EFFECTIVENESS OF SCHOOL POLICIES PROHIBITING ADOLESCENT ALCOHOL AND DRUG USE

by

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Abstract

The purpose of this study was to evaluate the effectiveness of school policies aimed to reduce adolescent alcohol and marijuana use. More specifically, the study investigated whether more severe school policy measures are related to the increased or decreased instances of overall alcohol and marijuana use on and beyond school grounds among grade 10 and 12 students. I used data from the National Education Longitudinal Study (NELS). After controlling for a number of prior measures of environmental and demographic factors that are significant predictors of adolescent alcohol and marijuana use, the school policy measures showed no impact on either alcohol or marijuana use at any level of its consumption. This was true for both grade 10 and grade 12 students. The study’s findings suggest that instead of constructing punitive policy measure, policymakers should develop prevention and intervention programs that more specifically target the needs of adolescents, peers, parents, and teachers.
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Chapter 1

Introduction

As a period of intense physical, physiological, and psychological changes, adolescence is often described as a very challenging and turbulent phase in life (Lerner & Galambos, 1998). It is marked by multiple demands posed on adolescents that can be divided into two general types: internal and external. Demands that are internal in nature require adolescents to understand and adapt to their rapidly changing ‘selves’, whereas external demands require adolescents to accept a variety of roles and successfully manage their family, social, and school responsibilities (Santrock, 2006). Even though the majority of youth cope well with the demands and challenges of adolescence, some of them experience a great amount of behavioural problems in this transitional phase. One such problem that usually begins in adolescence and extends into adulthood is alcohol and substance abuse (Grant & Dawson, 1997; Leatherdale, Hammond, & Ahmed, 2008).

According to the results of the National Survey on Drug Use in the USA (Johnston, O’Malley, & Bachman, 1999), 40% of students try illicit drugs by grade 8, and this number increases to 56% by the time students reach grade 12. The proportion of drug users further rises to over 65% in early adulthood. Five percent of grade 12 students in the US smoke marijuana on a daily basis, and 9% of students try cocaine by the age of 18. These high figures should be extraordinarily alarming to the general population considering the extent of their detrimental consequences (Bentler, 1992).

Researchers have identified a number of factors that trigger and predict drinking and substance use behaviours in adolescents. Most frequently mentioned factors are personality
traits, peer influences, parental monitoring, school environment, and demographic characteristics (Belcher & Shinitzky, 1998; Dishion & McMahon, 2006; Kirkcaldya, Siefenb, Surallb, Bischoffc, & Karlamangla, 2004; Leatherdale, Hammond, & Ahmed, 2008; Moore, Gould, Reuben, Greendale, Carter, Zhou, 2005; Small, Jones, Barrios, Crossett, Dahlberg, Albuquerque, Sleet, Greene, Schmidt, 2001) Studies in the past have focused on examining personality and social factors within family and peer circles; only recently has the importance of school environment become a significant factor of interest in the substance abuse literature (Small et al., 2001).

Adolescents spend a significant amount of their time in schools. In addition to constituting an active learning environment, schools have important social, moral, and health-promoting functions. Many schools have constructed policies in order to address issues that are crucial to adolescents’ social, emotional, and physical development. The major function of school policies is to establish normative values for students’ beliefs and behaviours and to impose rules and procedures that ought to be followed on school grounds (Evans-Whipp, Bond, Toumbourou, & Catalano, 2007). School policies should not only aim toward providing a healthier, safer and better school environment, but also promote permanent positive changes in the lives of young people.

