented. Furthermore, Hirschi's idea that a belief in the rules and values of the society prevents deviation is very similar to Nye's concept that rules are internalized into an individual's conscience. The other two factors that Hirschi believes prevent people from deviating, an involvement in conventional activities (and thus less time to deviate) and commitment to conventional goals (and thus the risk of losing what you've invested time and energy into – eg. getting into a good university, having a prestigious job) do not seem to be related to Nye's conceptualization of the theory.

One study found that all four elements of Hirschi's theory predicted adolescent substance use, particularly the use of illicit drugs (Thompson, Smith-DiJulio & Matthews, 1982). Unfortunately, the attachment variable in this study involved only attachment to peers (Thompson, et al., 1982). Another study found that belief was most strongly related to adolescent substance use, followed by attachment, involvement, and finally commitment. Attachment was found to have a direct relationship with drug use (marijuana and amphetamine use, but not cocaine use), as well as an indirect relationship because of the association it had with belief, involvement, and commitment (Marcos & Bahr, 1988). These studies would suggest that internal and indirect control, which are similar to Hirschi's conceptualization of belief and attachment, may play an important

role in preventing adolescent substance use. The latter study also would suggest that affection towards one's parents (Hirschi's idea of attachment) does impact internal control, as Nye (1958) theorized.

Relationship Between the Theory and This Study

Nye's version of social control theory is useful for this study, because it shows the different ways that family may have an influence on adolescent substance use. The concept of direct control is very similar to that of parental supervision, and yet it is likely that restrictions placed on them and the threat of punishment are not the only things that prevent adolescents from using substances.

There is nothing inherent about having a certain family structure or a certain level of family functioning that directly causes an adolescent to violate the rules and use substances. Rather, having a certain family structure or a certain level of family functioning translate into some other factor that causes the adolescent to use substances. Nye (1958) proposes that this related factor is control, and in describing his theory, he discusses how he believes family structure impacts the control that parents have over their adolescents. He suggests that single-parents provide less effective direct control than do parents in intact families, presumably because providing direct control takes considerable time and effort. He further suggests that even if a step-parent becomes part of the family and there are two people to provide direct control, the direct control is still less effective than that provided by intact families. Step-parents, he proposes, are more hesitant and less likely to provide control. Having a step-parent may also reduce the closeness of the parent-child relationship, thus affecting both indirect and internal controls (Nye, 1958).

It is proposed in this research that the level of family functioning may impact the various factors (as proposed by Nye, (1958)) that prevent deviance, including substance use, in a similar manner. An adolescent whose parents have not modeled and encouraged proper problem solving may not be able to come up with alternative ways to meet needs (eg. cope with stress, increase status with his or her peers), and may therefore turn to substance use. A family with impaired communication may not communicate societal norms and rules effectively, and thus the adolescent may not have internalized rules about substance use. A family that does not effectively allocate roles, may leave an adolescent without someone to provide direct control or may not meet the needs of the adolescent, leaving him or her to look for other ways to meet them, which may deviate from societies expectations. A family whose members struggle with affective responsiveness, showing too little love and affection and too much anger and disappointment, may not develop a strong and affectionate enough parent-child bond for the parent to have adequate indirect control. The same result could happen if the family has too little affective involvement. The family functioning element of behaviour control seems to correspond very closely with direct control. In this case, it has been predicted both from a family functioning point of view and a social control theory point of view, that both too much and too little control of behaviour can cause problems (Epstein, et al., 1978; Epstein, et al., 1993; Nye, 1958).

Summary of Social Control Theory

Internal control, indirect control, direct control, and alternative ways to meet needs prevent the majority of people from deviating from the rules and norms of society. Although this version of control theory does not appear to have been studied specifically

with relation to adolescent substance use, it would follow that these same factors prevent the majority of adolescents from breaking the rules that society has with regards to substance use. Social control theory illuminates one possible set of reasons why family structure, family functioning, and parental supervision may have an influence on adolescent substance use.

Research Questions

In order to extend the current literature, and to examine issues arising from the literature, in addition to the McMaster Model of family functioning and Social Control Theory, the following research questions were created:

1. How do adolescents from families of different structures differ in:
    a) their levels of perceived family functioning?
    b) their levels of perceived supervision from parents?
    c) their levels of reported past year substance use?
2. Are there differences between adolescents' perceived levels of family functioning in:
    a) the levels of supervision they perceive receiving from their parents?
    b) their levels of reported past year substance use?
3. Are there differences between adolescents' perceived levels of supervision in their levels of reported past year substance use?
4. a) For adolescents' perceived levels of supervision, are there differences in the sex of the adolescents by their family structures?
    b) For the adolescents' reported levels of past year substance use, are there differences in the sex of the adolescents by their family structures?

c) For adolescents' perceived levels of supervision, are there differences in the sex of the adolescents by their perceived levels of family functioning?

d) For the adolescents' reported levels of past year substance use, are there differences in the sex of the adolescents by their perceived levels of family functioning?

e) For the adolescents' reported levels of past year substance use, are there differences in the sex of the adolescents by the levels of supervision they perceive receiving from parents?

5. For the adolescents' reported levels of past year substance use:

   a) are there differences in the adolescents' types of family structure by their perceived levels of family functioning?

   b) are there differences in the adolescents' types of family structure by the levels of supervision they perceive receiving?

6. For the adolescents' reported levels of past year substance use, are there differences in the levels of supervision that adolescents perceive receiving from parents by their perceived levels of family functioning?

CHAPTER 3 - METHODOLOGY

Data that had previously been collected by Gomes, Bertrand, Paetsch and Hornick (Canadian Research Institute for Law and the Family) and Doherty and Munro (University of Alberta) in the spring and fall of 1999 was analyzed for this study.

Sampling Procedures

Adolescents in grades seven through twelve, living in variously sized rural and urban communities were selected for the sample. For the larger cities (Edmonton and Calgary), schools were first selected as randomly as possible for each geographical quadrant of the city, while making sure that alternative curriculum schools were not chosen. One high school and two junior high schools were chosen from each quadrant for each school system (public and Catholic). School boards determined the number of students needed per grade level for a stratified sample, and then randomly selected students. For smaller cities and rural areas, once schools were selected, principals identified classes that were mandatory for students, and all students in the classes were part of the selected sample. Once students were selected to participate, a letter was sent to parents describing the study and requesting the parents signature if he or she consented to his or her adolescent's participation. For the majority of the schools (53 of the 67 schools), address labels were generated at the school for those who had been selected, and consent forms were mailed to parents. For schools without the technology to generate labels or which had policies prohibiting them to release addresses, consent forms were sent home with the selected students. Parents who gave their consent were able to mail or fax the form back to the Canadian Research Institute for Law and the Family. Postage was provided with the form, as well as a toll free number for those who choose to

fax the form back. A list of students whose parents consented to their participation was sent back to the principal of each school and a convenient date and time was selected for the questionnaire to be administered at the school by a member of the research team. A brief introduction, which was both attached to the questionnaire and given verbally by the member of the research team administering it, indicated that participation was voluntary, information provided would be confidential, and respondents would remain anonymous. Having respondents seal completed questionnaires in manila envelopes further ensured anonymity. Participants were informed that they could leave any questions they chose to blank and were free to withdraw their participation at any point. Participants consented to being a part of the study implicitly by filling out the questionnaire. A total of 6,656 letters were initially sent home for parental consent, 2,675 parents consented and 2,009 adolescents participated. Eight participants gave responses that were considered invalid, leaving 2,001 adolescents in the final sample.

Subjects

Fewer males than females participated (45.8% versus 54.2%), and more junior high students than senior high students were in the final sample (59.5% of the sample was made up of junior high students). The majority, 61.7%, of respondents were from the larger cities (Edmonton and Calgary), with 16% being from smaller cities and 22.2% being from towns and rural areas.

Instruments

The questionnaire that participants filled out, entitled The Youth Victimization, Crime and Delinquency Survey, was made up of several sections, including sections on demographics, personal characteristics, family life, leisure time, school, violence and

delinquency, and contact with the police. The questionnaire contained approximately 240 questions, and while most of the questions asked about specific behaviours, seven sub-scales included questions about thoughts and feelings related to different topics. Only selected questions about family, and the delinquency questions relating to substance use will be included in this study for analysis.

To determine family structure, adolescents were asked "Who do you live with most of the time?" and were instructed to mark all categories that applied to them. Based on the responses, adolescents were then categorized as living in intact, single-father, single-mother, mother and step-father, father and step-mother, and other types of families.

The General Functioning scale of the McMaster Family Assessment Device was used to measure family functioning. This scale consists of twelve questions with responses on a Likert scale (strongly agree, agree, disagree, and strongly disagree). The odd numbered questions were reverse scored, and responses from the twelve questions were added to form a composite score for family functioning. In addition, separating the ten percent of respondents with the highest functioning scores and the ten percent with the lowest scores from the middle eighty percent created a categorical variable.

The General Functioning scale has been found to correlate highly (ranging from 0.48 to 0.76) with the other six dimensions (scales) of the Family Assessment Device (Epstein, Baldwin, & Bishop, 1983). However, when partial correlations were conducted removing the effect of the general functioning scale, the correlations between the other dimensions of the assessment devise dropped considerably. This indicates that the general functioning scale can effectively be used as a simplified version of the total

assessment device (Epstein, et al., 1983). The general functioning scale has been found to have a high level of predictive validity in terms of which families came from clinical and nonclinical samples (Epstein, et al., 1983). The internal consistency of the scale has also been found to be high (.92), and the test-retest reliability was found to be adequate (.71) (Epstein, et al., 1983; Miller, Epstein, Bishop, & Keitner, 1985). According to Sawyer, et al. (1988), the Family Assessment Device was designed to be used by those over twelve years of age, and when the instrument's reliability was tested with a group of adolescent psychiatric inpatients, the internal consistency (alpha) came out as high as the adult sample, indicating that the scale can likely reliably be used with adolescents. Social desirability does not appear to influence responses to the Family Assessment Device or the General Functioning scale, with the correlations between social desirability and each measure being quite small (-.14 for General Functioning) (Miller, et al., 1985). Internal consistency was analyzed for the sample in this study, and was found to be .8779, comparable to that reported in the literature.

Supervision was measured with seven items asking the adolescents how often their parents supervised certain parts of their lives. The items were modified from questions used in the Monitoring the Future Survey, an extensive American study (Bachman, Johnston, & O'Malley, 1991). Participants were asked how often parents checked to see if homework had been done, provided help with homework if needed, required them to do chores, limited the time they could spend watching television, told them what time to be home, and checked to see who they were going out with and where they were going. Responses were on a Likert scale (never, rarely, sometimes, and often), and were totaled to obtain a composite score for supervision. As was done with

functioning, the ten percent of respondents with the highest supervision scores and the ten percent with the lowest scores were separated from the middle eighty percent in order to create a categorical variable. The reliability and validity of this scale does not appear to have been previously reported, although Bachman, Johnston, and O'Malley (1991) do describe careful piloting and pre-testing of original questions to ensure validity and reliability. The internal consistency, based on the current sample, was found to be acceptable, at .7085.

Past year substance use was measured using four questions. Participants were asked, over the previous year, how often they "had 5 or more drinks of alcohol on one occasion," "smoked marijuana or hash," "used steroids," and "used other illegal drugs." Participants were asked whether each behaviour had taken place never, once, twice, or three or more times. For the purposes of this study, only heavy drinking, marijuana use, and the use of other illicit drugs was examined. Respondents who reported engaging in the behaviour once or twice were grouped together, in order to compare adolescents who had never engaged in the behaviour with those who had done so once or twice, and three or more times. A fourth substance use variable was created in order to examine multiple substance use by categorizing respondents according to the combinations of substances that they had used over the previous year. The substance use questions were not tested for re-test reliability. They do appear to be valid compared to other studies, with rates for each substance use behaviour being very similar to those rates found in recent studies. However, studies have shown that past year use tends to be underreported compared to past month use, so estimates reported within this study should be considered conservative

(Bachman & O'Malley, 1981; O'Malley, Bachman, & Johnston, 1983). The anonymous and confidential nature of the study should help to raise the validity of these questions.

Data Analysis

The data was analyzed using SPSS 11.0. Graphs were first created to identify the type of possible relationships. The relationships did not appear to be curvilinear.

For the first three research questions, Analysis of Variance (ANOVA) was used to analyze the segments where family functioning or parental supervision were the dependent variables, and Multivariate Analysis of Variance (MANOVA) was used when the dependent variable was substance use, to allow for concurrent analysis of heavy drinking, marijuana use, and illicit drug use. After the first ANOVA or MANOVA was run, a second one (either a two-way ANOVA or a MANOVA with two independent variables) was then run to test for the effects of school level. For each question, significant main effects were analyzed with the Tukey method of multiple comparisons to determine where the significant difference occurred. Interaction effects for all six questions were analyzed by examining graphs of the means in question, and by running separate multiple comparisons (again, Tukey was used) for each sex, grade, family type, or a combination thereof (depending on the specific question).

For the last three research questions, the analysis followed a similar pattern with one exception. In each case the analysis began with either a two-way ANOVA or a MANOVA with two independent variables, and then a three-way ANOVA or a MANOVA with three independent variables was used to check for the effects of school level. Interaction effects were examined using the same method as was used for the first three research questions.

After analysis had been done for each question individually, regression analysis was performed to examine the overall contribution of each of the variables in predicting past year substance use. As sex of the adolescent, school level, and family structure are nominal variables, "dummy" variables were created for each of them to allow them to be entered into the model.

CHAPTER 4 – RESULTS

In this chapter, the findings of the study will be presented. Descriptive statistics relating to family structure, family functioning, parental supervision, and substance use will first be presented, followed by the analysis for the individual research questions and then the regression analysis. The findings of the research questions will then be integrated, and finally, the limitations of the current study will be discussed.

Descriptive Statistics

Family Structure

Over two-thirds (70.5%) of the adolescents in the sample came from intact families. Adolescents coming from single-parent families comprised 17.2% of the sample participants, with 14.4% coming from single-mother families and 2.8% coming from single-father families. Those coming from step-parent families comprised 6.3% of the sample, with 5.0% coming from families with mothers and step-fathers and 1.3% coming from families with fathers and step-mothers. A further 6.0% came from other types of families, which were not explored in this study.

Family Functioning and Parental Supervision

Family functioning and parental supervision, in addition to being used as scales, were categorized into high, moderate, and low. An attempt was made to select only ten percent of the respondents for both the "highest" and "lowest" categories. As a result of natural breaks in the scores, 10.2% of adolescents were categorized as being from high functioning families, while 78.3% were categorized as being from moderate families, and 11.4% as being from low functioning families. For parental supervision, natural breaks in the scores resulted in 11.2% of adolescents being categorized as having the most

supervision, 9.1% being categorized as having the least, and 79.7% being categorized as having moderate supervision.

Substance Use

While only 31% of junior high students had taken part in heavy drinking over the last year (13.0% of them 3 or more times), 76.2% of high school students had (45.2% of them 3 or more times). Similarly, high school students had used marijuana (40.7% versus 12.4%) and other types of illegal drugs (18.0% versus 5.5%) in greater numbers, compared to junior high students. Table 1 summarizes the findings for males and females. When the use of multiple substances over the past year was examined, it was found that for most adolescents who reported using at least one substance, heavy drinking was part of their substance use behaviour, whether they only participated in heavy drinking, whether they participated in heavy drinking and marijuana use, or whether the participated in heavy drinking, marijuana use, and illicit drug use. A very small percentage of adolescents used marijuana and illicit drugs, either alone or in combination, without also having participated in heavy drinking within the last year (See Table 2)

A Multivariate Analysis of Variance was conducted to examine the means of frequency of these three substance use indicators in relation to the adolescent's sex and school level (See Table 3 for means). The MANOVA revealed a significant main effect for school level, $F(3, 1700)=110.472$, $p<.001$, showing that senior high students used substances more frequently than junior high students, and a trend towards an interaction effect for school level and sex, $F(3, 1700)=2.217$, $p=.084$, according to Pillai's Trace. No

Table 1

Percentage of Heavy Drinking, Marijuana Use, and Illicit Drug Use Among Adolescents as a Function of School Level and Sex

	Junior High		Senior High	
Substance	Males	Females	Males	Females
Heavy Drinking				
Never	68.3%	69.6%	31.9%	35.5%
Once or twice	18.3%	17.9%	21.9%	20.3%
Three or more times	13.5%	12.5%	46.2%	44.2%
Marijuana Use				
Never	82.8%	89.7%	58.8%	59.5%
Once or twice	10.0%	5.5%	15.2%	17.1%
Three or more times	7.2%	4.8%	26.0%	23.4%
Illicit Drug Use				
Never	94.3%	94.9%	80.4%	83.4%
Once or twice	3.9%	2.9%	9.9%	10.0%
Three or more times	1.7%	2.3%	9.6%	6.6%

Table 2

Percentage of Adolescents Who Participated in Each Substance Use Behaviour Alone and in Combination

Substance Use Behaviour	Percentage
No Substance Use	51.9
Heavy Drinking Only	21.8
Marijuana Use Only	1.8
Illicit Drug Use Only	0.2
Heavy Drinking and Marijuana Use	13.8
Heavy Drinking and Illicit Drug Use	0.9
Marijuana Use and Illicit Drug Use	0.2
Heavy Drinking, Marijuana Use and Illicit Drug Use	9.4

Table 3

Mean Substance Use Scores as a Function of School Level and Sex

	School Level	Sex	Mean	Std. Deviation	N
Heavy Drinking	Junior High	Male	1.4510	.72033	459
		Female	1.4297	.70494	526
	Senior High	Male	2.1433	.87316	342
		Female	2.0897	.88931	379
Marijuana Use	Junior High	Male	1.2418	.57258	459
		Female	1.1502	.47235	526
	Senior High	Male	1.6725	.86190	342
		Female	1.6412	.83760	379
Illicit Drug Use	Junior High	Male	1.0741	.32198	459
		Female	1.0741	.33837	526
	Senior High	Male	1.2924	.63329	342
		Female	1.2322	.55770	379

main effect was found for sex, F(3, 1700)=1.173, n.s.. However, when examining the substance use behaviours separately, the effect of sex on marijuana use did approach significance, F(1, 1057.474)=3.398, p=.065. The results were graphed to determine the nature of the trend towards the interaction (See Figure 1). The graphs show that, while males reported slightly higher frequencies of use for all three substance use behaviours at both school levels, males and females differed more in senior high in their frequency of heavy drinking and illicit drug use, while the sexes differed more in junior high in frequency of marijuana use.

To summarize the findings, senior high students were found to have participated in heavy drinking, marijuana use, and illicit drug use more frequently than junior high students. Males and females were not found to differ significantly on their participation in any of the three behaviours. However, there was a trend towards males using marijuana more frequently than females. There was also a trend towards an interaction between school level and sex, with junior high males' and females' level of participation in heavy drinking and illicit drug use having been more similar, compared to their older counterparts, and senior high males' and females' marijuana use frequency being more similar, compared to their younger counterparts.

Analyses for Individual Research Questions

Research Question 1a

How do adolescents from families of different structures differ in their levels of perceived family functioning?