Almost all schools in North America have a policy that prohibits alcohol and drug use (Small et al., 2001). The existence of alcohol and drug policies is certainly valuable. What is of greater importance is proper and consistent enforcement of these policies. Despite our knowledge about the existence of alcohol and drug polices at schools, it has not been well documented how and to which extent these policies influence students’ behaviour (Evans-Whipp et al., 2007).
In this paper I will summarize past findings related to school policies and adolescent substance use, point out the limitations of prior research, discuss the importance of environmental and personality factors linked to alcohol and drug use in adolescents, and derive hypotheses with regard to school policy impact on adolescent substance use. I will explain analytical procedures used to test the hypotheses, present the results, and discuss the findings and their practical implications.
Chapter 2
Past Research Evidence

Among the few studies that have attempted to evaluate the impact of school policies on student behavior, most of them focused on tobacco use rather than on alcohol and drug use. For example, there is evidence that schools vary in the degree of severity and the level of enforcement of their policies on tobacco use (Evans-Whipp et al., 2004). Studies of tobacco policies may inform our understanding of the potential impact of alcohol and drug policies on students’ behavior, because smoking, drinking, and drug use exhibit similar consumption patterns (Einstein, Hughes, & Hindmarch, 2006; Leatherdale, Hammond, & Ahmed, 2008). For example, more than 30 years ago Einstein and colleagues (1975) found that students who were current tobacco and alcohol users had the highest likelihood of using marijuana. The same finding was replicated by Leatherdale and colleagues in 2008, who reported that students who have tried both alcohol and tobacco were over 180 times more likely to try marijuana. I will begin by reviewing empirical evidence on tobacco policies and will then discuss studies that examined alcohol and drug policies.

The available findings on tobacco policies are quite diverse and inconclusive (Evans-Whipp et al., 2004). Different studies reported dissimilar magnitudes of relationships between the existence or the severity of formal school policies and tobacco use among students (Clarke et al, 1994; Porter, 1982). First, studies from Sweden and Australia found no relationship between the adoption of formal school policies and students’ overall tobacco use (Clarke et al., 1994; Rosendahl et al., 2002). Second, studies conducted in the UK revealed that schools with more permissive tobacco polices report higher prevalence of overall smoking in students (Porter, 1982). However, another team of researchers reported no relationship between the severity of
punitive measures imposed by a school policy and adolescent tobacco use (Kumar, O’Malley, Johnson, 2005). Yet another line of research found that schools with more severe tobacco policies reported lower instances of smoking among students on school grounds, but additional findings revealed that the overall smoking behaviour of those students did not decrease (Charlton & While, 1994).

In addition to punitive consequences imposed by school policies, policy comprehensiveness might also play a role in impacting students’ behaviour. Evans-Whipp and colleagues (2004) explain that more comprehensive policies include precise information about the prohibition rules concerning people, times, and places to which these policies apply. Two studies conducted in California and Wales found that schools with more detailed tobacco policies reported a lower amount of overall tobacco use among their students (Moore, Roberts, & Tudor-Smith, 2001; Pentz et al., 1989).

Similarly, there is a great degree of variation among written school policies aimed to control alcohol and drug use. In the US, for instance, each school can decide about the specifics of its policies (Evans-Whipp et al., 2004). Even though all alcohol and drug policies focus on reducing and discouraging substance use in students, their orientations and effectiveness might be different. A series of longitudinal studies conducted in the US and Australia revealed key differences between two trends in policy orientation-- abstinence-based approach in the US versus harm-minimization approach in Australia (Beyers, Evans-Whipp, Mathers, Toumbourou, & Catalano, 2005; Evans-Whipp et al., 2004; Toumbourou et al., 2005).

A majority of schools in the US adopted the so-called zero-tolerance policies for substance use (Beyers et al., 2005; Evans-Whipp et al., 2004) The main goal of these policies is to promote abstinence and reduce overall drug use. Zero-tolerance policies are characterized by
more punitive penalties for policy violations in order to decrease availability and use of drugs at schools. Consistent with this approach, American schools often tend to implement suspension and expulsion as punitive measures for policy violations.

Schools in Australia, on the other hand, are primarily concerned with reducing harm associated with drug use. In addition to promoting drug abstinence, Australian educators also recognize that some students will inevitably use drugs, and therefore try to base their policies on minimizing potential harm related to drug use. Consequently, these policies are less punitive than those in the US, and have a greater focus on remediation of substance use problems (Beyers et al, 2005).

Toumbourou and colleagues (2005) attempted to explain the differences in drug use patterns in the US and Australia by these two differential policy orientations. They speculated that higher reported rates of drug use among American students were related to the zero-tolerance policy approach. The authors further suggested that the US abstinence policies are less tolerant and more punitive and, as such, may increase student motivation to engage in policy violations. The motivational aspect for violating school policies was attributed to adolescents’ increased rebelliousness at this stage of life.

However, the authors did not attribute the higher prevalence of alcohol use and binge drinking among Australian students to more tolerant school policies in Australia but rather to a number of social and cultural norms (Toumbourou et al., 2005). It is worth questioning why the authors chose to associate only higher levels of drug use with more punitive American policies without considering possible differences in social and cultural norms between the two societies. If their argument about rebelliousness toward stricter policies and greater punishment was universally true, American students would then be more likely to break other policy norms and
use both alcohol and drugs more than Australian students do, which was not the case in this study (Toumbourou et al., 2005). It is clear that the authors did not present proper empirical evidence or convincing reasoning for the explication of higher drug consumption among US students and seemingly arbitrarily chose the US policy orientation as a possible explanation.

Moreover, not all American schools have equally punitive measures for policy violations. In order to empirically examine the impact of the ‘rebelliousness effect’, it is important to first distinguish among schools that endorse different degrees of punitive policies. It is probably true that American schools generally adopt more penalizing school policies than do Australian schools, but there is a great degree of variation in specific elements that different American schools choose to include in their policies (Evans-Whipp et al., 2004).

Using the same data set as Toumbourou and colleagues (2005), Evans-Whipp and her colleagues (2007) found that student drinking and drug use on school grounds was lower at schools that had more punitive policy measures, such as expulsion. In addition, lower consumption of alcohol and drug use was associated with the delivery of strong abstinence drug education messages. These findings are consistent with those on tobacco use where severe tobacco policies were related to lower instances of smoking on school grounds (Charlton & While, 1994). However, the findings doubtlessly contradict those of Toumbourou and colleagues (2005).

Even though school policy researchers labeled American and Australian policy practices as two different orientations or approaches, it is not clear what exactly they implied by this distinction: two sides of the same continuum or two separate dimensions. It seems that punitive measures and remediation measures can be considered as two separate dimensions, with each of them being measured on a continuum. The researchers suggested that American policies are
higher than Australian policies on the punitive dimension but are lower on the remediation aspect (Beyers et al., 2005; Evans-Whipp et al., 2007; Toumbourou et al., 2005). However, there was no attempt to control for one dimensional aspect of the policy measures while examining the other one in either American or Australian policies. It is thus not clear whether punitive or remedial qualities of policy measures are more important in preventing adolescent substance use and whether these qualities are culturally universal.

Although the past research on school policies and student substance use did contribute to a better understanding of the link between these two factors, it left some unanswered questions. The following section addresses certain limitations of the existing research and outlines the need for a better research design and measurement techniques of school policies and substance use.

Limitations of Prior Research

Potential confounding factors. There is a clear need for better-designed research in the domain of school policies and substance abuse. Despite their contradictory findings, both Evans-Whipp et al. (2007) and Toumbourou et al. (2005) acknowledged a similar set of limitations: both mentioned the confounding effect of contextual, economic and cultural differences between the US and Australia (Evans-Whipp et al., 2007; Toumbourou et al., 2005). Furthermore, only sex, age, and clustering within schools were explicitly controlled in the two studies even though a number of other factors have been found to influence students’ decisions to use illicit substances (Dishion & McMahon, 2006; Harolyn, Harold, & Shinitzky, 1998; Kirkcaldya et al., 2004; Moore et al., 2005). The influence of peers, parents, school environment, and personality traits are some of the factors that might alter the results about the link between school policies and adolescent substance use. Those studies on tobacco policies that controlled for school characteristics and certain student demographics found no effects of school policies on tobacco
One of the widely cited studies that found the difference in students tobacco use between two schools with different punitive measures did not control for a lot of potential confounders but rather assumed that the student composition and social status were similar between the two examined schools (Porter, 1982).