Analysis of Variance (ANOVA) was run between family structure and the family

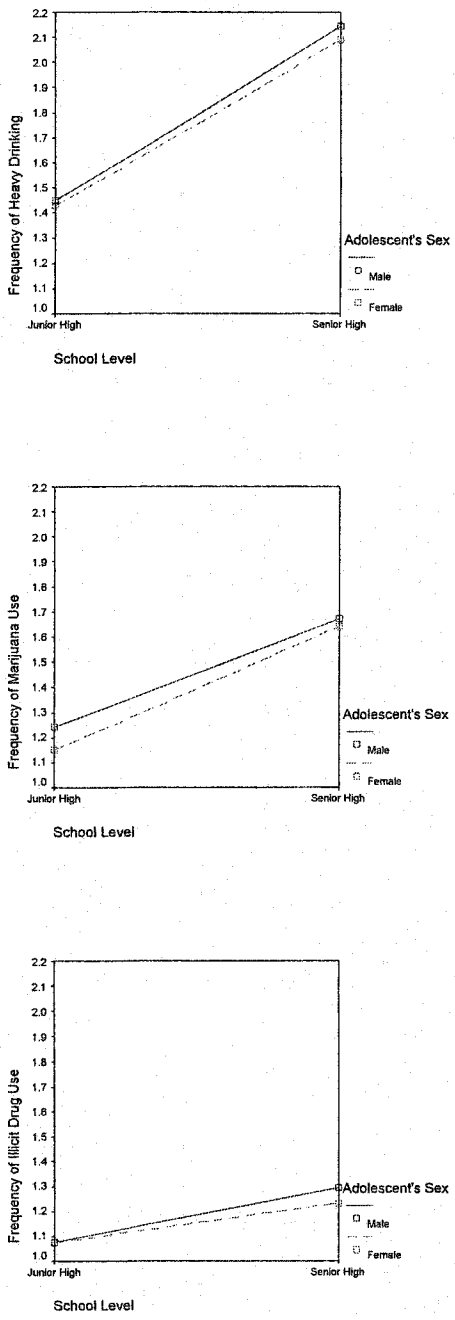


Figure 1. Mean substance use scores as a function of school level and sex.

functioning scale. Significant differences were found between adolescents from the five family types on their mean levels of family functioning, $F(4, 1843)=8.267$, $p<.001$ (See Table 4 for means and Figure 2 for a graph of the means). Based on the Tukey method of multiple comparisons, it was found that intact families, which had the highest levels of functioning, differed from father and step-mother ($p<.01$), single-father ($p<.01$), and single-mother families ($p<.01$). To determine if the results would be the same for both junior and senior high school students, a second ANOVA was run between family structure, school level, and the level of family functioning (Table 5). The interaction effect between family structure and school level on level of functioning was significant $F(4, 1833)=3.473$, $p<.01$, indicating that the results would be different depending on the school level.

In order to see how school level was involved, the data was plotted on a graph with separate lines for junior and senior high students (See Figure 3). This graph showed that for junior high students, while intact families had the highest levels of functioning, the other family forms all functioned at about the same somewhat lower level. Senior high students reported more variation between family types. They reported that intact, single-mother, and mother and step-father families functioned at about the same high level, while single-father, and particularly father and step-mother families functioned quite a bit lower. While senior high students reported higher levels of functioning in mother and step-father families compared to junior high students, they reported lower functioning in intact, single-mother, and particularly father and step-mother families. The Tukey method of multiple comparisons was used to determine whether

Table 4

Mean Family Functioning Scores as a Function of Family Structure

Family Type	Mean	Std. Deviation	N
Intact	37.4387	6.09843	1386
Single-father	34.4727	6.31827	55
Single-mother	36.0246	6.45538	285
Father & Step-mother	33.3846	7.59514	26
Mother & Step-father	36.3750	3.15630	96

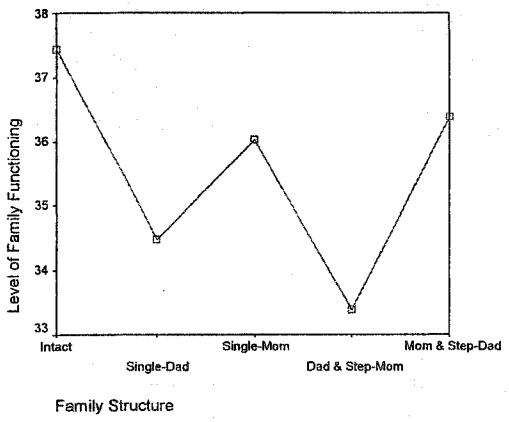


Figure 2. Mean family functioning scores as a function of family structure.

Table 5

Mean Family Functioning Scores as a Function of Family Structure and School Level

Family Type	School Level	Mean	Std. Deviation	N
Intact	Junior High	38.0622	5.76468	804
	Senior High	36.5717	6.44699	579
Single-father	Junior High	35.6333	5.31415	30
	Senior High	33.0800	7.21064	25
Single-mother	Junior High	35.8297	6.15442	182
	Senior High	36.3824	7.00642	102
Father & Step-mother	Junior High	35.9167	8.41490	12
	Senior High	30.7692	6.35287	13
Mother & Step-father	Junior High	35.7368	6.52612	57
	Senior High	37.3077	5.52103	39

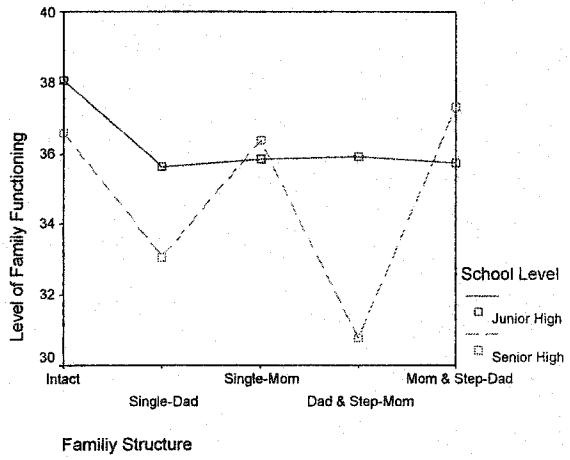


Figure 3. Mean family functioning scores as a function of family structure and school level.

differences between family types were significant within each school level category. Based on the results of the Tukey test, junior high students reported significantly lower functioning between intact and single-mother families, $p<.001$, and between intact and mother and step-father families, $p<.05$. As mother and step-father families were reported as having the second highest level of functioning, it would appear that junior high students reported higher functioning in intact families compared to all other types (although this difference was not significant for all family types). For senior high school students, a significant difference was found between intact and father and step-mother families, $p<.05$, and there was a trend towards significance for the differences between intact and single-father families, $p=.066$, and mother and step-father and single-father families, $p=.084$. This would confirm that senior high school students reported higher functioning in intact, mother and step-father and single-mother families compared to father and step-mother and single-father families (although again, not all differences were significant).

In summary, adolescents from intact families reported higher functioning than those from single-mother, single-father, and father and step-mother families. Junior high students reported that intact families functioned better than all other types, whereas senior high school students reported that single-mother and mother and step-father families functioned as well as intact ones.

Research Question 1b

How do adolescents from families of different structures differ in their levels of perceived supervision from parents?

Analysis of Variance (ANOVA) was run between family structure and the parental supervision scale. Significant differences were found between the five family types on their mean levels of parental supervision, $F(4, 1859)=13.117$, $p<.001$ (See Table 6 for the means and Figure 4 for a graph of the means). The Tukey method of multiple comparisons was run, and it was determined that differences between family types occurred in several places. As with functioning, adolescents from intact families were found to have the highest mean level of supervision, and were found to differ significantly from father and step-mother ($p<.05$), single father ($p<.001$), and single-mother families ($p<.001$) in their level of parental supervision. Mother and step-father families, which had the second-highest mean level of supervision differed significantly from single-father families ($p<.05$), and approached significance in their differences with father and step-mother ($p=.088$) and single-mother families ($p=.086$).

School level was found to make no difference when an ANOVA was run with family structure, school level, and level of supervision, $F(4, 1849)=1.177$, n.s. (See Table 7 for means).

In summary, intact and mother and step-father families had significantly higher supervision than single-father families, and intact families also had significantly higher supervision compared to father and step-mother and single-mother families. School level was found to make no significant difference.

Research Question 1c

How do adolescents from families of different structures differ in their levels of reported past year substance use?

Table 6

Mean Parental Supervision Scores as a Function of Family Structure

Family Type	Mean	Std. Deviation	N
Intact	15.6152	3.75340	1398
Single-father	13.5000	4.31909	56
Single-mother	14.2211	4.04337	285
Father & Step-mother	13.2308	3.63657	26
Mother & Step-father	15.3434	3.73664	99

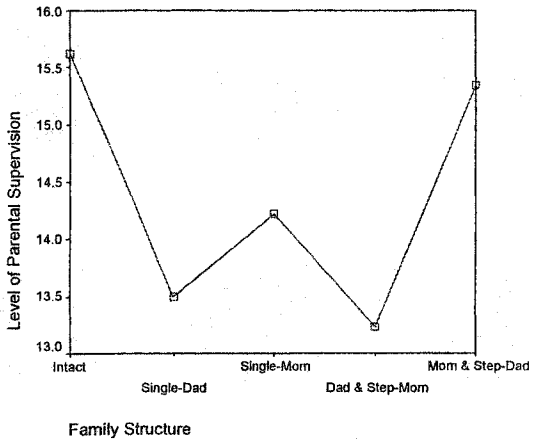


Figure 4. Mean parental supervision scores as a function of family structure.

Table 7

Mean Parental Supervision Scores as a Function of Family Structure and School Level

Family Type	School Level	Mean	Std. Deviation	N
Intact	Junior High	16.5000	3.35616	814
	Senior High	14.3924	3.93581	581
Single-father	Junior High	14.2581	3.91551	31
	Senior High	12.5600	4.68224	25
Single-mother	Junior High	14.7582	3.58123	182
	Senior High	13.3039	4.63048	102
Father & Step-mother	Junior High	13.3333	3.44656	12
	Senior High	13.0769	4.07148	13
Mother & Step-father	Junior High	15.7458	3.78560	59
	Senior High	14.7500	3.62859	40

Multivariate Analysis of Variance (MANOVA) was run between family structure and heavy drinking, marijuana use, and illicit drug use. The MANOVA revealed a main effect of family structure on substance use, $F(12, 4770)=2.94$, $p<.001$, according to Pillai's Trace. Significant differences were found between adolescents from the five family types on the mean frequency of all three forms of substance use [$F(4, 1590)=4.389$, $p<.01$, $F(4, 1590)=4.749$, $p<.01$, and $F(4, 1590)=3.687$, $p<.01$ respectively] (See Table 8 for means and Figure 5 for a graph of the means). According to multiple comparisons, adolescents from intact families, who were found to have the lowest frequency of heavy drinking, were found to have participated in heavy drinking significantly less than those from single-father ($p<.05$) and single-mother families ($p<.05$). Those from intact families were also found to have lower mean marijuana use rates than those from mother and step-father ($p<.01$) and single-mother families ($p<.05$). The differences in mean marijuana use were greater between intact families and both single-father and father and step-mother families, but they were not found to be significant differences, likely due to the comparatively small number of adolescents living in these types of families. Finally, adolescents from intact families were found to have the lowest mean rate of illicit drug use. They were found to have a significantly lower mean rate of illicit drug use than those from mother and step-father families ($p<.05$), and the difference between their mean illicit drug use rate approached significance when compared with those from single-father families ($p=.094$).

A second MANOVA was run, with family structure, school level, and the three substance use behaviours, to determine if school level was an influential factor

Table 8

Mean Frequency of Substance Use as a Function of Family Structure

	Family Type	Mean	Std. Deviation	N
Heavy Drinking	Intact	1.6755	.84362	1171
	Single-father	2.0185	.85761	54
	Single-mother	1.8560	.85621	257
	Father & Step-mother	1.8333	.86811	24
	Mother & Step-father	1.7978	.90679	89
Marijuana Use	Intact	1.3467	.69383	1171
	Single-father	1.5000	.81842	54
	Single-mother	1.4864	.74004	257
	Father & Step-mother	1.5000	.83406	24
	Mother & Step-father	1.6067	.80648	89
Illicit Drug Use	Intact	1.1341	.43555	1171
	Single-father	1.2963	.69035	54
	Single-mother	1.1634	.46409	257
	Father & Step-mother	1.2500	.67566	24
	Mother & Step-father	1.2809	.63940	89

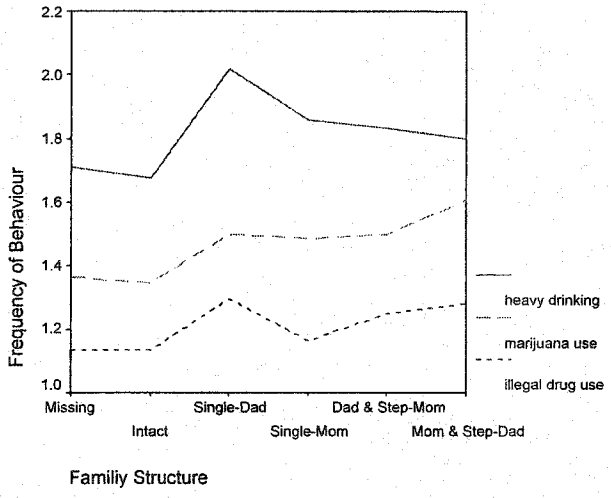


Figure 5. Mean frequency of substance use as a function of family structure.

(See Table 9 for means). The effect of the interaction between family structure and school level was not significant for adolescent substance use, $F(12, 4740)=1.006$, n.s..

In summary, adolescents from intact families were found to have reported lower frequencies of heavy drinking and marijuana use than those from single-mother families, lower frequencies of marijuana and illicit drug use than those from mother and step-father families, and lower levels of heavy drinking than those from single-father families. School level was not found to make a difference.

Research Question 2a

Are there differences between adolescents' perceived levels of family functioning in the levels of supervision they perceive receiving from their parents?

Analysis of Variance (ANOVA) was run between family functioning and the parental supervision scale. Significant differences were found between the three levels of functioning on their mean levels of parental supervision, $F(2, 1989)=66.046$, $p<.001$ (See Table 10 for means and Figure 6 for a graph of the means). The Tukey method of multiple comparisons was run, and it was determined that each of the three levels of functioning resulted in significantly different levels of parental supervision. Adolescents from highly functioning families reported receiving the highest levels of supervision, followed by those from moderately functioning families, and finally those from poorly functioning families. The greatest differences in supervision were therefore between those from highly and poorly functioning families ($p<.001$). Although the difference between the amounts of perceived supervision in moderately and highly functioning families was significant ($p<.001$), the difference was less than between moderately and poorly functioning families ($p<.001$).

Table 9

Mean Frequency of Substance Use as a Function of Family Structure and School Level

	Family Type	School Level	Mean	Std. Deviation	N
Heavy Drinking	Intact	Junior High	1.3943	.68050	662
		Senior High	2.0455	.89438	506
	Single-father	Junior High	1.6207	.77523	29
		Senior High	2.4800	.71414	25
	Single-mother	Junior High	1.5796	.76901	157
		Senior High	2.2828	.80863	99
	Father & Step-mother	Junior High	1.4545	.68755	11
		Senior High	2.1667	.93744	12
	Mother & Step-father	Junior High	1.4340	.74703	53
		Senior High	2.3333	.86189	36
Marijuana Use	Intact	Junior High	1.1420	.44798	662
		Senior High	1.6126	.85142	506
	Single-father	Junior High	1.3793	.77523	29
		Senior High	1.6400	.86023	25
	Single-mother	Junior High	1.3312	.65426	157
		Senior High	1.7172	.79591	99
	Father & Step-mother	Junior High	1.1818	.60302	11
		Senior High	1.8333	.93744	12
	Mother & Step-father	Junior High	1.3019	.60717	53
		Senior High	2.0556	.86005	36
Illicit Drug Use	Intact	Junior High	1.0529	.27818	662
		Senior High	1.2411	.56391	506
	Single-father	Junior High	1.2069	.61987	29
		Senior High	1.4000	.76376	25
	Single-mother	Junior High	1.1083	.38530	157
		Senior High	1.2424	.55496	99
	Father & Step-mother	Junior High	1.1818	.60302	11
		Senior High	1.3333	.77850	12
	Mother & Step-father	Junior High	1.1698	.46969	53
		Senior High	1.4444	.80868	36

Table 10

Mean Parental Supervision Scores as a Function of Family Functioning

Family Type	Mean	Std. Deviation	N
High Functioning	17.0000	3.13112	205
Moderate Functioning	15.3586	3.77178	1567
Low Functioning	12.8996	4.50764	229

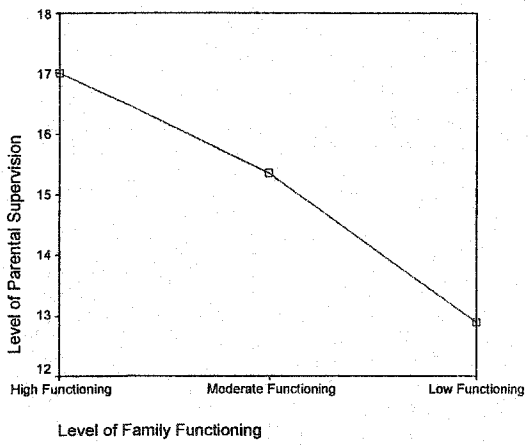


Figure 6. Mean parental supervision scores as a function of family functioning.

School level was found to make no difference ($F<1$) when an ANOVA was run to check for interaction effects between school level and family functioning for parental supervision (See Table 11 for means).

In summary, adolescents from the highest functioning families reported more supervision than those from moderate functioning families, who reported more supervision than those from low functioning families. School level was not found to make a difference.

Research Question 2b

Are there differences between adolescents' perceived levels of family functioning in their levels of reported past year substance use?

Multivariate Analysis of Variance (MANOVA) was run between family functioning and heavy drinking, marijuana use, and illicit drug use. The MANOVA showed a main effect of family functioning on adolescent substance use, $F(6, 3418)=16.246$, $p<.001$, according to Pillai's Trace. Significant differences were found between adolescents from the three levels of family functioning on the mean frequency of all three forms of substance use [$F(2, 1710)=13.434$, $p<.001$, $F(2, 1710)=28.452$, $p<.001$, and $F(2, 1710)=44.843$, $p<.001$ respectively] (See Table 12 for the means and Figure 7 for a graph of the means). Multiple comparisons showed that, for all three substance use behaviours, there were no significant differences between those who came from highly versus moderately functioning families. However, there were significant differences between highly and poorly functioning families, as well as between moderately and poorly functioning families for heavy drinking ($p<.001$ and $p<.001$ respectively), marijuana use ($p<.001$ and $p<.001$), and illicit drug use ($p<.001$ and $p<.001$).

Table 11

Mean Parental Supervision Scores as a Function of Family Functioning and School Level

Family Type	School Level	Mean	Std. Deviation	N
High Functioning	Junior High	17.5115	2.99837	131
	Senior High	16.0946	3.17598	74
Moderate Functioning	Junior High	16.0568	3.44900	950
	Senior High	14.3028	4.00430	611
Low Functioning	Junior High	13.8785	4.37555	107
	Senior High	12.0410	4.46362	122

Table 12

Mean Frequency of Substance Use as a Function of Family Functioning

	Family Type	Mean	Std. Deviation	N
Heavy Drinking	High Functioning	1.5813	.83532	160
	Moderate Functioning	1.6982	.84336	1332
	Low Functioning	1.9864	.89178	221
Marijuana Use	High Functioning	1.2500	.60397	160
	Moderate Functioning	1.3521	.68682	1332
	Low Functioning	1.7149	.87136	221
Illicit Drug Use	High Functioning	1.1063	.39806	160
	Moderate Functioning	1.1134	.40460	1332
	Low Functioning	1.4253	.72619	221

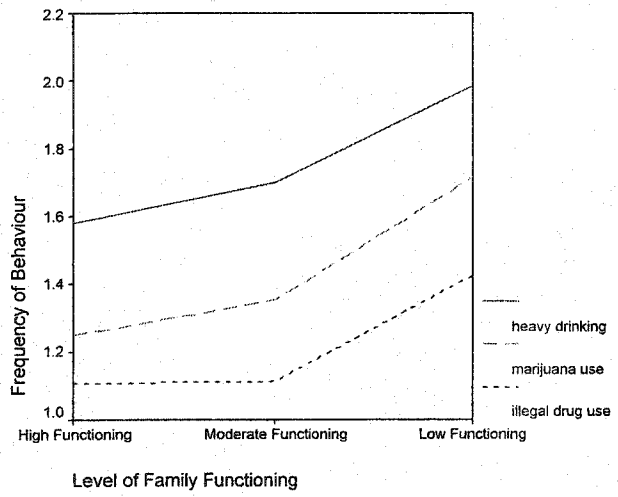


Figure 7. Mean frequency of substance use as a function of family functioning.

When a second MANOVA was run to include school level, no significant interactions were found between school level and family functioning for adolescent substance use, $F(6, 3400)=1.745$,n.s. (See Table 13 for means). However, when the substance use behaviours were examined individually, the interaction between the two variables for illicit drug use did approach significance ($F=2.904$; $p=.055$). The variables were graphed, and it appeared that adolescents from low functioning families were more likely to use illicit drugs, and this appeared to be even more the case for senior high school students (Figure 8). The Tukey test provided no further illumination on this matter, showing only that both junior and senior high students used illicit drugs with greater frequency when they came from low functioning homes compared to moderate or high functioning ones (for junior high students, $p<.01$ when adolescents from low functioning families were compared to both high and moderate, and for senior high students, $p<.001$ for both comparisons).