**Measurement of school policies and student outcomes.** The link between punitive policy measures and subsequent alcohol and drug use needs to be empirically examined more in depth. It is necessary to classify schools into different categories based on the punitive consequences that they implement for policy violations and then compare rates of alcohol and drug use among students in each school category. In some of the previous studies, researchers compared tobacco and other substance use before and after the implementation of a certain policy measure and also made cross-cultural comparisons between different policy approaches (e.g., Clarke et al., 1994; Evans-Whipp et al., 2004). However, there is a lack of studies that examined adolescent alcohol and drug use with respect to the degree of a punitive measure posed by different schools within the same country.

It is also imperative to obtain more precise information about the frequency of alcohol and drug use among students and to make a distinction between consumption on school grounds and overall use. For example, to achieve more accuracy and provide a better point of comparison among those students who use alcohol and drugs, it is not enough to simply ask them *whether or not* they used any alcohol or drugs in the past month (or in their lifetime), as the previous studies have done (Leatherdale, Hammond, & Ahmed, 2008; Toumbourou et al., 2005). It is more sensible to provide multiple response options by asking them to estimate the *number of occasions* they used alcohol and drugs in a specific time frame. In particular, it is more informative to offer a range of occasions (e.g., from never to 20 times or more) on which
students might have used alcohol or drugs in the past month, year, or in their lifetime. This information would be valuable for discriminating among students who have different levels of involvement in drinking and drug use behaviours.

**Environmental and Personal Factors That Predict Adolescent Alcohol and Drug Use**

This study examines the association between students’ alcohol and drug use and school policies in the context of adolescent development. As already mentioned, this life phase is accompanied by a number of developmental, social, emotional, and cognitive changes (Santrock, 2006). I discuss below the role that each of these factors, as well as their combination, might play in adolescents' substance use. The environmental factors include the influence of family and community members, peers, school environment, faculty and staff, and adolescents’ demographic characteristics. The personality factors are all personality traits of adolescents that may foster or hinder substance use (e.g., self-esteem, self-concept, locus of control, conscientiousness, neuroticism, anxiety, aggression, etc).

**Family and Community Influence**

In terms of family support, there are several aspects of parent-child relations that were found to be linked to adolescent alcohol and drug use: parental monitoring, involvement, warmth, attachment, parenting style, and shared interests and understanding (Bogenschneider, Wu, Raffaelli, & Tsay, 1998; Karlsen, Rogers, & McCarthy, 1998; Kirkcaldya et al., 2004; Petraitis, Flay, & Miller, 1995). High-quality family dynamics and strong emotional attachment to parents can serve as excellent buffers against adolescent substance use (Petraitis, Flay, & Miller, 1995). More specifically if adolescents think of their parents as supportive, encouraging, and proactive, they are less likely to use illicit substances (Baumrind, 1991; Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Kosterman et al., 2000). On the contrary, adolescents who
have weak connections to their family nuclei are more likely to socialize with unconstructive peers and, in turn, be influenced to use alcohol and drugs (Miller et al., 2000; Karlsen, Rogers, & McCarthy, 1998).

Parenting styles and parents’ understanding of their child’s development are also imperative for the quality of parent-child interactions (Baumrind, 1991). Cohen and Rice (1997) found that adolescents who perceived their parents as high on authoritativeness and low on permissiveness were less likely to use alcohol and tobacco. Furthermore, Baumrind (1991) noted that the combination of authoritative, highly demanding and highly responsive parenting provided best protection against adolescent substance use. Moreover, adolescents’ perception of parental acceptance has been linked to a lower risk of cocaine use, whereas the perception of maternal rejection was related to increased marijuana use (Kirkcaldy et al., 2004).