In summary, adolescents from high or moderate functioning families participated in heavy drinking, marijuana use, and illicit drug use significantly less than those from low functioning families. School level made no significant difference, but for illicit drug use, the effect of school level did approach significance quite closely. Although junior high and senior high school students from low functioning families were more likely to use illicit drugs, high school students were especially more likely.

Table 13

Mean Frequency of Substance Use as a Function of Family Functioning and School Level

	Family Type	School Level	Mean	Std. Deviation	N
Heavy Drinking	High Functioning	Junior High	1.2857	.62590	98
		Senior High	2.0484	.91306	62
	Moderate Functioning	Junior High	1.4293	.70197	785
		Senior High	2.0887	.87954	541
	Low Functioning	Junior High	1.6602	.81112	103
		Senior High	2.2712	.86391	118
Marijuana Use	High Functioning	Junior High	1.1020	.36580	98
		Senior High	1.4839	.80454	62
	Moderate Functioning	Junior High	1.1758	.49711	785
		Senior High	1.6044	.82927	541
	Low Functioning	Junior High	1.4078	.74672	103
		Senior High	1.9831	.88659	118
Illicit Drug Use	High Functioning	Junior High	1.0510	.26369	98
		Senior High	1.1935	.53832	62
	Moderate Functioning	Junior High	1.0522	.27861	785
		Senior High	1.2015	.52535	541
	Low Functioning	Junior High	1.2621	.59345	103
		Senior High	1.5678	.80041	118

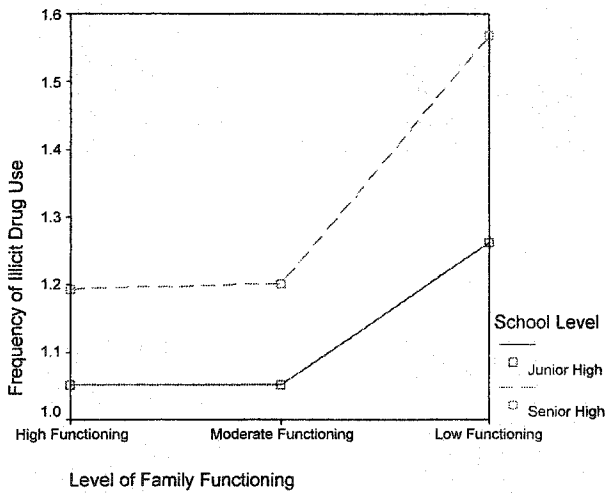


Figure 8. Mean frequency of illicit drug use as a function of family functioning and school level.

Research Question 3

Are there differences between adolescents' perceived levels of supervision in their levels of reported past year substance use?

Multivariate Analysis of Variance (MANOVA) was run between parental supervision and heavy drinking, marijuana use, and illicit drug use. The MANOVA revealed a main effect of parental supervision on adolescent substance use, $F(6, 3418)=15.864$, $p<.001$, according to Pillai's Trace. Significant differences were found between adolescents from the three levels of family functioning on the mean frequency of all three forms of substance use [$F(2, 1710)=38.314$, $p<.001$, $F(2, 1710)=32.859$, $p<.001$, and $F(2, 1710)=21.334$, $p<.001$ respectively] (See Table 14 for means and Figure 9 for a graph of the means). Multiple comparisons showed that for all three substances, there were significant differences between the most and the least supervised adolescents, the most supervised adolescents and those with moderate supervision, and the least supervised and those with moderate supervision (for all of these comparisons $p<.001$, with the exception of the comparison between the most supervised and those moderately supervised where significance was at the $p<.05$ level). The most supervised were the least likely to have taken part in each behaviour, followed by those who were moderately supervised, and then the least supervised group.

A second MANOVA was run, to determine whether school level would have any influence on these results. The MANOVA showed a significant interaction between parental supervision and school level for adolescent substance use, $F(6, 3400)=4.020$, $p<.01$. It was found that while school level did not interact with supervision for heavy drinking, $F(2, 1701)=1.037$, n.s., interaction effects were found for both marijuana use,

Table 14

Mean Frequency of Substance Use as a Function of Parental Supervision

	Family Type	Mean	Std. Deviation	N
Heavy Drinking	Most Supervision	1.3371	.63927	175
	Moderate Supervision	1.7232	.85057	1362
	Least Supervision	2.1193	.90236	176
Marijuana Use	Most Supervision	1.1086	.40781	175
	Moderate Supervision	1.3833	.70993	1362
	Least Supervision	1.7159	.87438	176
Illicit Drug Use	Most Supervision	1.0457	.23531	175
	Moderate Supervision	1.1410	.44945	1362
	Least Supervision	1.3523	.69348	176

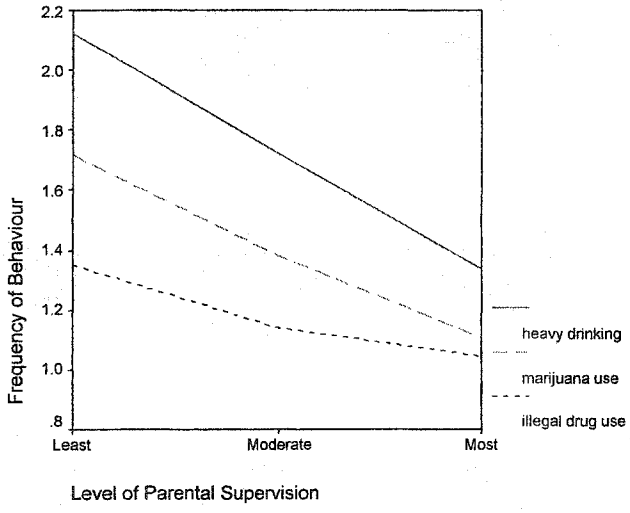


Figure 9. Mean frequency of substance use as a function of parental supervision.

$F(2, 1701)=3.752$, $p<.05$ and illicit drug use, $F(2, 1701)=8.172$, $p<.001$ (See Table 15 for means). The variables were graphed to determine where the differences occurred. For marijuana, it appeared that for both junior and senior high school students, the frequency of use was less with increasing amounts of supervision. Frequency of use was the most similar for the two school levels when adolescents were the most supervised. The gap between the two levels widened when adolescents received moderate supervision, and to an even greater extent when adolescents received the least amount of supervision (See Figure 10). When multiple comparisons were run, no difference was found between the school levels. Both junior high and senior high students used marijuana with greater frequency when they came from the least supervised homes compared to moderate ones ($p<.05$ and $p<.01$ respectively for junior and senior high school students) and when they came from moderate compared to the most supervised homes ($p<.001$ for both). For illicit drug use, it appeared (based on the graph) that there was very little difference in use among junior high students for the different levels of supervision. When supervision was highest, senior high school students had the same mean frequency as junior high students, but again the gap widened as the level of supervision decreased (See Figure 11). When Tukey was run, no difference was found among junior high students for the different levels of supervision, but senior high students used illicit drugs with significantly greater frequency when they came from the least supervised homes compared to moderate or the most supervised ones ($p<.001$ for both comparisons).

In summary, those from the most supervised families reported significantly lower frequencies of all three substance use behaviours compared to those from moderately supervised families, who were found to have reported lower frequencies than

Table 15

Mean Frequency of Substance Use as a Function of Parental Supervision

	Family Type	School Level	Mean	Std. Deviation	N
Heavy Drinking	Most Supervision	Junior High	1.2077	.47733	130
		Senior High	1.7111	.86923	45
	Moderate Supervision	Junior High	1.4467	.71182	788
		Senior High	2.1074	.87936	568
	Least Supervision	Junior High	1.7941	.90700	68
		Senior High	2.3241	.84088	108
Marijuana Use	Most Supervision	Junior High	1.0692	.30975	130
		Senior High	1.2222	.59882	45
	Moderate Supervision	Junior High	1.1980	.53006	788
		Senior High	1.6373	.83707	568
	Least Supervision	Junior High	1.3676	.68903	68
		Senior High	1.9352	.90969	108
Illicit Drug Use	Most Supervision	Junior High	1.0462	.24468	130
		Senior High	1.0444	.20841	45
	Moderate Supervision	Junior High	1.0761	.34085	788
		Senior High	1.2306	.55522	568
	Least Supervision	Junior High	1.1029	.35153	68
		Senior High	1.5093	.80298	108

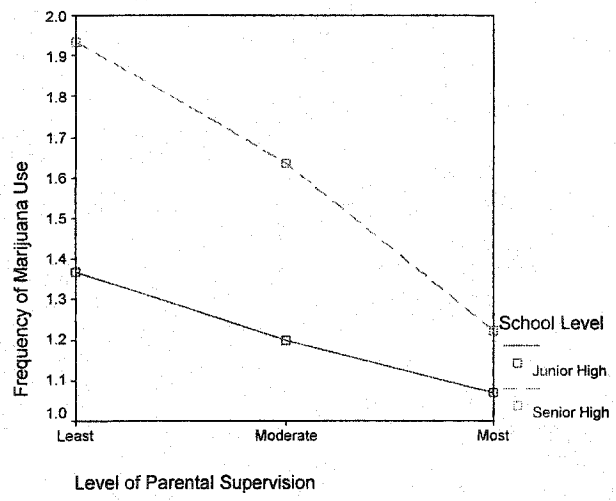


Figure 10. Mean frequency of marijuana use as a function of parental supervision and school level.

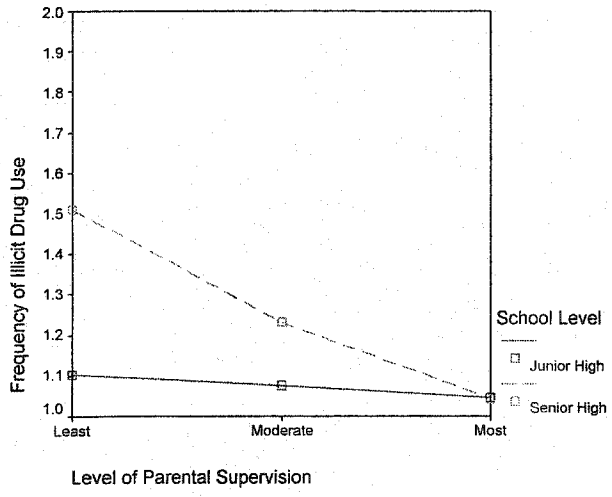


Figure 11. Mean frequency of illicit drug use as a function of parental supervision and school level.

those from families with low levels of supervision. The gap between the junior high school students and the senior high school students with regards to their frequencies of both marijuana and illicit drugs widened as supervision decreased. Junior high and senior high school students' use of marijuana and senior high students use of illicit drugs (but not junior high students' use of illicit drugs), differed based on the levels of parental supervision they received.

Research Question 4a

For adolescents' perceived levels of supervision, are there differences in the sex of the adolescents by their family structures?

A Two-way Analysis of Variance (ANOVA) was run for family structure, sex of the adolescent, and perceived levels of parental supervision. While a main effect was found for sex, $F(1, 1854)=6.492$, $p<.05$, no interaction was found between sex and family structure on parental supervision, $F<1$ (See Table 16 for means and Figure 12 for a graph of the means). When the results were plotted on a graph, it appeared that females consistently received more supervision than males, regardless of family type. The gap between males and females from different family types was fairly constant, with the possible exception of those from mother and step-father families where it appeared to be just over twice as big.

To determine if school level played a role in these results, a second ANOVA was run. No interaction, $F<1$, was found between family structure, sex, and school level for parental supervision (See Table 17 for means).

Table 16

Mean Parental Supervision Scores as a Function of Family Structure & Sex

Family Type	Adolescent's Sex	Mean	Std. Deviation	N
Intact	Male	15.0964	3.97775	643
	Female	16.0570	3.49356	755
Single-father	Male	13.0323	4.23071	31
	Female	14.0880	4.44335	25
Single-mother	Male	13.8051	3.78991	118
	Female	14.5150	4.19962	167
Father & Step-mother	Male	13.1176	3.90324	17
	Female	13.4444	3.28295	9
Mother & Step-father	Male	13.8125	4.17703	32
	Female	16.0746	3.29515	67

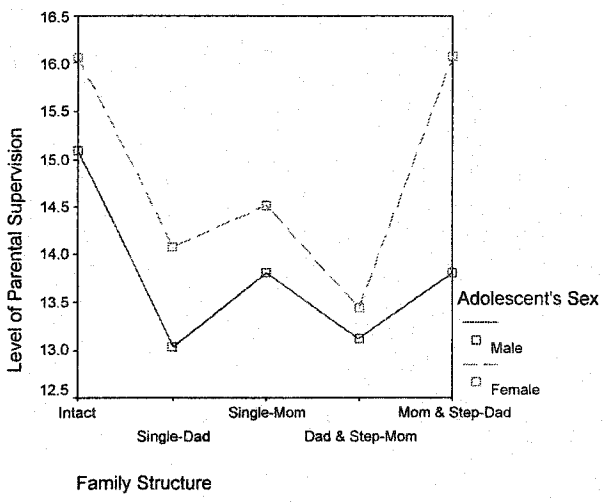


Figure 12. Mean parental supervision scores as a function of family structure and sex.

Table 17

Mean Parental Supervision Scores as a Function of Family Structure, Sex & School Level

Family Type	Adolescent's Sex	School Level	Mean	Std. Deviation	N
Intact	Male	Junior High	16.0318	3.44084	377
		Senior High	13.7774	4.31078	265
	Female	Junior High	16.9039	3.23114	437
		Senior High	14.9082	3.51610	316
Single-father	Male	Junior High	13.1667	4.20434	18
		Senior High	12.8462	4.43182	13
	Female	Junior High	15.7692	3.00427	13
		Senior High	12.2500	5.11904	12
Single-mother	Male	Junior High	14.5125	3.44943	80
		Senior High	12.3784	4.11873	37
	Female	Junior High	14.9510	3.68668	102
		Senior High	13.8308	4.84951	65
Father & Step-mother	Male	Junior High	13.2500	3.95511	8
		Senior High	12.8750	4.35685	8
	Female	Junior High	13.5000	2.64575	4
		Senior High	13.4000	4.03733	5
Mother & Step-father	Male	Junior High	14.0526	4.30082	19
		Senior High	13.4615	4.13552	13
	Female	Junior High	16.5500	3.27344	40
		Senior High	15.3704	3.25987	27

In summary, when the sex of the adolescents by their family structures was examined, no differences were found for the levels of supervision. This was the case for both junior and senior high school students.

Research Question 4b

For the adolescents' reported levels of past year substance use, are there differences in the sex of the adolescents by their family structures?

A Multivariate Analysis of Variance (MANOVA) was run for family structure, sex of the adolescent, and reported past year substance use. No significant interaction was found between family structure and sex for substance use [$F<1$ according to Pillai's Trace], heavy drinking ($F=1.517$, n.s.), marijuana or illicit drug use ($F<1$ for both) (See Tables 18-20 for means and Figure 13 for a graph of the means). However, as a graph of the means shows, for heavy drinking, females in single-father and father and step-mother families had higher mean frequencies than males, and males in mother and step-father families had a higher mean frequency than females. Males in mother and step-father families also appear to have a higher mean frequency of marijuana use compared to females. While the Tukey test could not compare the two sexes, comparisons did show that, compared to females in intact homes, those from single-father families ($p<.05$) participated in heavy drinking more frequently. Males in mother and step-father families were found to use marijuana more frequently than those from intact families ($p<.05$).

In order to determine whether school level played any role in these results, a second MANOVA was run with school level in addition to the original variables. According to the MANOVA, there was no significant interaction between family structure, sex, and school level for adolescent substance use, $F(12, 4710)=1.437$,

Table 18

Mean Heavy Drinking Scores as a Function of Family Structure & Sex

Family Type	Adolescent's Sex	Mean	Std. Deviation	N
Intact	Male	1.7013	.84995	559
	Female	1.6520	.83780	612
Single-father	Male	1.8667	.81931	30
	Female	2.2083	.88363	24
Single-mother	Male	1.8824	.87080	102
	Female	1.8387	.84886	155
Father & Step-mother	Male	1.7500	.85635	16
	Female	2.0000	.92582	8
Mother & Step-father	Male	2.0333	.92786	30
	Female	1.6780	.87967	59

Table 19

Mean Marijuana Use Scores as a Function of Family Structure & Sex

Family Type	Adolescent's Sex	Mean	Std. Deviation	N
Intact	Male	1.3864	.72406	559
	Female	1.3105	.66354	612
Single-father	Male	1.4333	.81720	30
	Female	1.5833	.82970	24
Single-mother	Male	1.5784	.78899	102
	Female	1.4258	.70202	155
Father & Step-mother	Male	1.5000	.81650	16
	Female	1.5000	.92582	8
Mother & Step-father	Male	1.8000	.84690	30
	Female	1.5085	.77399	59

Table 20

Mean Illicit Drug Use Scores as a Function of Family Structure & Sex

Family Type	Adolescent's Sex	Mean	Std. Deviation	N
Intact	Male	1.1592	.48050	559
	Female	1.1111	.38897	612
Single-father	Male	1.2667	.69149	30
	Female	1.3333	.70196	24
Single-mother	Male	1.1765	.45406	102
	Female	1.1548	.47183	155
Father & Step-mother	Male	1.2500	.68313	16
	Female	1.2500	.70711	8
Mother & Step-father	Male	1.3333	.66089	30
	Female	1.2542	.63227	59

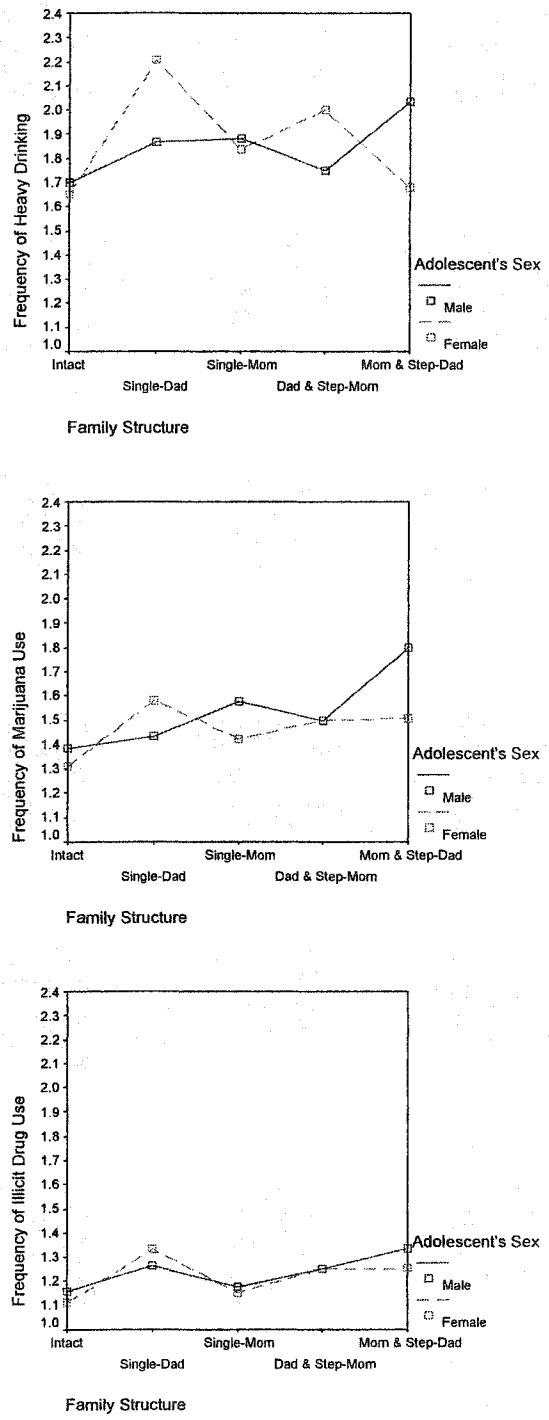


Figure 13. Mean level of substance use as a function of family structure and sex.