Parental monitoring has consistently been discussed as a critical factor in reducing adolescents’ risk for substance use (Bahr, Marcos, & Maughan, 2005; Parsai, Marsiglia, & Kulis, 2008; Steinberg, Fletcher, & Darling, 1994). Despite the existence of different definitions of parental monitoring, researchers unitarily agreed that it involves parental supervision of their children’s activities (where and with whom they are) and, more importantly, the children’s perception of them being monitored (Bahr, Maughan, Marcos, & Li, 1998; DiClemente et al., 2009). Adolescents of parents who have well-developed monitoring habits have lower risk of using tobacco, alcohol and drugs (DiClemente et al., 2009; Parsai, Marsiglia, & Kulis, 2008). Monitoring rules need to be clearly articulated to adolescents, and they, in turn, need to believe that breaking those rules will result in negative consequences (Petraitis, Flay, & Miller, 1995).

In addition to family support, social support from community members such as pastors, youth councilors, coaches, and extended family members may also have a positive influence on
adolescents’ behaviours. A considerable number of studies pointed out that support from religious communities and involvement in religious activities is a big defense mechanism against substance use in adolescents (Karlsen, Rogers, and McCarhty, 1998; Marsiglia et al., 2005; Parsai, Marsiglia, & Kulis, 2008). Considering the fact that most religions oppose substance use, one would expect that students who are religiously active would adhere to the standards of their religions and refrain from using harmful substances. Karlsen, Rogers, and McCarhty (1998) explained that involvement in religious activities in itself involves spending more time with family members and religious peers and reduces the available time that could otherwise be spent on any destructive activities (e.g., drinking, using drugs).

History of substance abuse in family, such as having siblings or parents who abuse (or have abused) alcohol or drugs, greatly amplifies adolescents’ risk for substance use. Boyle and colleagues (2001) found out that adolescents’ risk for substance use is doubled if both parents in the household use marijuana. However, there is evidence that substance abuse among siblings poses even greater risk for both male and female adolescents (Reinherz et al., 2000; Windle, 2000). The negative impact of siblings on substance use is stronger if siblings are closer in age (two or fewer years apart), male, and ages 19-24 (Boyle, Sanford, Szatmari, Merikangas, & Offord, 2001).

The fundamentals of social learning theory can explain why familial substance use may have such a profound impact on adolescents substance use (Bandura, 1986). Children learn a diverse range of behaviours by observing and imitating role models (e.g., parents, sibling, and teachers). Family members who use alcohol and drugs will directly influence adolescents’ beliefs about the appropriateness of substance use (Parsai, Marsiglia, & Kulis, 2008). For example, adolescents whose family members use alcohol or drugs may be able to observe immediate
rewarding consequences of substance use, such as euphoric and relaxed psychological state, which can be an incentive to try those substances themselves. Furthermore, youth who live in stressful environments might learn from their sibling that substance use is an acceptable coping strategy for life stressors (Windle, 2000). Reinherz and his colleagues (2000) noted that in their study 85% of parents with substance abuse disorders were fathers, which led them to conclude that male children in those families are especially at risk for substance use as fathers are usually their main role models.

Family and community influence may also confound the relationship between school policies and substance use. First, parents can purposely choose to enroll their children in a school with a specific type of school policies. In this case, parents can select a school whose rules closely correspond to their own values and practices. Such selection bias is probably more likely to be found in schools that put more emphasis on substance use prevention. Second, parents can directly or indirectly impact school policies by participating in policy formation and implementation. Third, communities can also shape school policies through lobbying or utilizing outreach activities. For example, more affluent communities may have means of sponsoring or influencing implementation and maintenance of certain school policies.

Adolescents’ relations and interactions with family and community members may greatly influence how adolescents respond to their school policies. For instance, if parents and community members value and nourish societal and school norms, adolescents may be more prone to do so in order to gain social approval. Furthermore, if parents are exerting authoritative parenting style at home, adolescents’ compliance with the school policy may be more easily transferred from home to school environment. Closely related with this is parental involvement in policy creation and implementation. Parental and community input in policy matters may help
create policies that more closely reflect societal values, which in turn may increase their effectiveness. However, Evans-Whipp and colleagues (2007) noted that less than 10% of parents in the US and Australia reported being ‘very involved’ in the policy setting process.