n.s. (See Tables 21-23 for means). It was also found that no significant interaction existed for heavy drinking, marijuana, or illicit drug use. However, the interaction approached significance for both marijuana [F(4, 1570)=2.109, p=.077] and illicit drug use [F(4, 1570)=2.057, p=.084] (for heavy drinking, F(4, 1750)=1.6666, n.s.). To determine what the trend towards interaction looked like, the variables were plotted (See Figures 14 &15). For marijuana use, mean frequencies were fairly similar for males and females in each family type for junior high school students. Females in father and step-mother homes tended to report greater frequency of use than males (it is important to interpret the means for females from father and step-mother families with caution because of the small number of females from this family type), and males from mother and step-father families tended to report greater frequency of use than females. For senior high school students, males reported greater use when they came from single-mother and father and step-mother families, as compared to females. While the Tukey test did not compare the differences in frequency between males and females, it did reveal some significant differences between family types. Junior high females from intact families used marijuana with significantly lower frequency than those from single-mother families ($p<.001$), and there is a trend towards significance between those from intact families and those from single-father families (p=.084). For junior high males, there is a trend towards those from mother and step-father families using marijuana with more frequency than those from intact families (p=.059). No significant differences were found between the family types for either senior high males or females with regard to marijuana use. According to the graphs, males in junior high school had fairly similar

Table 21

Mean Heavy Drinking Scores as a Function of Family Structure, Sex & School Level

Family Type	Adolescent's Sex	School Level	Mean	Std. Deviation	N
Intact	Male	Junior High	1.4127	.69655	315
		Senior High	2.0782	.88494	243
	Female	Junior High	1.3775	.66616	347
		Senior High	2.0152	.90364	263
Single-father	Male	Junior High	1.5882	.71229	17
		Senior High	2.2308	.83205	13
	Female	Junior High	1.6667	.88763	12
		Senior High	2.7500	.45227	12
Single-mother	Male	Junior High	1.5156	.75576	64
		Senior High	2.4865	.69208	37
	Female	Junior High	1.6237	.77899	93
		Senior High	2.1613	.85303	62
Father & Step-mother	Male	Junior High	1.2857	.48795	7
		Senior High	2.1250	.99103	8
	Female	Junior High	1.7500	.95743	4
		Senior High	2.2500	.95743	4
Mother & Step-father	Male	Junior High	1.7647	.90342	17
		Senior High	2.3846	.86972	13
	Female	Junior High	1.2778	.61464	36
		Senior High	2.3043	.87567	23

Table 22

Mean Marijuana Use Scores as a Function of Family Structure, Sex & School Level

Family Type	Adolescent's Sex	School Level	Mean	Std. Deviation	N
Intact	Male	Junior High	1.2063	.52815	315
		Senior High	1.6173	.86580	243
	Female	Junior High	1.0836	.35079	347
		Senior High	1.6084	.83953	263
Single-father	Male	Junior High	1.3529	.78591	17
		Senior High	1.5385	.87706	13
	Female	Junior High	1.4167	.79296	12
		Senior High	1.7500	.86603	12
Single-mother	Male	Junior High	1.3594	.69846	64
		Senior High	1.9189	.79507	37
	Female	Junior High	1.3118	.62517	93
		Senior High	1.5968	.77797	62
Father & Step-mother	Male	Junior High	1.0000	.00000	7
		Senior High	2.0000	.92582	8
	Female	Junior High	1.5000	1.00000	4
		Senior High	1.5000	1.00000	4
Mother & Step-father	Male	Junior High	1.5882	.71229	17
		Senior High	2.0769	.95407	13
	Female	Junior High	1.1667	.50709	36
		Senior High	2.0435	.82453	23

Table 23

Mean Illicit Drug Use Scores as a Function of Family Structure, Sex & School Level

Family Type	Adolescent's Sex	School Level	Mean	Std. Deviation	N
Intact	Male	Junior High	1.0698	.32154	315
		Senior High	1.2757	.61162	243
	Female	Junior High	1.0375	.23131	347
		Senior High	1.2091	.51503	263
Single-father	Male	Junior High	1.1176	.48507	17
		Senior High	1.4615	.87706	13
	Female	Junior High	1.3333	.77850	12
		Senior High	1.3333	.65134	12
Single-mother	Male	Junior High	1.0781	.32390	64
		Senior High	1.3243	.57995	37
	Female	Junior High	1.1290	.42287	93
		Senior High	1.1935	.53832	62
Father & Step-mother	Male	Junior High	1.0000	.00000	7
		Senior High	1.5000	.92582	8
	Female	Junior High	1.5000	1.00000	4
		Senior High	1.0000	.00000	4
Mother & Step-father	Male	Junior High	1.2353	.43724	17
		Senior High	1.4615	.87706	13
	Female	Junior High	1.1389	.48714	36
		Senior High	1.4348	.78775	23

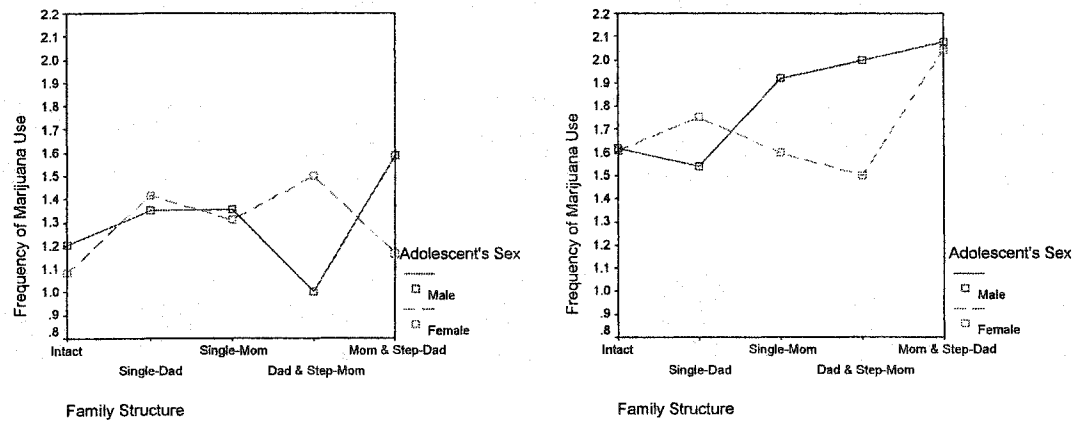


Figure 14. Mean marijuana use scores as a function of family structure, sex, and school level.

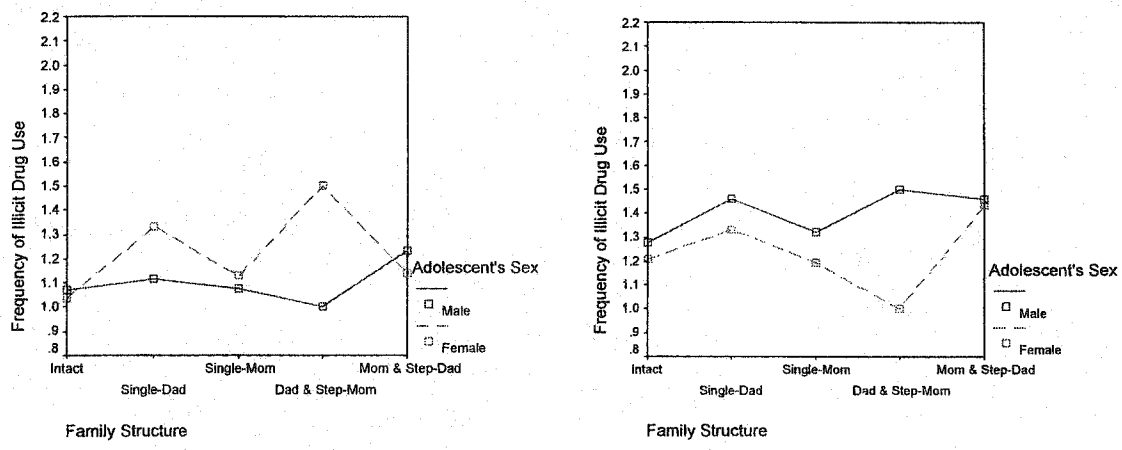


Figure 15. Mean illicit drug use scores as a function of family structure, sex, and school level.

rates of illicit drug use, regardless of family type. Junior high females, on the other hand, seemed to have higher rates of use when they were from single-father or father and step-mother families. In senior high, male illicit drug use rates were higher than in junior high, but again were fairly consistent across family types. Senior high females appeared to have a lower mean frequency of use when they were from father and step-mother families (again, few females came from father and step-mother families, so the results from females from this family type should be interpreted with care). According to multiple comparisons, junior high females reported significantly higher frequencies of illicit drugs when they came from single-father ($p<.05$) and father and step-mother ($p<.05$) families as compared to intact ones. No significant differences between the family types were found for senior high females, or males at either school level.

In summary, when sex of the adolescents by their family structures was examined, there were no significant differences found for substance use. School level did not make a significant difference, although the differences did approach significance for both marijuana and illicit drug use. Senior high males used more marijuana than females when they came from single-mother, father and step-mother, and mother and step-father families. Junior high students did not report this pattern. When multiple comparisons were run, differences were found between the sexes for junior high students only. It was found that junior high females from intact families used marijuana with less frequency than those from single-mother families and there was a trend towards the same difference between those from intact and single-father families. For junior high males, there was a trend towards those from intact families using marijuana with less frequency than those from mother and step-father families. For illicit drug use, junior high females reported

higher levels of use when they came from single-father and father and step-mother families, and senior high females did when they came from father and step-mother families (few respondents were in these categories). When multiple comparisons were run, differences between family types were found only for junior high females, with those from single-father and father and step-mother families using marijuana with greater frequency than those from intact families.

Research Question 4c

For adolescents' perceived levels of supervision, are there differences in the sex of the adolescents by their perceived levels of family functioning?

A Two-way Analysis of Variance (ANOVA) was run for family functioning, sex of the adolescent, and perceived levels of parental supervision. No interaction was found between sex and family functioning for parental supervision, $F<1$ (See Table 24 for means and Figure 16 for a graph of the means).

A second ANOVA was run, in order to include school level in the analysis. No interaction was found between family functioning, sex, and school level for parental supervision, $F<1$ (See Table 25 for means).

In summary, when the sex of the adolescents by their levels of family functioning was examined, no significant differences were found in the levels of parental supervision reported for either school level.

Research Question 4d

For the adolescents' reported levels of past year substance use, are there differences in the sex of the adolescents by their perceived levels of family functioning?

A Multivariate Analysis of Variance (MANOVA) was run for family functioning,

Table 24

Mean Parental Supervision Scores as a Function of Family Functioning & Sex

Family Functioning	Adolescent's Sex	Mean	Std. Deviation	N
High Functioning	Male	16.0000	3.34736	84
	Female	17.6942	2.78042	121
Moderate Functioning	Male	14.8435	4.01784	735
	Female	15.8145	3.48172	830
Low Functioning	Male	12.4167	4.50653	96
	Female	13.2481	4.49310	133

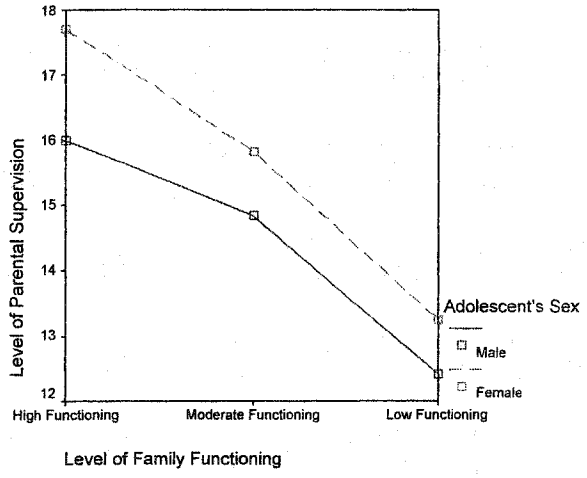


Figure 16. Mean parental supervision scores as a function of sex and family functioning.

Table 25

Mean Parental Supervision Scores as a Function of Family Functioning, Sex & School Level

Family Functioning	Adolescent's Sex	School Level	Mean	Std. Deviation	N
High Functioning	Male	Junior High	16.4464	3.26368	56
		Senior High	15.1071	3.39214	28
	Female	Junior High	18.3067	2.52540	75
		Senior High	16.6957	2.91257	46
Moderate Functioning	Male	Junior High	15.6000	3.61516	445
		Senior High	13.7003	4.33889	287
	Female	Junior High	16.4563	3.24881	504
		Senior High	14.8364	3.60612	324
Low Functioning	Male	Junior High	13.5870	3.95292	46
		Senior High	11.3400	4.74926	50
	Female	Junior High	14.0984	4.68937	61
		Senior High	12.5278	4.21925	72

sex of the adolescent, and reported past year substance use. According to Pillai's Trace, no significant interaction effect was found between family functioning and sex for adolescent substance use, $F(6, 3408)=1.815$, $p=.092$, although there was a trend towards significance (See Table 26-28 for means and Figure 17 for a graphs of the means). There were no interactions between adolescent's sex and family functioning for either heavy drinking, $F<1$ or marijuana use $F<1$, but there was for illicit drug use, $F(2,1705)=3.025$, $p<.05$. Based on the graph of the variables, males and females used illicit drugs with approximately the same frequency when they came from either highly or moderately functioning homes. However, when they came from poorly functioning homes, males were more likely to use illicit substances than females. However, according to multiple comparisons, there was no effect for sex. Both males and females used illicit drugs with significantly less frequency when they came from high or moderate functioning homes compared to low functioning ones ($p<.001$ for comparisons between low and high and low and moderate for both males and females).

A second MANOVA was then conducted to determine what involvement, if any, school level would have. According to Pillai's Trace, the interaction between family functioning, sex, and school level was not significant for adolescent substance use, $F<1$ (See Tables 29-31 for means). Furthermore, it was found that there was no interaction for heavy drinking, marijuana use, or illicit drug use ($F<1$ for all three substance use behaviours).

In summary, when the sex of the adolescents by their levels of family functioning was examined, significant differences were found for illicit drug use. When they came from either high or moderate functioning homes, males and females used illicit

Table 26

Mean Heavy Drinking Scores as a Function of Family Functioning & Sex

Family Functioning	Adolescent's Sex	Mean	Std. Deviation	N
High Functioning	Male	1.6349	.84818	63
	Female	1.5464	.82942	97
Moderate Functioning	Male	1.7229	.84944	646
	Female	1.6769	.83797	684
Low Functioning	Male	1.9895	.90501	95
	Female	1.9841	.88529	126

Table 27

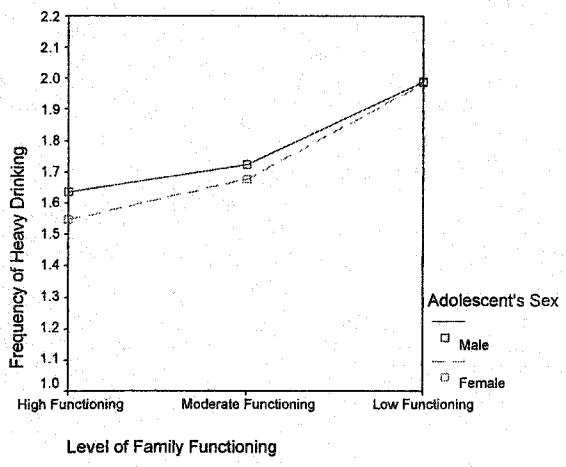
Mean Marijuana Use Scores as a Function of Family Functioning & Sex

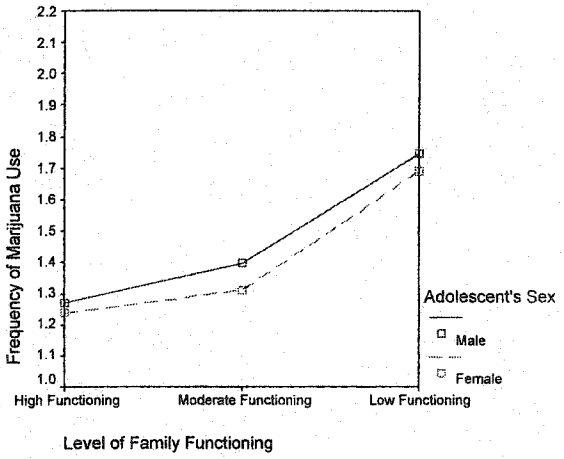
Family Functioning	Adolescent's Sex	Mean	Std. Deviation	N
High Functioning	Male	1.2698	.60124	63
	Female	1.2371	.60850	97
Moderate Functioning	Male	1.3963	.72449	646
	Female	1.3114	.64786	684
Low Functioning	Male	1.7474	.86256	95
	Female	1.6905	.88058	126

Table 28

Mean Illicit Drug Use Scores as a Function of Family Functioning & Sex

Family Functioning	Adolescent's Sex	Mean	Std. Deviation	N
High Functioning	Male	1.1111	.36417	63
	Female	1.1031	.42043	97
Moderate Functioning	Male	1.1207	.42148	646
	Female	1.1067	.38873	684
Low Functioning	Male	1.5263	.78337	95
	Female	1.3492	.67311	126





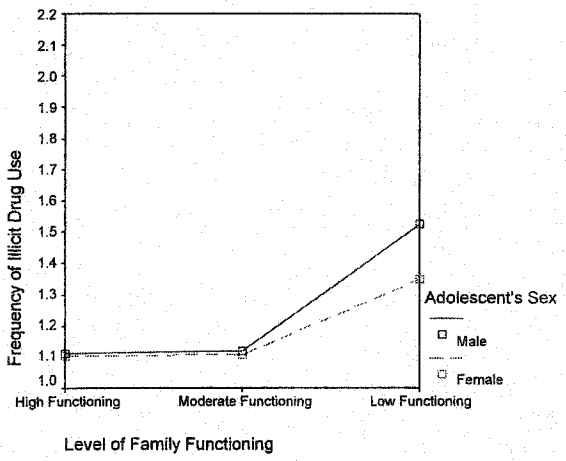


Figure 17. Mean substance use scores as a function of family functioning and sex.

Table 29

Mean Heavy Drinking Scores as a Function of Family Functioning, Sex & School Level

Family Functioning	Adolescent's Sex	School Level	Mean	Std. Deviation	N
High Functioning	Male	Junior High	1.3421	.66886	38
		Senior High	2.0800	.90921	25
	Female	Junior High	1.2500	.60014	60
		Senior High	2.0270	.92756	37
Moderate Functioning	Male	Junior High	1.4415	.70939	376
		Senior High	2.1161	.87445	267
	Female	Junior High	1.4191	.69631	408
		Senior High	2.0620	.88526	274
Low Functioning	Male	Junior High	1.6222	.83364	45
		Senior High	2.3200	.84370	50
	Female	Junior High	1.6897	.79927	58
		Senior High	2.2353	.88297	68

Table 30

Mean Marijuana Use Scores as a Function of Family Functioning, Sex & School Level

Family Functioning	Adolescent's Sex	School Level	Mean	Std. Deviation	N
High Functioning	Male	Junior High	1.1579	.43659	38
		Senior High	1.4400	.76811	25
	Female	Junior High	1.0667	.31173	60
		Senior High	1.5135	.83738	37
Moderate Functioning	Male	Junior High	1.2234	.55951	376
		Senior High	1.6330	.85846	267
	Female	Junior High	1.1324	.44016	408
		Senior High	1.5766	.80039	274
Low Functioning	Male	Junior High	1.4667	.78625	45
		Senior High	2.0000	.85714	50
	Female	Junior High	1.3621	.71814	58
		Senior High	1.9706	.91375	68

Table 31

Mean Illicit Drug Use Scores as a Function of Family Functioning, Sex & School Level

Family Functioning	Adolescent's Sex	School Level	Mean	Std. Deviation	N
High Functioning	Male	Junior High	1.0526	.22629	38
		Senior High	1.2000	.50000	25
	Female	Junior High	1.0500	.28671	60
		Senior High	1.1892	.56949	37
Moderate Functioning	Male	Junior High	1.0479	.25891	376
		Senior High	1.2210	.56183	267
	Female	Junior High	1.0564	.29618	408
		Senior High	1.1825	.48748	274
Low Functioning	Male	Junior High	1.3111	.63325	45
		Senior High	1.7200	.85809	50
	Female	Junior High	1.2241	.56330	58
		Senior High	1.4559	.74180	68

substances with approximately the same frequency, but when they came from low functioning families, males used illicit drugs with greater frequency than females. Both males and females used illicit drugs with more frequency when they came from low functioning homes, as compared to moderate or high functioning ones. School level was not found to make a difference.

Research Question 4e

For the adolescents' reported levels of past year substance use, are there differences in the sex of the adolescents by the levels of supervision they perceive receiving from parents?

A Multivariate Analysis of Variance (MANOVA) was run for parental supervision, sex of the adolescent, and reported past year substance use. The MANOVA revealed that there was no significant interaction between parental supervision and sex for adolescent substance use, $F(6, 3408)=1.141$, n.s., according to Pillai's Trace (See Tables 32-34 for means and Figure 18 for a graph of the means). Also, there were no interaction effects found between these same two variables for heavy drinking, $F<1$, marijuana use, $F<1$, or illicit drug use, $F(2, 1705)=1.846$, n.s..

A second MANOVA was run in order to determine whether school level was involved. According to Pillai's Trace, there was no interaction between parental supervision, adolescent sex, and school level for adolescent substance use, $F(6, 3386)=1.375$, n.s. (See Tables 35-37 for means). No interaction was found when the interaction was examined separately for heavy drinking, $F<1$, marijuana use, $F<1$, and illicit substance use, $F(2, 1694)=1.360$, n.s.

In summary, when the sex of the adolescents by their levels of supervision was

Table 32

Mean Heavy Drinking Scores as a Function of Parental Supervision and Sex

Parental Supervision	Adolescent's Sex	Mean	Std. Deviation	N
Most Supervision	Male	1.3684	.69774	57
	Female	1.3220	.61159	118
Moderate Supervision	Male	1.7287	.85203	645
	Female	1.7203	.85016	715
Least Supervision	Male	2.0784	.88649	102
	Female	2.1757	.92689	74

Table 33

Mean Marijuana Use Scores as a Function of Parental Supervision and Sex

Parental Supervision	Adolescent's Sex	Mean	Std. Deviation	N
Most Supervision	Male	1.1404	.44072	57
	Female	1.0932	.39196	118
Moderate Supervision	Male	1.4047	.72380	645
	Female	1.3650	.69786	715
Least Supervision	Male	1.7353	.88917	102
	Female	1.6892	.85889	74

Table 34

Mean Illicit Drug Use Scores as a Function of Parental Supervision and Sex

Parental Supervision	Adolescent's Sex	Mean	Std. Deviation	N
Most Supervision	Male	1.0526	.29405	57
	Female	1.0424	.20230	118
Moderate Supervision	Male	1.1395	.44135	645
	Female	1.1427	.45751	715
Least Supervision	Male	1.4118	.74930	102
	Female	1.2703	.60358	74

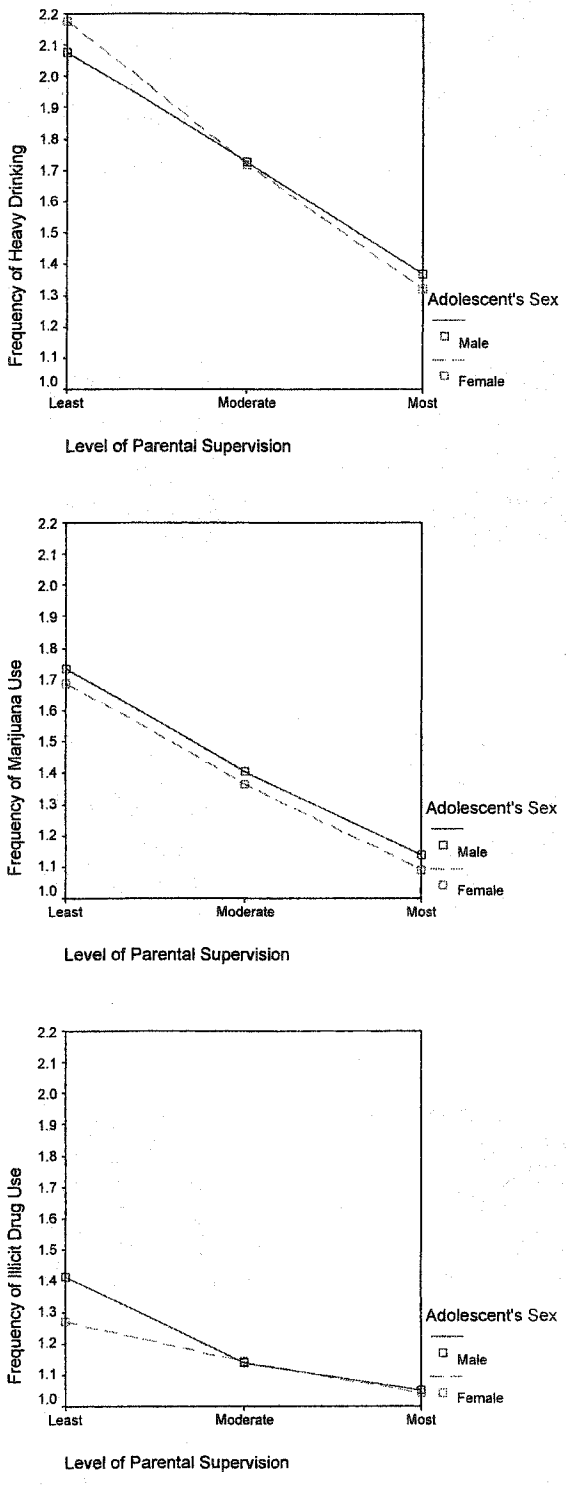


Figure 18. Mean substance use scores as a function of parental supervision and sex.

Table 35

Mean Heavy Drinking Scores as a Function of Parental Supervision, Sex & School Level

Parental Supervision	Adolescent's Sex	School Level	Mean	Std. Deviation	N
Most Supervision	Male	Junior High	1.2051	.46901	39
		Senior High	1.7222	.95828	18
	Female	Junior High	1.2088	.48342	91
		Senior High	1.7037	.82345	27
Moderate Supervision	Male	Junior High	1.4383	.70674	381
		Senior High	2.1494	.87084	261
	Female	Junior High	1.4557	.71785	406
		Senior High	2.0682	.88706	307
Least Supervision	Male	Junior High	1.8205	.91398	39
		Senior High	2.2381	.83694	63
	Female	Junior High	1.7586	.91242	29
		Senior High	2.4444	.84087	45

Table 36

Mean Marijuana Use Scores as a Function of Parental Supervision, Sex & School Level

Parental Supervision	Adolescent's Sex	School Level	Mean	Std. Deviation	N
Most Supervision	Male	Junior High	1.1538	.43155	39
		Senior High	1.1111	.47140	18
	Female	Junior High	1.0330	.23336	91
		Senior High	1.2963	.66880	27
Moderate Supervision	Male	Junior High	1.2310	.56119	381
		Senior High	1.6513	.84869	261
	Female	Junior High	1.1675	.49842	406
		Senior High	1.6254	.82826	307
Least Supervision	Male	Junior High	1.4359	.75376	39
		Senior High	1.9206	.92111	63
	Female	Junior High	1.2759	.59140	29
		Senior High	1.9556	.90342	45

Table 37

Mean Illicit Drug Use Scores as a Function of Parental Supervision, Sex & School Level

Parental Supervision	Adolescent's Sex	School Level	Mean	Std. Deviation	N
Most Supervision	Male	Junior High	1.0769	.35427	39
		Senior High	1.0000	.00000	18
	Female	Junior High	1.0330	.17954	91
		Senior High	1.0741	.26688	27
Moderate Supervision	Male	Junior High	1.0709	.31240	381
		Senior High	1.2375	.56593	261
	Female	Junior High	1.0813	.36622	406
		Senior High	1.2248	.54680	307
Least Supervision	Male	Junior High	1.1026	.38353	39
		Senior High	1.6032	.85269	63
	Female	Junior High	1.1034	.30993	29
		Senior High	1.3778	.71633	45

examined, no differences were found for substance use for either junior high or senior high students.

Research Question 5a

For the adolescents' reported levels of past year substance use are there differences in the adolescents' types of family structure by their perceived levels of family functioning?

A Multivariate Analysis of Variance (MANOVA) was run for family functioning, family structure, and reported past year substance use. The MANOVA revealed a significant interaction between family functioning and family structure for adolescent substance use, $F(24, 4740)=2.230$, $p=.001$ (See Tables 38-40 for means and Figure 19 for a graph of the means). Although no interaction was found for heavy drinking, $F(8, 1580)=1.512$, n.s., interactions were found between family structure and family functioning for both marijuana use, $F(8, 1580)=4.385$, $p<.001$, and illicit drug use $F(8, 1580)=3.309$, $p<.01$. Based on the graphs that resulted from plotting these variables, it appears that the main differences between family types took place only when the family functioned poorly. Adolescents from poorly functioning single-father and father and step-mother homes used marijuana with greater frequency than those from the other family types that were poorly functioning. Adolescents from poorly functioning single-father homes also used illicit drugs more frequently than those from other family types which also functioned poorly. Multiple comparisons could not be run for single-father families because there was only one adolescent who reported coming from a high functioning single-father family, but they were run for the other four family types to determine differences between the family types on the link between family functioning

Table 38

Mean Heavy Drinking Scores as a Function of Family Functioning and Family Structure

Family Functioning	Family Structure	Mean	Std. Deviation	N
High Functioning	Intact	1.5333	.79846	120
	Single-Father	3.0000	.	1
	Single-Mother	1.80000	.95145	20
	Father & Step-Mother	2.0000	1.41421	2
	Mother & Step-Father	1.6250	.91613	8
Moderate Functioning	Intact	1.6479	.83222	923
	Single-Father	1.9070	.81105	43
	Single-Mother	1.8646	.85761	192
	Father & Step-Mother	1.5333	.74322	15
	Mother & Step-Father	1.8088	.90203	68
Low Functioning	Intact	2.0078	.89175	128
	Single-Father	2.4000	.96609	10
	Single-Mother	1.8444	.82450	45
	Father & Step-Mother	2.4286	.78680	7
	Mother & Step-Father	1.8462	.98710	13

Table 39

Mean Marijuana Use Scores as a Function of Family Functioning and Family Structure

Family Functioning	Family Structure	Mean	Std. Deviation	N
High Functioning	Intact	1.1917	.53915	120
	Single-Father	2.0000	.	1
	Single-Mother	1.4500	.75915	20
	Father & Step-Mother	2.0000	1.41421	2
	Mother & Step-Father	1.5000	.92582	8
Moderate Functioning	Intact	1.3088	.65949	923
	Single-Father	1.3023	.67383	43
	Single-Mother	1.5104	.75882	192
	Father & Step-Mother	1.1333	.35187	15
	Mother & Step-Father	1.6029	.79438	68
Low Functioning	Intact	1.7656	.89164	128
	Single-Father	2.3000	.94868	10
	Single-Mother	1.4000	.65366	45
	Father & Step-Mother	2.1429	1.06904	7
	Mother & Step-Father	1.6923	.85485	13

Table 40

Mean Illicit Drug Use Scores as a Function of Family Functioning and Family Structure

Parental Supervision	Family Structure	Mean	Std. Deviation	N
High Functioning	Intact	1.0750	.32183	120
	Single-Father	1.0000	.	1
	Single-Mother	1.2000	.52315	20
	Father & Step-Mother	2.0000	1.41421	2
	Mother & Step-Father	1.2500	.70711	8
Moderate Functioning	Intact	1.1040	.38690	923
	Single-Father	1.1395	.46708	43
	Single-Mother	1.1302	.42033	192
	Father & Step-Mother	1.0000	.0000	15
	Mother & Step-Father	1.2353	.57608	68
Low Functioning	Intact	1.4063	.69234	128
	Single-Father	2.0000	1.05409	10
	Single-Mother	1.2889	.58861	45
	Father & Step-Mother	1.5714	.97590	7
	Mother & Step-Father	1.5385	.87706	13

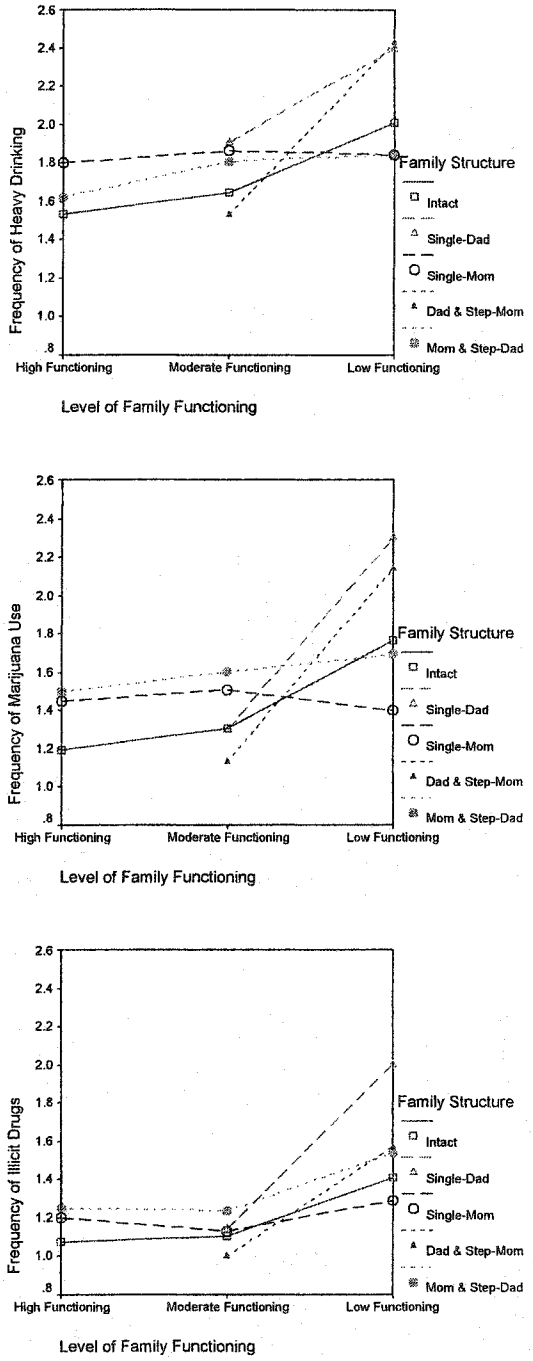


Figure 19. Mean substance use scores as a function of family functioning and family structure. Means were not plotted for adolescents who came from high functioning single-father and father and step-mother families as a result of the small number of adolescents belonging to these categories (1 and 2 adolescents respectively).

and marijuana and illicit drug use. Multiple comparisons showed that for marijuana use frequency, only adolescents from intact and father and step-mother families exhibited significant differences based on functioning, and for illicit drug use frequency, this was only the case for intact families. Adolescents from high or moderate functioning intact families used marijuana and illicit drugs with less frequency than those from low functioning intact families ($p<.001$ for both comparisons for both substances) and those from moderate functioning father and step-mother families used marijuana less frequently than those from low functioning father and step-mother families ($p<.05$).

A second MANOVA was conducted to determine if school level had any involvement. According to Pillai's Trace, there is a trend towards an interaction between family functioning, family structure, and school level for adolescent substance use, $F(18, 4683)=1.566$, $p=.060$ (See Tables 41-43 for means). When the substance use behaviours were examined individually, there was still a significant interaction for illicit drug use, $F(7, 1561)=3.498$, $p=.001$, but in this second ANOVA, the interaction was significant for heavy drinking, $F(7, 1561)=2.170$, $p<.05$, rather than for marijuana use, $F(7, 1561)=1.155$, n.s. Graphs were produced for heavy drinking and illicit drug use in order to determine where the interaction occurred (See Figure 20 & 21). The graphs must be interpreted with caution, however, because some of the groupings are very small. Means were not plotted if only one or two adolescents composed the entire category, but means that were plotted were sometimes made up of as few as four respondents. For heavy drinking, there appeared to be very little variation between the family types for junior high students. For senior high students from high functioning families, adolescents from mother and step-father families seemed to have lower heavy drinking than those

Table 41

Mean Heavy Drinking Scores as a Function of Family Functioning, Family Structure & School Level

Family Functioning	Family Structure	School Level	Mean	Std. Deviation	N
High Functioning	Intact	Junior High	1.2468	.56559	77
		Senior High	2.0465	.89850	43
	Single-Father	Junior High	3.0000	.	1
		Senior High	.	.	0
	Single-Mother	Junior High	1.4444	.88192	9
		Senior High	2.0909	.94388	11
	Father & Step-Mother	Junior High	1.0000	.	1
		Senior High	3.0000	.	1
	Mother & Step-Father	Junior High	1.7500	.95743	4
		Senior High	1.5000	1.00000	4
Moderate Functioning	Intact	Junior High	1.3865	.67499	533
		Senior High	2.0103	.89321	387
	Single-Father	Junior High	1.5000	.65938	24
		Senior High	2.4211	.69248	19
	Single-Mother	Junior High	1.5537	.75222	121
		Senior High	2.3857	.76694	70
	Father & Step-Mother	Junior High	1.5000	.75593	8
		Senior High	1.5000	.83666	6
	Mother & Step-Father	Junior High	1.4000	.70892	40
		Senior High	2.3929	.83174	28
Low Functioning	Intact	Junior High	1.6923	.80534	52
		Senior High	2.2237	.88842	76
	Single-Father	Junior High	2.0000	1.15470	4
		Senior High	2.6667	.81650	6
	Single-Mother	Junior High	1.7407	.81300	27
		Senior High	2.0000	.84017	18
	Father & Step-Mother	Junior High	1.5000	.70711	2
		Senior High	2.8000	.44721	5
	Mother & Step-Father	Junior High	1.4444	.88192	9
		Senior High	2.7500	.50000	4

Table 42

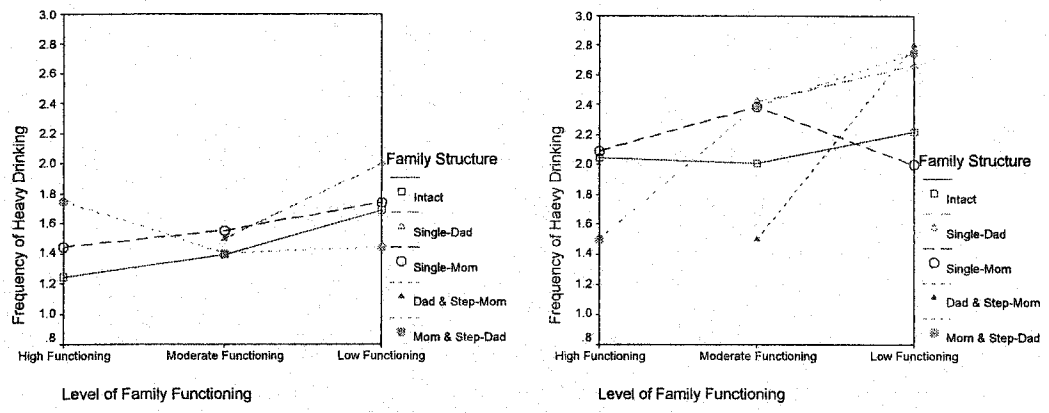
Mean Marijuana Use Scores as a Function of Family Functioning, Family Structure & School Level

Family Functioning	Family Structure	School Level	Mean	Std. Deviation	N
High Functioning	Intact	Junior High	1.0649	.24803	77
		Senior High	1.4186	.79380	43
	Single-Father	Junior High	2.0000	.	1
		Senior High	.	.	0
	Single-Mother	Junior High	1.2222	.66667	9
		Senior High	1.6364	.80904	11
	Father & Step-Mother	Junior High	1.0000	.	1
		Senior High	3.0000	.	1
	Mother & Step-Father	Junior High	1.5000	1.00000	4
		Senior High	1.5000	1.00000	4
Moderate Functioning	Intact	Junior High	1.1238	.41996	533
		Senior High	1.5607	.82594	387
	Single-Father	Junior High	1.2500	.67566	24
		Senior High	1.3684	.68399	19
	Single-Mother	Junior High	1.3471	.65461	121
		Senior High	1.7714	.83703	70
	Father & Step-Mother	Junior High	1.0000	.00000	8
		Senior High	1.3333	.51640	6
	Mother & Step-Father	Junior High	1.2750	.55412	40
		Senior High	2.0714	.85758	28
Low Functioning	Intact	Junior High	1.4423	.75182	52
		Senior High	1.9868	.91642	76
	Single-Father	Junior High	2.0000	1.15470	4
		Senior High	2.5000	.83666	6
	Single-Mother	Junior High	1.2963	.66880	27
		Senior High	1.5556	.61570	18
	Father & Step-Mother	Junior High	2.0000	1.41421	2
		Senior High	2.2000	1.09545	5
	Mother & Step-Father	Junior High	1.3333	.70711	9
		Senior High	2.5000	.57735	4