Peer Influence

Peer influence is another social element that is often more powerful in impacting adolescent substance use than family and community factors (Brook, Nomura, & Cohen 1989; Kirkcaldya et al., 2004; Windle, 2000). A large body of literature acknowledged that peer groups are critical in shaping adolescents’ development in a number of different ways (McLellan & Pugh, 1999; Miller et al., 2000; Santrock, 2006). First, peer interactions provide opportunities for the development of identity, intimacy, and personal beliefs (Miller et al., 2000). Second, peers are readily used as a source of social and emotional support. Third, peer behaviours and attitudes often serve as indicators of what actions are appropriate and accepted in adolescents’ peer circles (Miller, et al., 2000). It is thus very important for adolescents to be accepted and liked by their peers and to identify themselves with a certain group of friends (Santrock, 2006). This explains why the influence of peers plays such a pertinent role in substance use among adolescents.

It has been widely documented that adolescents who have peers who abuse illegal substances are very likely to become substance abusers themselves (Bauman & Ennett, 1996; Kirkcaldya et al., 2004; Petraitis, Flay, & Miller, 1995). The reasons why adolescents choose to socialize with problematic peers are multifold. First, adolescents who display lack of social skills, low self-esteem and high social anxiety tend to associate themselves with destructive peers (Kirkcaldya et al., 2004; Petraitis, Flay, & Miller, 1995). On the other hand, researchers (Baumrind, 1985; Jessor, Donovan, & Costa, 1991) found that nonconformity, aggression, and rebelliousness are also related to socialization with deviant peers. In addition, weak family
attachment, inadequate family support, divorced families, problematic neighborhoods, lack of religious involvement and low academic achievement are elements that also increased adolescents’ vulnerability to hang out with problematic peers (Karlsen, Rogers, & McCarhty, 1998; Petraitis, Flay, & Miller, 1995).

Knowing the extent to which peers can influence adolescent substance use, one would assume that peers may also shape adolescents’ attitudes toward conforming to school policies. This attitude alteration may occur in reciprocal ways. First, peers who use alcohol and drugs may convince an adolescent that substance use is harmless and socially acceptable or even desirable and may witness that policy violation is not followed by any negative consequences. The adolescent may thus disregard the existence of school policies and engage in substance use in order to experience psychological and social reinforcements that can follow such actions. Second, adolescents who have already consumed alcohol or illegal drugs might experience a dissonance between their performed behaviour and school policy norms. According to Festinger (1957), individuals tend to reduce the feeling of dissonance by changing their attitudes. Consequently, adolescents may persuade themselves and their peers of the correctness of substance use and irrelevance of the rules imposed by school policies. If, on the other hand, peers disapprove of substance use and closely follow school policies, they may exert positive influence on those adolescents who have more favourable attitudes toward substance use.

Analogous to the plausibility of parents confounding the association between school policies and substance use, peer groups can also act as confounders. For instance, schools that have a large population of students who use alcohol or drugs may resort to implementing more severe policy measures. Similarly, schools with a very minor percentage of such students may not have a need to accept severely punitive policies. In these two cases, the association between
the severity of school policies and adolescent substance use would be positive and confounded by the characteristics of the student population in a particular school.

School Environment

As both educational and social institutions, schools have a salient role in adolescents’ lives. School atmosphere, curriculum, policies, and interactions between faculty and students can greatly influence students’ learning, personal and social development, and their responses to the world around them. A number of school factors have been discussed as significant predictors of substance use among student population (Allison et al., 1999; Ennett, Flewelling, Lindrooth, & Norton, 1997). These factors can be classified in two general categories: (1) those that are purposely designed to prevent or stop substance use (e.g., school policies, education programs, workshops); (2) those factors that reflect student composition and general school characteristics (e.g., SES, racial composition, school size, school sector, safety, etc.). Researchers have found that patterns of alcohol and drug use are very similar within schools but quite diverse between schools (Ennett et al., 1997). Hence the type of school that adolescents attend can have a large impact on their decisions to use illicit substances.