Table 43

Mean Illicit Drug Use Scores as a Function of Family Functioning, Family Structure & School Level

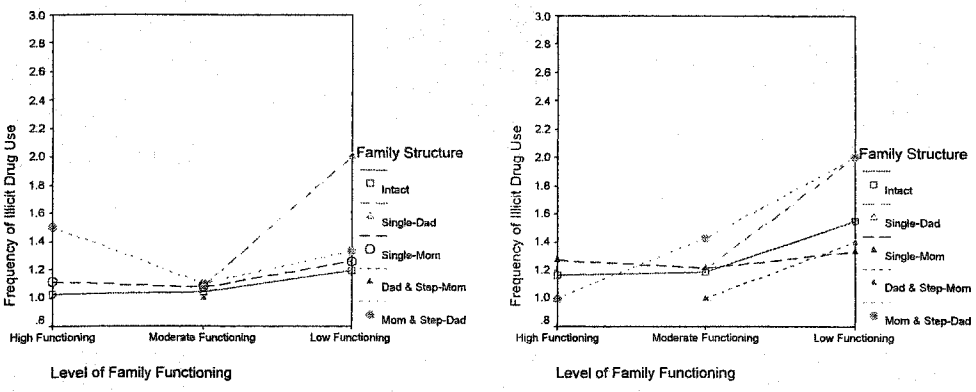
Family Functioning	Family Structure	School Level	Mean	Std. Deviation	N
High Functioning	Intact	Junior High	1.0269	.16010	77
		Senior High	1.1628	.48453	43
	Single-Father	Junior High	1.0000	.	1
		Senior High	.	.	0
	Single-Mother	Junior High	1.1111	.33333	9
		Senior High	1.2727	.64667	11
	Father & Step-Mother	Junior High	1.0000	.	1
		Senior High	3.0000	.	1
	Mother & Step-Father	Junior High	1.5000	1.00000	4
		Senior High	1.0000	.00000	4
Moderate Functioning	Intact	Junior High	1.0432	.26016	533
		Senior High	1.1886	.50189	387
	Single-Father	Junior High	1.0833	.40825	24
		Senior High	1.2105	.53530	19
	Single-Mother	Junior High	1.0744	.32055	121
		Senior High	1.2143	.53549	70
	Father & Step-Mother	Junior High	1.0000	.00000	8
		Senior High	1.0000	.00000	6
	Mother & Step-Father	Junior High	1.1000	.30382	40
		Senior High	1.4286	.79015	28
Low Functioning	Intact	Junior High	1.1923	.48662	52
		Senior High	1.5526	.77278	76
	Single-Father	Junior High	2.0000	1.15470	4
		Senior High	2.0000	1.09545	6
	Single-Mother	Junior High	1.2596	.59437	27
		Senior High	1.3333	.59409	18
	Father & Step-Mother	Junior High	2.0000	1.41421	2
		Senior High	1.4000	.89443	5
	Mother & Step-Father	Junior High	1.3333	.70711	9
		Senior High	2.0000	1.15470	4



Junior High Students

Senior High Students

Figure 20. Mean heavy drinking scores as a function of family functioning, family structure, and school level. Means were not plotted for adolescents who came from high functioning single-father (n=1) and father and step-mother families (n=2), or for the adolescents who reported low functioning in their father and step-mother family (n=2), as a result of the small number of adolescents belonging to these categories.



Junior High Students

Senior High Students

Figure 21. Mean illicit drug use scores as a function of family functioning, family structure, and school level. Means were not plotted for adolescents who came from high functioning single-father (n=1) and father and step-mother families (n=2), or for the adolescents who reported low functioning in their father and step-mother family (n=2), as a result of the small number of adolescents belonging to these categories.

from single-mother and intact families. For moderate functioning families, those from father and step-mother families seemed to have the lowest mean frequency of heavy drinking, followed by those from intact families. Those from the other three types had the highest levels of heavy drinking. This changes somewhat for low functioning families, where those from intact and single-mother families had the lowest means, and those from father and step-mother, mother and step-father, and single-father families had the highest mean heavy drinking. Multiple comparisons were run to determine whether there was a consistent link between functioning and heavy drinking and illicit drug use for each family type at each school level. Single-father families and father and step-mother families were not included in the analysis, because of too few respondents in one case, and no respondent in one group in another. For heavy drinking, the only difference that was found between junior and senior high school students was found for intact families. Junior high students from intact families participated in heavy drinking less frequently when they came from high or moderate functioning families compared to low functioning ones ($p<.001$ for both comparisons), but this was not the case for senior high students from intact families, where functioning was not linked to heavy drinking. Functioning was not linked to heavy drinking for either junior or senior high students from single-mother or mother and step-father families. When the graphs were examined for illicit drug use, some variation could be seen in junior high illicit drug use rates when they were examined according to family structure. Among high functioning families, adolescents from mother and step-father families had a higher mean than those from intact or single-mother families. Although no differences could be seen when families were moderate functioning, when they were low functioning, those from single-father

families appeared to have a higher mean than those from intact, single-mother, and mother and step-father families. Among senior high students, family types did not stand out as having higher or lower means for those from high or moderate functioning families. For those from low functioning families, single-father and mother and step-father appeared to have higher means than the other three family types. When multiple comparisons were run (again, single-father and father and step-mother families could not be run), an effect was only seen for family structure, not the interaction between structure and school level. For adolescents from intact families, adolescents from high or moderate functioning homes used illicit drugs with less frequency than those from low functioning homes (for junior high, $p<.01$ for both comparisons and for senior high, $p<.01$ when low and high functioning were compared, and $p<.001$ when moderate and low functioning were compared). Neither junior or senior high school students from the other family types reported differences in frequency of illicit drug use related to levels of functioning.

In summary, when family structure by family functioning was examined, significant differences were found for both marijuana and illicit drug use. Adolescents from low functioning single-father families reported higher frequencies of marijuana and illicit drug use, and adolescents from low functioning father and step-mother families reported a higher frequency of marijuana use compared to other family types that were also low functioning. Adolescents from high or moderate functioning intact families were found to use marijuana and illicit drugs with less frequency than those from low functioning intact families, and those from moderate functioning father and step-mother families were found to use marijuana less frequently than those from low functioning father and step-mother families. When school level was considered, there were no

significant differences for illicit drug use, but there were for both heavy drinking and marijuana use. Unfortunately, it was inconsistent which family types had higher and lower frequencies for each substance. Junior high students from high or moderate functioning intact families were found to participate in less heavy drinking than those from low functioning intact families. Both junior and senior high students from high or moderate functioning intact homes were found to use illicit drugs with less frequency than those from low functioning intact homes.

Research Question 5b

For the adolescents' reported levels of past year substance use are there differences in the adolescents' types of family structure by the levels of supervision they perceive receiving?

A Multivariate Analysis of Variance (MANOVA) was run for parental supervision, family structure, and reported past year substance use. According to Pillai's Trace, there was no significant interaction between parental supervision and family structure for adolescent substance use, $F<1$ (See Tables 44-46 for means and Figure 22 for a graph of the means). No interaction effects were found for parental supervision and family structure for any of the three specific substance use behaviours ($F<1$ for all three).

A second MANOVA was run, to determine whether school level would have any involvement. Based on this second MANOVA, it can be seen that no significant interaction exists between parental supervision, family structure, and school level for adolescent substance use, $F<1$, for heavy drinking, $F<1$, marijuana use, $F<1$, or illicit drug use, $F(7, 1562)=1.423$, n.s. (See Table 47-49 for means).

Table 44

Mean Heavy Drinking Scores as a Function of Parental Supervision and Family Structure

Parental Supervision	Family Structure	Mean	Std. Deviation	N
Most Supervision	Intact	1.3358	.63335	137
	Single-Father	1.3333	.57735	3
	Single-Mother	1.6154	.86972	13
	Father & Step-Mother	.	.	0
	Mother & Step-Father	1.3333	.65134	12
Moderate Supervision	Intact	1.6849	.84620	933
	Single-Father	2.0000	.85840	39
	Single-Mother	1.7981	.83077	213
	Father & Step-Mother	1.7647	.83137	17
	Mother & Step-Father	1.8261	.90678	69
Least Supervision	Intact	2.0495	.89862	101
	Single-Father	2.1818	.87386	11
	Single-Mother	2.3548	.87744	31
	Father & Step-Mother	2.0000	1.00000	5
	Mother & Step-Father	2.2500	1.03510	8

Table 45

Mean Marijuana Use Scores as a Function of Parental Supervision and Family Structure

Family Functioning	Family Structure	Mean	Std. Deviation	N
Most Supervision	Intact	1.0949	.38124	137
	Single-Father	1.0000	.00000	3
	Single-Mother	1.1538	.55470	13
	Father & Step-Mother	.	.	0
	Mother & Step-Father	1.3333	.65134	12
Moderate Supervision	Intact	1.3494	.69184	933
	Single-Father	1.4103	.78532	39
	Single-Mother	1.4413	.71545	213
	Father & Step-Mother	1.3529	.70189	17
	Mother & Step-Father	1.6522	.81936	69
Least Supervision	Intact	1.6634	.88631	101
	Single-Father	1.9091	.94388	11
	Single-Mother	1.9355	.81386	31
	Father & Step-Mother	1.8000	1.09545	5
	Mother & Step-Father	1.6250	.91613	8

Table 46

Mean Illicit Drug Use Scores as a Function of Parental Supervision and Family Structure

Parental Supervision	Family Structure	Mean	Std. Deviation	N
Most Supervision	Intact	1.0438	.23852	137
	Single-Father	1.0000	.00000	3
	Single-Mother	1.0000	.00000	13
	Father & Step-Mother	.	.	0
	Mother & Step-Father	1.1667	.38925	12
Moderate Supervision	Intact	1.1233	.41540	933
	Single-Father	1.3077	.69410	39
	Single-Mother	1.1455	.43702	213
	Father & Step-Mother	1.1176	.48507	17
	Mother & Step-Father	1.2754	.63903	69
Least Supervision	Intact	1.3564	.68679	101
	Single-Father	1.3636	.80904	11
	Single-Mother	1.3548	.66073	31
	Father & Step-Mother	1.4000	.89443	5
	Mother & Step-Father	1.5000	.92582	8

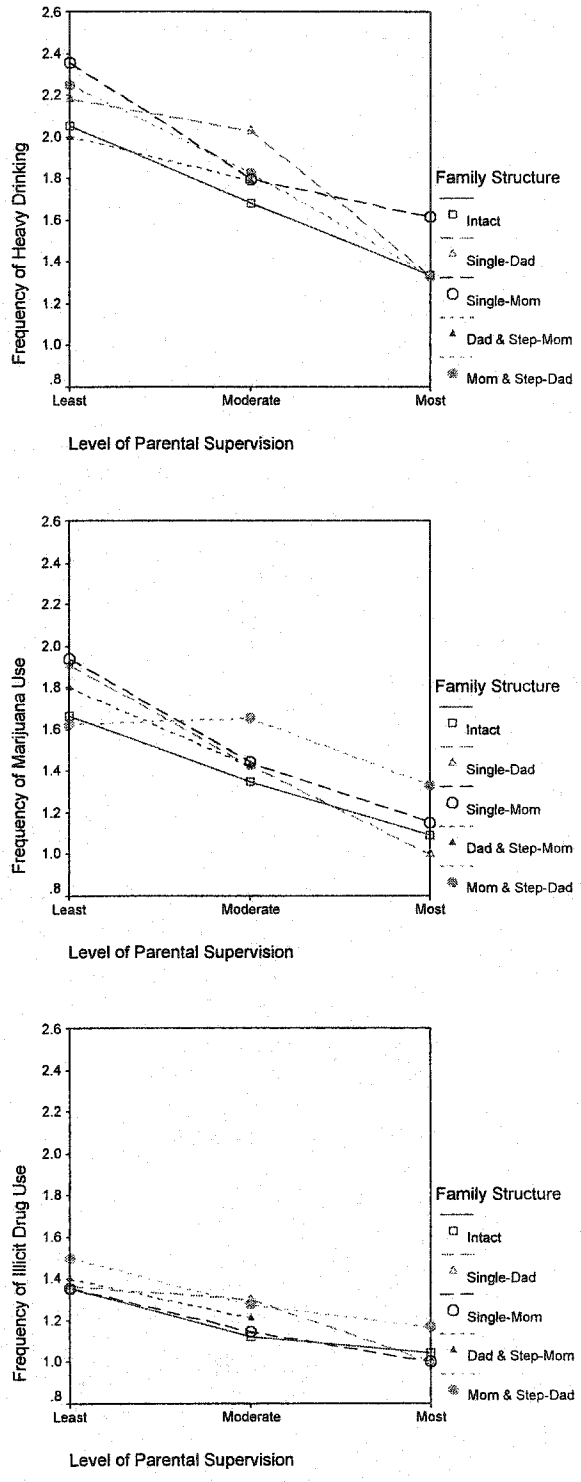


Figure 22. Mean substance use scores as a function of parental supervision and family structure.

Table 47

Mean Heavy Drinking Scores as a Function of Parental Supervision, Family Structure & School Level

Parental Supervision	Family Structure	School Level	Mean	Std. Deviation	N
Most Supervision	Intact	Junior High	1.2115	.47609	104
		Senior High	1.7273	.87581	33
	Single-Father	Junior High	1.0000	.	1
		Senior High	1.5000	.70711	2
	Single-Mother	Junior High	1.4444	.72648	9
		Senior High	2.0000	1.15470	4
	Father & Step-Mother	Junior High	.	.	0
		Senior High	.	.	0
	Mother & Step-Father	Junior High	1.1250	.35355	8
		Senior High	1.7500	.95743	4
Moderate Supervision	Intact	Junior High	1.4019	.68425	520
		Senior High	2.0463	.89568	410
	Single-Father	Junior High	1.6667	.76139	24
		Senior High	2.5625	.72744	16
	Single-Mother	Junior High	1.5474	.74726	137
		Senior High	2.2400	.78568	75
	Father & Step-Mother	Junior High	1.4444	.72648	9
		Senior High	2.1111	.92796	9
	Mother & Step-Father	Junior High	1.4390	.74326	41
		Senior High	2.3929	.83174	28
Least Supervision	Intact	Junior High	1.7895	.90518	38
		Senior High	2.2063	.86432	63
	Single-Father	Junior High	1.5000	1.00000	4
		Senior High	2.5714	.53452	7
	Single-Mother	Junior High	2.0909	.94388	11
		Senior High	2.5000	.82717	20
	Father & Step-Mother	Junior High	1.5000	.70711	2
		Senior High	2.3333	1.15470	3
	Mother & Step-Father	Junior High	2.0000	1.15470	4
		Senior High	2.5000	1.00000	4

Table 48

Mean Marijuana Use Scores as a Function of Parental Supervision, Family Structure & School Level

Parental Supervision	Family Structure	School Level	Mean	Std. Deviation	N
Most Supervision	Intact	Junior High	1.0577	.27260	104
		Senior High	1.2121	.59987	33
	Single-Father	Junior High	1.0000	.	1
		Senior High	1.0000	.00000	2
	Single-Mother	Junior High	1.2222	.66667	9
		Senior High	1.0000	.00000	4
	Father & Step-Mother	Junior High	.	.	0
		Senior High	.	.	0
	Mother & Step-Father	Junior High	1.1250	.35355	8
		Senior High	1.7500	395743	4
Moderate Supervision	Intact	Junior High	1.1500	.46100	520
		Senior High	1.6000	.83972	410
	Single-Father	Junior High	1.2917	.69025	24
		Senior High	1.6250	.88506	16
	Single-Mother	Junior High	1.3066	.63665	137
		Senior High	1.6667	.77692	75
	Father & Step-Mother	Junior High	1.2222	.66667	9
		Senior High	1.6667	.86603	9
	Mother & Step-Father	Junior High	1.3415	.65612	41
		Senior High	2.1071	.83174	28
Least Supervision	Intact	Junior High	1.2632	.60109	38
		Senior High	1.9048	.94552	63
	Single-Father	Junior High	2.0000	1.15470	4
		Senior High	1.8571	.89974	7
	Single-Mother	Junior High	1.7273	.78625	11
		Senior High	2.0500	.82558	20
	Father & Step-Mother	Junior High	1.0000	.00000	2
		Senior High	2.3333	1.15470	3
	Mother & Step-Father	Junior High	1.2500	.50000	4
		Senior High	2.0000	1.15470	4

Table 49

Mean Illicit Drug Use Scores as a Function of Parental Supervision, Family Structure & School Level

Parental Supervision	Family Structure	School Level	Mean	Std. Deviation	N
Most Supervision	Intact	Junior High	1.0481	.25618	104
		Senior High	1.0303	.17408	33
	Single-Father	Junior High	1.0000	.	1
		Senior High	1.0000	.00000	2
	Single-Mother	Junior High	1.0000	.00000	9
		Senior High	1.0000	.00000	4
	Father & Step-Mother	Junior High	.	.	0
		Senior High	.	.	0
	Mother & Step-Father	Junior High	1.1250	.35355	8
		Senior High	1.2500	.50000	4
Moderate Supervision	Intact	Junior High	1.0519	.28311	520
		Senior High	1.2146	.52589	410
	Single-Father	Junior High	1.1667	.56466	24
		Senior High	1.5000	.81650	16
	Single-Mother	Junior High	1.1168	.40340	137
		Senior High	1.1867	.48472	75
	Father & Step-Mother	Junior High	1.2222	.66667	9
		Senior High	1.2222	.66667	9
	Mother & Step-Father	Junior High	1.1951	.51086	41
		Senior High	1.3929	.78595	28
Least Supervision	Intact	Junior High	1.0789	.27328	38
		Senior High	1.5238	.80035	63
	Single-Father	Junior High	1.5000	1.00000	4
		Senior High	1.2857	.75593	7
	Single-Mother	Junior High	1.0909	.30151	11
		Senior High	1.5000	.76089	20
	Father & Step-Mother	Junior High	1.0000	.00000	2
		Senior High	1.6667	1.15470	3
	Mother & Step-Father	Junior High	1.0000	.00000	4
		Senior High	2.0000	1.15470	4

In summary, when family structure by parental supervision was examined, no differences were found for adolescent substance use for either school level.

Research Question 6

For the adolescents' reported levels of past year substance use, are there differences in the levels of supervision that adolescents perceive receiving from parents by their perceived levels of family functioning?

A Multivariate Analysis of Variance (MANOVA) was run for family functioning, parental supervision, and reported past year substance use. The MANOVA revealed a significant interaction between family functioning and parental supervision for adolescent substance use, $F(12, 5112)=2.140$, $p<.05$, according to Pillai's Trace. No interaction effects were found for either heavy drinking, $F(4, 1704)=1.391$, n.s., or marijuana use, $F<1$, but an interaction was found between parental supervision and family functioning for illicit drug use, $F(4, 1704)=2.397$, $p<.05$ (See Tables 50-52 for means and Figure 23 for a graph of the means). Based on the graph, regardless of their levels of supervision, those from high and moderate functioning homes had very similar levels of illicit drug use frequency. When functioning was low, there was more variation. Those with the least supervision reported the highest rates, followed by those with moderate supervision, and those with the most supervision reported the lowest rates. It would also appear, based on the graph, that those from the most supervised homes used illicit drugs with approximately the same low frequency regardless of level of family functioning. Those who received a moderate amount of supervision seemed to use illicit drugs with more frequency when they came from low functioning homes as opposed to high or moderate functioning ones. Adolescents who were in the least supervised group seemed to increase

Table 50

Mean Parental Heavy Drinking Scores as a Function of Family Functioning and Parental Supervision

Family Functioning	Parental Supervision	Mean	Std. Deviation	N
High Functioning	Most Supervision	1.3889	.72812	36
	Moderate Supervision	1.6050	.84591	119
	Least Supervision	2.4000	.89443	5
Moderate Functioning	Most Supervision	1.2769	.58423	130
	Moderate Supervision	1.7106	.84233	1085
	Least Supervision	2.0513	.90826	117
Low Functioning	Most Supervision	2.0000	.70711	9
	Moderate Supervision	1.8987	.89007	158
	Least Supervision	2.2407	.8882	54

Table 51

Mean Marijuana Use Scores as a Function of Family Functioning and Parental Supervision

Family Functioning	Parental Supervision	Mean	Std. Deviation	N
High Functioning	Most Supervision	1.0556	.33333	36
	Moderate Supervision	1.2857	.63969	119
	Least Supervision	1.8000	.83666	5
Moderate Functioning	Most Supervision	1.1154	.40605	130
	Moderate Supervision	1.3548	.68618	1085
	Least Supervision	1.5897	.84235	117
Low Functioning	Most Supervision	1.2222	.66667	9
	Moderate Supervision	1.6519	.85158	158
	Least Supervision	1.9815	.90054	54

Table 52

Mean Illicit Drug Use Scores as a Function of Family Functioning and Parental Supervision

Family Functioning	Parental Supervision	Mean	Std. Deviation	N
High Functioning	Most Supervision	1.0000	.00000	36
	Moderate Supervision	1.1429	.45632	119
	Least Supervision	1.0000	.00000	5
Moderate Functioning	Most Supervision	1.0615	.27148	130
	Moderate Supervision	1.1060	.38992	1085
	Least Supervision	1.2393	.59668	117
Low Functioning	Most Supervision	1.0000	.00000	9
	Moderate Supervision	1.3797	.69215	158
	Least Supervision	1.6296	.83092	54

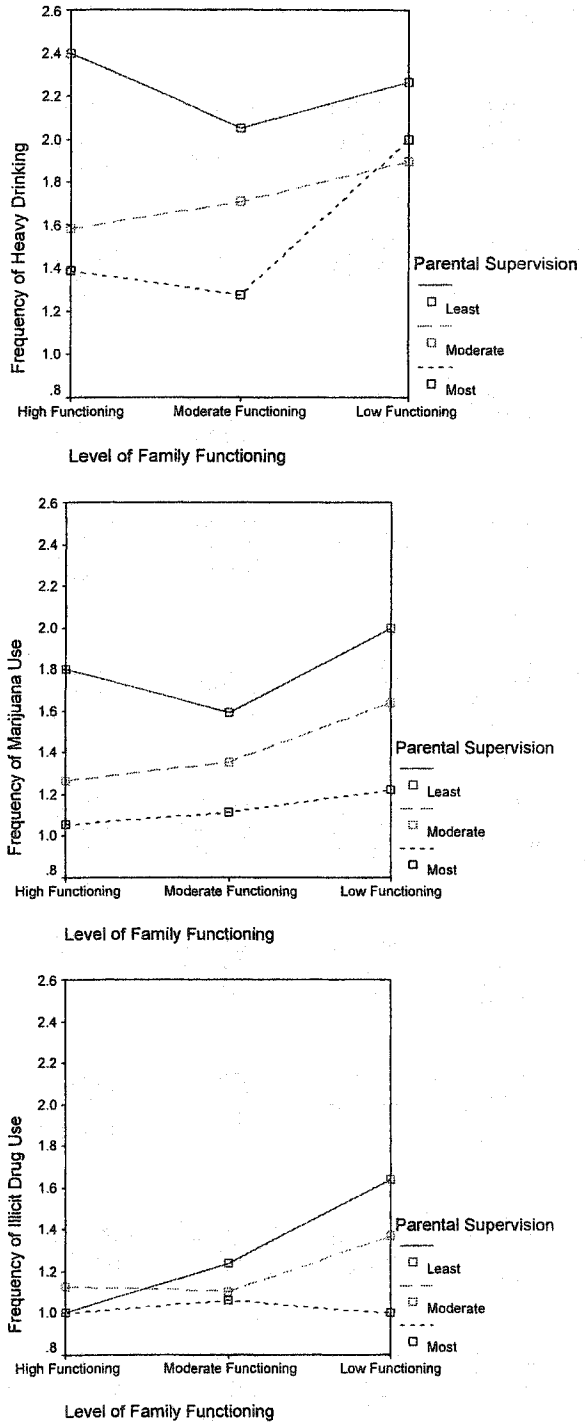


Figure 23. Mean substance use scores as a function of family functioning and parental supervision.

their use as family functioning decreased. The results of the Tukey test would generally support this interpretation. Functioning did not make a difference for adolescents with high supervision. For moderately supervised adolescents, those from high and moderate functioning families used illicit drugs less frequently than those from low functioning families ($p<.001$ for both comparisons). For the least supervised, a significant difference in frequency of use was found between those from moderate and low functioning families ($p<.01$) (only 5 adolescents received the least supervision but came from the highest functioning families, likely making the mean they reported too uncertain to reach significance).

No significant interaction could be found between family functioning, parental supervision, and school level for adolescent substance use, according to Pillai's Trace, $F<1$ (See Tables 53-55 for means). Furthermore, no interaction was found for heavy drinking, $F<1$, marijuana use, $F(4, 1689)=1.114$, n.s., or illicit drug use, $F<1$.

In summary, when parental supervision by family functioning was examined, significant differences were found for illicit drug use. Those from homes with high supervision used illicit drugs with the same low frequency regardless of family functioning, whereas those from moderately supervised homes used illicit drugs with more frequency when the came from low, as opposed to moderate or high, functioning homes. For those from homes with low supervision, illicit drug use increased as functioning decreased. No differences were found when school level was analyzed.

Regression Analysis

In order to explore the relationships between variables both directly and indirectly related to substance use, regression analysis was conducted.

Table 53

Mean Heavy Drinking Scores as a Function of Family Functioning, Parental Supervision & School Level

Family Functioning	Parental Supervision	School Level	Mean	Std. Deviation	N
High Functioning	Most Supervision	Junior High	1.2069	.55929	29
		Senior High	2.1429	.89974	7
	Moderate Supervision	Junior High	1.2879	.62672	66
		Senior High	2.0000	.91987	53
	Least Supervision	Junior High	2.0000	1.00000	3
		Senior High	3.0000	.00000	2
Moderate Functioning	Most Supervision	Junior High	1.1771	.43516	96
		Senior High	1.5588	.82356	34
	Moderate Supervision	Junior High	1.4424	.70475	642
		Senior High	2.1053	.87414	437
	Least Supervision	Junior High	1.7660	.91397	47
		Senior High	2.2429	.85864	70
Low Functioning	Most Supervision	Junior High	1.8000	.44721	5
		Senior High	2.2500	.95743	4
	Moderate Supervision	Junior High	1.6125	.80338	80
		Senior High	2.1923	.88358	78
	Least Supervision	Junior High	1.8333	.92355	18
		Senior High	2.4444	.80868	36

Table 54

Mean Marijuana Use Scores as a Function of Family Functioning, Parental Supervision & School Level

Family Functioning	Parental Supervision	School Level	Mean	Std. Deviation	N
High Functioning	Most Supervision	Junior High	1.0000	.00000	29
		Senior High	1.2857	.75593	7
	Moderate Supervision	Junior High	1.1364	.42558	66
		Senior High	1.4717	.79913	53
	Least Supervision	Junior High	1.3333	.57735	3
		Senior High	2.5000	.70711	2
Moderate Functioning	Most Supervision	Junior High	1.0938	.35772	96
		Senior High	1.1765	.52052	34
	Moderate Supervision	Junior High	1.1760	.49822	642
		Senior High	1.6133	.82624	437
	Least Supervision	Junior High	1.3404	.66844	47
		Senior High	1.7571	.90787	70
Low Functioning	Most Supervision	Junior High	1.0000	.00000	5
		Senior High	1.5000	1.00000	4
	Moderate Supervision	Junior High	1.4250	.75933	80
		Senior High	1.8846	.88245	78
	Least Supervision	Junior High	1.4444	.78382	18
		Senior High	2.2500	.84092	36

Table 55

Mean Illicit Drug Use Scores as a Function of Family Functioning, Parental Supervision & School Level

Family Functioning	Parental Supervision	School Level	Mean	Std. Deviation	N
High Functioning	Most Supervision	Junior High	1.0000	.00000	29
		Senior High	1.0000	.00000	7
	Moderate Supervision	Junior High	1.0758	.31916	66
		Senior High	1.2264	.57651	53
	Least Supervision	Junior High	1.0000	.00000	3
		Senior High	1.0000	.00000	2
Moderate Functioning	Most Supervision	Junior High	1.0625	.28331	96
		Senior High	1.0588	.23883	34
	Moderate Supervision	Junior High	1.0514	.28291	642
		Senior High	1.1854	.49767	437
	Least Supervision	Junior High	1.0426	.20403	47
		Senior High	1.3714	.72575	70
Low Functioning	Most Supervision	Junior High	1.0000	.00000	5
		Senior High	1.0000	.0000	4
	Moderate Supervision	Junior High	1.2750	.61572	80
		Senior High	1.4872	.75151	78
	Least Supervision	Junior High	1.2778	.57451	18
		Senior High	1.8056	.88864	36

The model under investigation can be seen in Figure 24. The model shows how each variable was thought to be related to substance use, in addition to how the variables that predict substance use were thought to be related to one another. Family structure, adolescent's sex, and adolescent's school level were all predicted to be related to functioning, supervision, and substance use. Functioning was predicted to be related to supervision and substance use.

In order to test this model, linear, stepwise regression was performed on family functioning and parental supervision, followed by heavy drinking, marijuana use, and illicit drug use. Dummy variables were created for being from intact families, single-father families, single-mother families, father and step-mother families, mother and step-father families, being male, and being a high school student.

Family Functioning

The five dummy variables for family structure, along with those for being male, and being a high school student, were entered into the regression. Being from an intact family was found to predict higher reported family functioning, whereas being a high school student and being from a father and step-mother family were predictive of lower reported family functioning, $F(3, 1960)=14.950$, $p<.001$; $R^2=.022$.

Parental Supervision

In this regression, the five family structure dummy variables, along with the dummy variables for being a high school student, and being male were included, with the addition of family functioning. A higher amount of the variance in parental supervision, $R^2=.185$, could be explained by the model than could be for family functioning. Reporting higher family functioning, and being from an intact family or a mother and

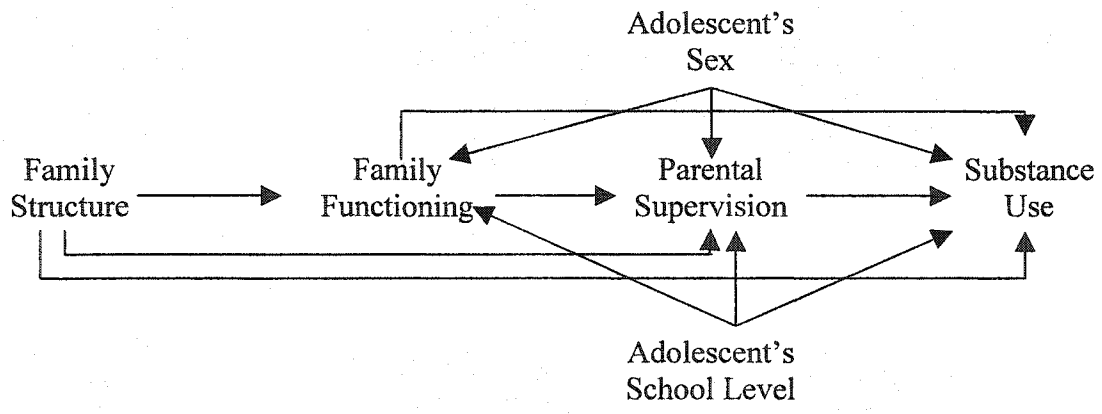


Figure 24. Original model of how family structure, family functioning, parental supervision, and adolescent's sex and school level are associated with substance use.

step-father family were found to be predictive of higher levels of reported parental supervision, and being a high school student and being male were found to predict lower parental supervision, $F(5, 1960)=88.919$, $p<.001$.

Heavy Drinking

The regression for heavy drinking included all of the dummy variables used in the previous regressions, along with family functioning and parental supervision. Approximately one-fifth of the variance was explained by the final model, $R^2=.196$. Being a high school student, along with reporting lower parental supervision and lower family functioning were found to be predictive of greater heavy drinking frequency, and being from an intact family was found to predict lower frequency $F(4, 1670)=102.059$, $p<.001$. A diagram of the final model can be seen in Figure 25.

Marijuana Use

The same variables as were used in the regression to predict heavy drinking were used in this regression. In the final model, being a high school student, reporting lower levels of parental supervision and lower levels of family functioning, and being from a mother and step-father family were found to predict greater frequency of marijuana use, $F(4, 1679)=80.255$, $p<.001$. Less variance was explained by this model, $R^2=.161$, than was explained by the model for heavy drinking. A diagram of this model can be seen in Figure 26.

Illicit Drug Use

The same variables were included in this regression as in the regression for both of the other substance use variables. However, compared to the other substance use

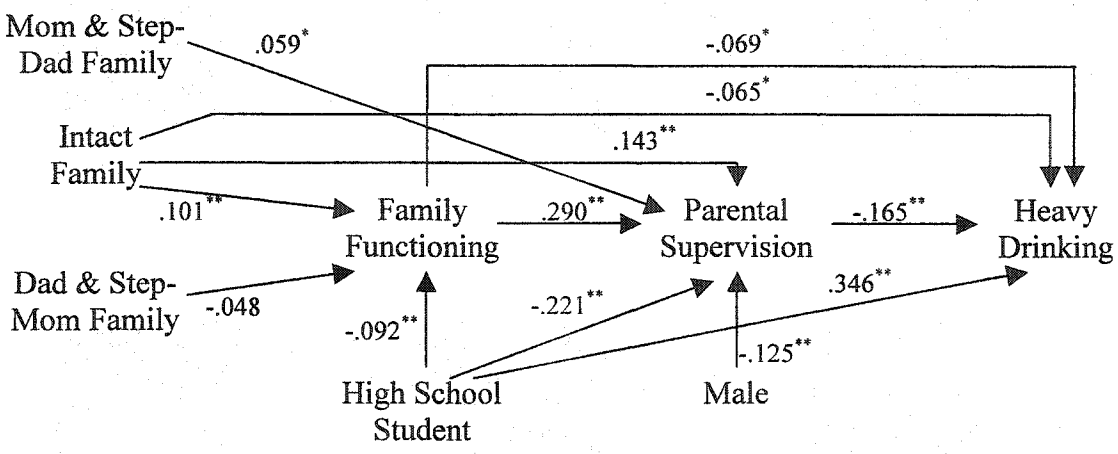


Figure 25. Model of the variables predicting heavy drinking.
*p<.01. **p<.001.

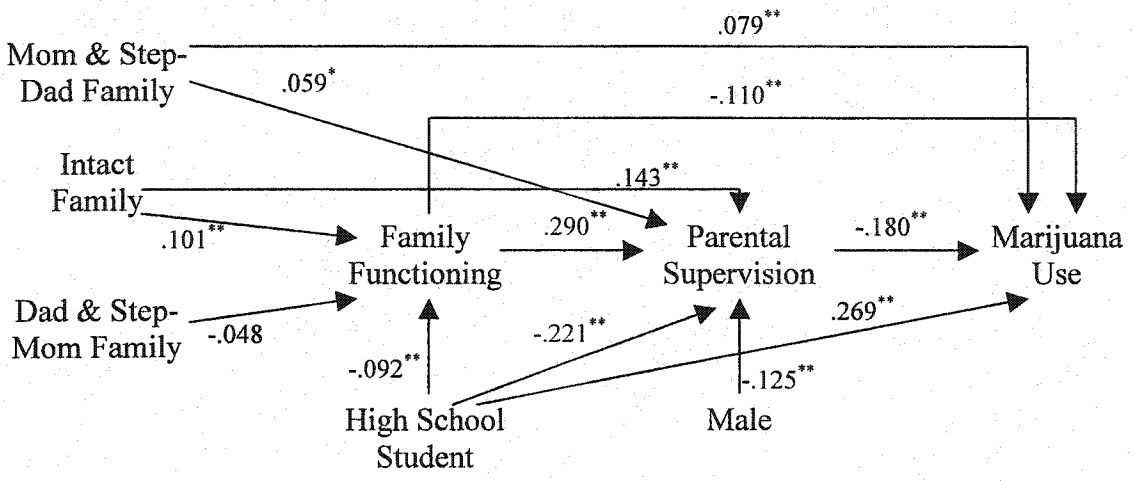


Figure 26. Model of the variables predicting marijuana use.
*p<.01. **p<.001.

regressions, less of the variance was explained by the final model, R^2=.092. Reporting lower parental supervision, being a high school student, reporting lower family functioning, and coming from a mother and step-father family were all included in the final model as being predictive of greater illicit drug use frequency, F(4, 1677)=42.239, p<.001. A diagram of this model can be seen in Figure 27.

Integration of Research Questions

While examining each research question individually is interesting, the true complexities can only be seen when the questions are examined in relation to one another. It is only through doing this that all of the direct, indirect, and moderating effects become apparent. The effects will be covered in this order.

Direct Effects

Family Structure

Family structure was found to be related to heavy drinking, marijuana use, and illicit drug use. Based on the analysis using ANOVA/MANOVA and regression, it is apparent that adolescents from non-intact family types, particularly those from single-father and single-mother families were more likely to have participated in heavy drinking with greater frequency. Those from mother and step-father families, and according to the MANOVA, single-mother families, were more likely to have used marijuana with greater frequency compared to those from intact families. Those from mother and step-father families were again more likely than those from intact families to have used illicit drugs with more frequency, and according to the MANOVA, there is a trend toward those from single-father families being more likely to do the same. Neither school level, nor sex, nor the combination of the two had a moderating effect on the relationship between family

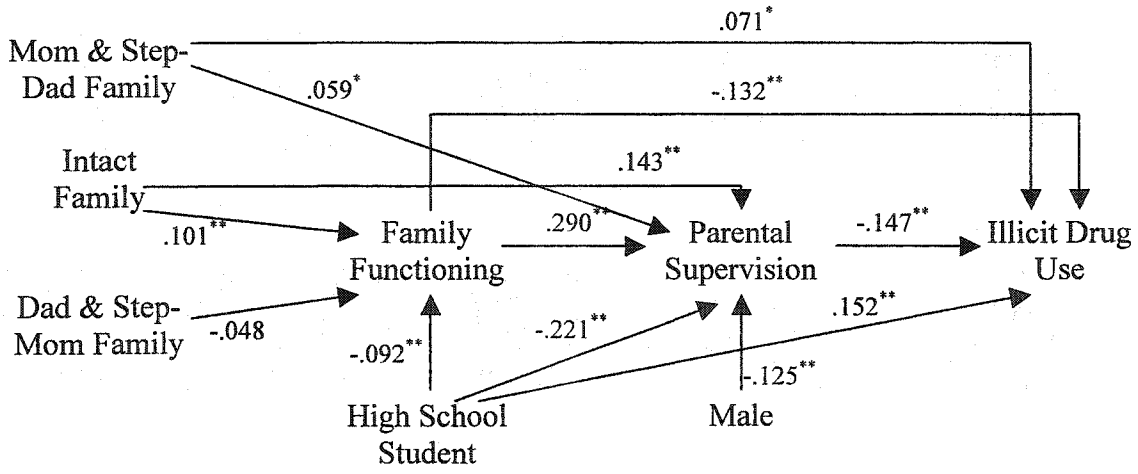


Figure 27. Model of the variables predicting illicit drug use.
*p<.01. **p<.001.

structure and substance use, although the interaction between sex and school level did approach significance for marijuana and illicit drug use. When examining the patterns for marijuana use, it appears that there is very little variation between the frequencies that males and females reported, with the exception of females from father and step-mother homes having reported greater marijuana use frequency than males. Also, compared to other females, those from single-father homes reported significantly more heavy drinking than those from intact ones, and for males, those from mother and step-father homes reported significantly more marijuana use than those from intact homes. For senior high school students, males reported greater frequencies of marijuana use than females when they came from single-mother, father and step-mother, and mother and step-father homes. When males and females from different family types were examined separately, junior high females from intact families used marijuana with less frequency than those from single-mother families, and junior high males from intact families used marijuana with less frequency than those from mother and step-father families. No differences were found for senior high students. For illicit drug use, junior high males reported relatively similar frequencies of use, regardless of family type. Junior high females, on the other hand reported greater use when they came from single-father or father and step-mother homes. As with junior high males, senior high males reported similar frequencies for each family type. However, senior high females, in contrast to their younger counterparts, reported lower illicit drug use when they were from father and step-mother families (there were, however only 4 females in each school level category from father and step-mother homes).

Family Functioning

According to the regression, adolescents who came from higher functioning families participated in heavy drinking, marijuana use, and illicit drug use less frequently. Based on the results of the MANOVA, adolescents from high and moderate functioning families were found to use substances with approximately the same frequency. However, those who came from low functioning families were found to use these substances with significantly higher frequency. School level was not found to significantly affect this relationship, although it did approach significance quite closely. Senior high school students were more likely than junior high school students to use illicit drugs with greater frequency regardless of family functioning, but when they came from poorly functioning families the likelihood increased more for senior high school students. The sex of the adolescents also impacted how functioning related to illicit drug use in a similar way. Males and females from high and moderate functioning homes used illicit drugs with approximately the same frequency. Those from poorly functioning homes used them with much greater frequency, and this was even more the case with males than females. No interaction was found between sex and school level for the relationship between functioning and substance use.

Parental Supervision

According to both the regression and the MANOVA, lower levels of parental supervision were related to greater frequency of heavy drinking, marijuana use, and illicit drug use. School level was found to be an important factor in this relationship for marijuana and illicit drug use. For marijuana use, both junior and senior high school students had lower frequencies of use when they had higher levels of supervision.

However, as the level of supervision decreased, the differences between the use by junior and senior high school students increased, with high school students using marijuana more and more frequently. For illicit drugs, there was very little difference in frequency of use for junior high students amongst the different levels of supervision. Senior high school students had the same low frequency of use as junior high students when they were highly supervised, but then the main pattern of less supervision being associated with greater substance use began to occur. The sex of the adolescent made no difference for this relationship, and neither did the sex of the adolescent combined with the school level.

Indirect Effects

Family Structure

In addition to its direct effect on substance use, family structure also had an indirect impact on substance use, through its effects on family functioning. Family structure was found to be directly related to family functioning. Those from intact families reported higher levels of functioning than those from father and step-mother, single-father, and single-mother families. According to the regression, being from an intact family was related to more positive family functioning and being from a father and step-mother family was related to lower family functioning. This was moderated by the adolescents' school level. Junior high students reported that intact families functioned highest, but all of the other family types functioned approximately the same. Senior high students reported little difference between intact, single-mother, and mother and step-father families, but reported that single-father and father and step-mother families functioned more poorly. While structure affected family functioning, family functioning

in turn affected substance use, both directly, with those from high or moderate functioning families having participated in heavy drinking less frequently and less frequently using marijuana and illicit substances, and indirectly, through its association with parental supervision. Greater levels of functioning were found to be related to greater levels of supervision, and greater levels of supervision were found to be related to lower levels of substance use.

While family structure can influence adolescent substance use through its influence on family functioning, it can also influence substance use through its influence on parental supervision. As was just described, family structure influenced parental supervision indirectly, through family functioning. Family structure was also found to be directly related to parental supervision. According to the regression, adolescents from intact families and those from mother and step-father families were more likely to have greater levels of parental supervision. The MANOVA found that adolescents from intact families had significantly higher levels of supervision than those from father and step-mother families, single-mother families, and that both intact families and mother and step-father families had higher levels of functioning than those from single-father families (the difference between mother and step-father families and single-mother families approached significance). Neither school level, sex, or the interaction between the two affected this relationship. Adolescents from intact families and mother and step-father families who had higher levels of parental supervision, in turn, used substances with less frequency, because of this indirect relationship.

Family Functioning

Family functioning was indirectly related to substance use through its relationship with parental supervision. According to both the regression and the MANOVA, greater reported levels of functioning were related to greater levels of parental supervision. School level, adolescent sex, and the two together were found to make no difference in this relationship. In turn, greater levels of parental supervision were related to lower levels of heavy drinking, marijuana use, and illicit drug use. Therefore, those who came from families with higher levels of functioning, were more likely to receive higher levels of supervision, and, in turn, used substances with less frequency.

Moderating Effects

Family Structure

Family structure has now been described as influencing adolescent substance use directly and indirectly. Family structure also had a moderating effect, because of the way it affects the relationship between functioning and both marijuana and illicit drug use. The pattern of lower levels of functioning (compared to moderate and high) being related to higher frequencies of marijuana use was much more the case for adolescents from single-father and father and step-mother families, and for illicit drug use was much more the case with those from single-father families. Multiple comparisons revealed that lower levels of functioning being related to higher levels of marijuana use was only significant for intact families and father and step-mother families and for the relationship with illicit drugs, was only significant for intact families (single-father families were not able to be compared).

Family structure also interacted with school level to moderate the relationship between family functioning and substance use. In this instance, the interaction affected heavy drinking and illicit drug use. For junior high students, the general pattern of lower functioning being associated with higher frequencies of heavy drinking occurred, and family structure appeared to play little role. For senior high students, family structure had a much larger association with functioning and heavy drinking. Senior high students from intact and single-mother families that were high functioning had higher heavy drinking frequencies than those from high functioning mother and step-father families. For those from moderate functioning families, mother and step-father, single-mother, and single-father families had higher levels of heavy drinking than intact families, and those from father and step-mother families had the lowest frequency of heavy drinking. This changed when the pattern was examined for low functioning families, when those from father and step-mother, mother and step-father, and single father families had the highest levels of heavy drinking, and those from intact and single-mother families had lower frequencies. Although the general pattern of lower functioning being related to greater use holds, there is quite a bit of variation between the amount that heavy drinking frequency increased with each decrease in functioning between each of the family structures. However, (although single-father and father and step-father families could not be included in the analysis), variation in the level of functioning was only found to be significantly linked to heavy drinking for junior high students from intact families. When the pattern was examined for illicit drug use, the general pattern of illicit drug use frequency increasing with decreasing functioning was maintained. However, for junior high students, those from high functioning mother and step-father families had higher

levels of use than would be expected based on the pattern, as do those from low-functioning single-father families. Among senior high school students, the increase in levels of use as functioning decreased was the most pronounced and apparent with low functioning single-father and mother and step-father families. When the effects of structure and functioning on illicit drug use were examined separately for each school level, both junior and senior high students reported that different levels of functioning were only related to the substance use of adolescents from intact families (although those from single-father and father and step-mother could not be included in this analysis).

Family structure was not found to have a moderating effect on the relationship between parental supervision and substance use, either alone, or in combination with school level.

Parental Supervision

Parental supervision was found to have a moderating effect on the relationship between family functioning and illicit drug use. Family functioning appeared to have little relationship to illicit drug use when supervision was high. Adolescents who received high supervision appeared to have used illicit drugs with the same, relatively low frequencies regardless of family functioning. There was little difference in use between adolescents from high and moderate functioning families when supervision was moderate, but when functioning was low, the frequency of illicit drug use increased. Adolescents who received low levels of supervision reported higher levels of illicit drug use as functioning decreased. Parental supervision and school level were not found to affect the relationship between family functioning and substance use when they were examined together.

Limitations of the Current Study

One of the factors that likely hampered the findings of this study was the small number of adolescents in the sample that fit into certain categories. Relatively few adolescents lived with single-fathers, and particularly fathers and step-mothers. This made reaching significance between families types more difficult, especially when family types were divided along levels of functioning or supervision. In some cases, mean differences that were larger were not found to be significant, while smaller mean differences were. The levels of uncertainty with the smaller groups were too high for significance to be reached.

A second limitation is the scale that was used to look at substance use. Three categories were used: never having participated in the specific behaviour, doing it once or twice, and doing it three or more times. If the scale had been further broken down so that adolescents who had participated in the behaviour three times could be differentiated from those who had done so twenty times, mean frequencies might have had more variation between them.

Thirdly, the conception of family structure used is fairly limited. By breaking the adolescents up into one of the five family types, no allowance was given for those from families with joint custody. How involved the non-custodial parent is was not examined, and neither was whether the single-parents were living with a partner. These elements, while making the concept of family structure more complex, might make differences to the findings.

Finally, adolescents in this study were included in the study based on grade level not age. As a result of this, nearly one-fifth of the senior high school students were at

least eighteen years old. As alcohol is more accessible for these adolescents, their heavy drinking frequencies might be expected to be higher, and perhaps less related to family variables since they are able to drink legally. This is a potential problem that has not been addressed in the substance use studies in Atlantic Canada, or in the Monitoring the Future Study.

CHAPTER 5 – DISCUSSION

In this chapter, the implications of the research study will be discussed, along with how the findings relate to previous research. Suggestions for future research directions will conclude the chapter.

Implications of the Study

Family Structure

According to Flewelling and Bauman (1990), Jacobson (2000), Jenkins and Zunguze (1998), Stern, et al., (1984), Sutherland and Shepherd (2001), Thomas, et al., (2000), and Van Nelson, et al., (1993), adolescents from non-intact families were more likely to use substances. Flewelling and Bauman found that this was the case for both males and females. Based on the results of this study, adolescents from non-intact families, both males and females, participated in all three substance use behaviours with greater frequency than those from intact families. Unfortunately, the results were not consistent. Compared to adolescents from intact families, those from single-mother families participated in heavy drinking and marijuana use more frequently, those from mother and step-father families used marijuana and illicit drugs more frequently, and those from single-father families participated in heavy drinking more frequently. There was also a trend towards adolescents from single-father families having used illicit drugs more frequently than those from intact families.

Results from this study do not support the findings of Turner, et al., (1991) and Stern, et al., (1984), that the difference in substance use between intact and non-intact families is more pronounced for males. It appears, however, that the substance use of males and females may be influenced differently by different family structures. Females,

but not males, from single-father families were found to have participated in heavy drinking more frequently than those from intact families. Males, on the other hand, were found to have used marijuana more frequently when they came from mother and step-father families, compared to intact ones, a finding that was not shared for females.

The results were somewhat more complicated when school level was examined at the same time as sex. Junior high females reported more marijuana usage when they came from single-mother families as opposed to intact ones (there was also a trend towards those from single-father families having used marijuana more frequently than those from intact families), whereas junior high males reported having used marijuana more frequently when they came from mother and step-father as opposed to intact families. Junior high females also reported higher illicit drug use frequencies when they came from single-father or father and step-mother families compared to intact ones. Junior high males reported no link between family structure and illicit drug use, and senior high students, both males and females, reported no differences on either marijuana or illicit drug use based on family structure. This would indicate that after the sex of the adolescent and the adolescent's school level are factored into the equation, the statement about the link between non-intact family types being related to increased substance use becomes much more specified. When these elements are considered, it can only be said that: compared to those who came from intact families, junior high females reported more marijuana use when they came from single-mother families (and a trend was reported towards this when they came from single-father families) and more illicit drug use when they came from father and step-mother families or single-father families. Junior high males reported more marijuana use frequency when they came from mother and step-

father families, compared to intact families. Since junior high males did not report any significant differences for illicit drugs, and senior high students did not report any differences at all, it can be concluded that family structure is related to marijuana and illicit drug use only for younger (junior high aged) adolescents, and particularly for younger females.

In their studies of family structure and adolescent substance use, Cookston (1999), Hoffmann and Johnson (1998), and Jenkins and Zunguze (1998) found that adolescents who lived with single-mothers were at less risk of substance use than those who lived with single fathers. In the current study, adolescents from single-mother families were found to have had lower frequencies of use than those from single-father families, but the differences were not significant. In none of the analyses run in conjunction with this study, were there any significant differences found between adolescents from single-mother and single-father families. Furthermore, when males were examined separately from females, males from single-mother homes were found to have higher heavy drinking and marijuana use frequencies than those from single-father homes (differences were not significant). This provides evidence that single-father families do not affect adolescent substance negatively compared to single-mother families.

That males from single-father families had lower frequencies for heavy drinking than those from single-mother families brings up an interesting point: perhaps adolescent substance use is linked to whether an adolescent lives with the parent of the same sex. Murray, et al., (1985) found that males smoked more when they lived with single-mothers and females smoked more when they lived with single-fathers. Based on the results of the current study, for all three substance use behaviours, females were found to

have lower mean frequencies when they lived with single-mothers (compared to single-fathers), and, as mentioned before, males were found to have lower mean frequencies of heavy drinking and marijuana use when they lived with single fathers (as compared to single-mothers), although again the differences were not significant. To continue this theory with step-parent families, males were found to participate in all three substance use behaviours less frequently when they lived in father and step-mother families (as compared to those who lived in mother and step-father families), and females who lived with their mothers and step-fathers had lower frequencies of heavy drinking (as compared to those living with fathers and step-mothers) (again, differences were not significant). Interestingly, females from single-father families were found to have the highest mean frequency of all three substance use behaviours, compared to other females (the difference for heavy drinking frequency, when compared to those from intact families, was significant), but for males, the highest frequencies were seen in those who came from mother and step-father families (the difference for marijuana use frequency, when compared to those from intact families, was significant).

Parental Supervision

The findings of this study indicate that higher levels of supervision were significantly related to lower levels of substance use. This is consistent with research on monitoring (Aseltine, 1995; Barnes, et al., 1997; DiClemente, et al., 2001; Garis, 1998; Small, 1995; SAMHSA, 2001a; Svensson, 2000). As was found for monitoring, and unlike what Seydlitz (1995) found for limit setting, females in this study were found to have received significantly more supervision than males. Greater supervision was related to lower frequencies of heavy drinking, marijuana use, and illicit drug use, for both males

and females. When school level was analyzed, supervision was found to have the same relationship with heavy drinking frequency for both junior high and senior high school students. Higher levels of supervision were also related to lower levels of marijuana use in both junior and senior high students, but higher levels of supervision had the most impact on senior high school students, whose marijuana use increased more dramatically between levels of supervision. Supervision was not found to have an influence on the frequency of illicit drug use for junior high students (whose low use did not change much with different levels of supervision), but it did for senior high school students. Therefore, even though supervision has been found to decrease the substance use of adolescents in general, it appears to have a much greater influence on the frequency of senior high school students' substance use. Unfortunately, fewer senior high school students are among the most supervised compared to those in junior high (6.7% compared to 14.3%) and more are in the least supervised group (13.8% compared to 6.1%).

Similar to the findings of Barnes and Farrell (2000) that adolescents from intact families received more monitoring, the findings of this study show that those from intact families received significantly more supervision than those from single-mother, single-father, and father and step-mother families. Sex of the adolescent did not influence this relationship, contrary to Jacobson's (2000) finding that only girls, not boys, from intact families received more monitoring than those in other family types.

Although significance was not examined, this study does support CASA's (2001) finding that for each family type, higher levels of supervision are related to lower levels of substance use. The only exception that was found in this study was that marijuana use increased slightly between low and moderate levels of supervision for those from mother

and step-father families (and only eight adolescents came from low supervised mother and step-father homes). The overall finding, that higher levels of supervision were related to lower levels of substance use, while not examined for significance, is very important. While some evidence was found linking family structure to substance use in specific instances, adolescents from each and every family type, with the highest levels of supervision had substance use frequencies that where lower than adolescents from the same family type who had the lowest levels of supervision (differences were not examined for significance). Providing adolescents with high levels of supervision is something that all families (with information, practice, and patience) are able to do to combat adolescent substance use. However, research needs to go one step further. Simply because supervision has been found to be related to substance use does not mean that if supervision is suddenly increased during adolescence that the effects will be realized.

Family Functioning

McKay's (1991) findings showed that while certain elements of family functioning were related to substance use, the general functioning scale was not. The current study provides evidence that the general functioning scale is indeed linked to substance use. Adolescents from high and moderate functioning families were found to have significantly lower mean frequencies of heavy drinking, marijuana use, and illicit drug use than those from low functioning families, and the regression confirmed that higher functioning was associated with lower use for all three behaviours. The relationship between functioning and substance use was found to be consistent for both school levels. However, based on the graph of illicit drug use frequency, family

functioning, and school level, it appears that as with supervision, the level of family functioning appears to be especially important in relation to senior high school students' illicit drug use, which increased more sharply between moderate and low levels of functioning compared to junior high students. Low functioning homes were found to affect males' use of illicit drugs more than females'.

Parental Supervision and Family Functioning

When the relative importance of supervision and functioning are compared, it appears that if families want to concentrate on improving only one of these elements, they should focus on supervision. While being a family that was categorized as being the highest functioning and the highest supervised was found to be related to the overall lowest substance use, being a moderately functioning family with the highest level of supervision resulted in very similar mean frequencies. Adolescents from moderately supervised families were found to have reported somewhat higher frequencies for both marijuana use and illicit drug use, compared to those from highly supervised families. The least supervised adolescents were found to have the highest frequencies of substance use, regardless of functioning (with the exception of the least supervised adolescents from high functioning families, who had the same low illicit drug use rates as other high functioning families).

An Anomaly

Looking at the regression models, as well as the other findings, there is one family type that stands out as not fitting with the regular pattern. In terms of functioning and supervision, adolescents from mother and step-father families did not report significant differences when compared to those from intact families. When the regression model

was examined, mother and step-father families were found to be related to higher levels of parental supervision. Yet males from mother and step-father families were found to have reported higher levels of marijuana use than those who came from intact families, and according to the regression models, adolescents from mother and step-father families were more likely to use both marijuana and illicit drugs. All indications would point towards adolescents from mother and step-father families having rates of substance use that are somewhat comparable to those from intact families, and yet they are the only family type in the regression that is related to higher levels of substance use. This indicates that there is another variable (or perhaps even several variables) involved that interacts differently with the different family types. This is not surprising considering the large amount of variance that remains unaccounted for in all three regression models. It is difficult to predict what variable or variables may be involved based on the what was studied here. Perhaps as Barnes, Farrell and Cairns (1986) and Barnes, Farrell and Dintcheff (1997) propose, parental support is an important element to consider in conjunction with parental supervision. Or, as Garis (1998) and Thomas and Farrell (1996) suggest, involvement of the biological father may be an important factor to consider along with family structure. Perhaps, involvement of the biological father declines after the mother remarries.

Summary of Main Implications

Based on the results of this study, it appears that the influence of family structure on adolescent substance use has been greatly exaggerated. Family structure was found to be related to junior high females' marijuana and illicit drug use, and junior high males' illicit drug use, but not the substance use of senior high students. Simply because a

family is not intact is no reason for parents to assume that adolescent substance use is a foregone conclusion. While certain family structures were found to be associated with higher or lower levels of family functioning and parental supervision, this is not necessarily the case, and does not have to be the case, for individual families. Both of these elements are ones that parents can work on adjusting. Furthermore, both family functioning and parental supervision were found to be associated with lower substance use in a much more consistent way than family structure was. Parental supervision was found to be a particularly important element for parents to focus on.

Suggestions for Future Research Directions

First of all, it is important that some of the limitations of this study are addressed. It might be useful to over-sample specific family types so that the numbers of adolescents from each type of family are more comparable. The upper limit of the scales for heavy drinking, marijuana use, and illicit drug use could be increased, and a separate category of family structure could be created for those adolescents whose parents have joint custody. An extra variable could be analyzed related to involvement of each parent in the adolescent's life, for all family types. Both Garis (1998) and Thomas and Farrell (1996) have suggested that involvement of the non-custodial parent is important. Perhaps involvement is important for those from intact families as well. If high school students who are eighteen and older are included in the study, it might be a good idea to check to see if the variables are associated any differently for the eighteen year olds versus the seventeen year olds.

Other suggestions for research stem from the implications that were discussed. It would be interesting to see an exploration of functioning, supervision, and substance use

according to whether adolescents live with intact families, their biological parent of the same sex, or their biological parent of the opposite sex, since there has been some evidence presented here that would suggest that that may make a difference. An examination of whether higher levels of supervision are related to significantly lower substance use frequencies for each family type would be both interesting, and important. Also related to supervision, it is important that future research addresses whether levels of supervision can effectively be increased during different points in adolescence (perhaps early, middle, and late) and still have an influence on adolescent substance use. Adolescents may not accept a sudden increase in supervision, or it may simply be too late, at some point, for the benefits discussed here to take place. It would be interesting to see whether once substance use initiation has occurred, and a rate of use has been established, whether an increase in supervision would be related to a decline in that established rate. Both an examination of the relative importance of monitoring versus limit setting, and exploration into whether there is variation in the importance of the area limits revolve around (dating, clothing, television, substance use, etc.), are important areas that need to be looked into with regard to supervision. Finally, some exploration into other variables that could affect the substance use of adolescents, but particularly adolescents from mother and step-father families, is needed. While none of the variables examined in this study give an indication of which variables might be related, variables that may be influential, based on previous research include parental support and parental involvement.

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