With respect to this issue, another line of research showed that about 95% of variance in substance use is found within schools (O’Malley, Johnston, Bachman, Schulenberg, Kumar, 2006). This however does not mean that the between school variance should be neglected. The same study reported that students’ attitudes toward substance use and the availability of substances on school grounds can explain between 2.5% and 7% of variance in substance use behaviours. In particular, alcohol availability was found to have the smallest and marijuana availability to have the greatest degree of variance between schools. These findings are consistent with those reported by Ennett and colleagues (1997), who discovered that lifetime
alcohol use was higher in schools where alcohol was readily available and accepted by students. In terms of school characteristics, school type, socioeconomic status, and racial composition of students were found to be significant indicators of between school variance in substance use.

However, the association of substance use with school characteristics was not unitary across all grade levels (O’Malley et al., 2006). Public schools, for example, exhibited higher rates of both alcohol and marijuana use than private or Catholic schools at grade 8 level, but the trend was reversed in grade 12. Similarly, school SES had a negative association with both alcohol and marijuana use in grade 8, no association in grade 10, and a positive association in grade 12. This interaction between certain school characteristics and substance use across different grades signifies the complexity that underlies the link between environmental factors and substance use. In addition, it indicates the relevance of grade levels in adolescent substance use.

One more characteristic on which schools were found to vary is the racial or ethnical composition of a particular school (O’Malley et al., 2006). Schools with predominately Caucasian students were found to have the highest prevalence of substance use in all grade levels, whereas schools mostly comprised of African American student population reported the lowest instances of substance use. These results are in line with the findings that link race and adolescent substance use at an individual level (Parker, Weaver, & Calhoun, 1995; Windle, 1990). School size displayed no relevance to adolescent substance use.

Furthermore, availability of alcohol and drugs on school grounds and a large student client population of the existing substance users were found to be predictive of adolescent substance use (Allison et al., 1999). Aligned with this finding, schools that foster substance-free environments and provide higher levels of surveillance have students who are less likely to use
drugs on school grounds (Evans-Whipp et al., 2004). The existence and proper implementation of alcohol and drug programs at schools can assist in reducing alcohol and drug consumption among students (Dusenbury et al., 2003; Perry & Staufacker, 1996; Flay, 2000).

When studying school policies and substance use among adolescents it is inevitable to consider the role of drug education programs that can either moderate or mediate the effect school policies may have on adolescent substance use. One of the most prominent and widely implemented education intervention programs is the Drug Abuse Resistance Education (DARE) (Ennett et al., 1994; West & O’Neal, 2004). DARE has been implemented in elementary, middle, and high schools across the US for a few decades now. Its main curriculum targets students in the last year of their elementary school, but modified curricula exist for students in middle and high schools. DARE is rooted in a social influence approach, and its main focus is thus on teaching students to resist social pressure to use drugs. In addition, DARE is supposed to help students gain more social skills and increase their self-esteem in order to more effectively protect themselves from a temptation of trying drugs. The definition of drugs in DARE refers to tobacco, alcohol, marijuana, inhalants, cocaine, heroin, and other illicit drugs. This education program has a very broad scope and includes entire communities in its delivery and implementation.

Despite its original purpose to prevent or postpone adolescent substance use, DARE has consistently shown to be ineffective in doing so (Ennett et al., 1994; Lynam, et al., 1999; West & O’Neal, 2004). DARE showed neither immediate nor long term direct effects in preventing adolescent substance use. Because substance use patterns may vary with age, Lynam and colleagues (1999) examined the effectiveness of DARE ten years after its implementation and also found no direct effects of DARE on drug use. In addition, a comprehensive and carefully
conducted meta-analysis of all DARE evaluation projects prior to 2004 confirmed that the average effect size of DARE was not different from zero (West & O’Neal, 2004). Some studies however found that DARE is related to certain mediators of substance use such as students’ assertiveness and attitudes toward substance use but not their self-esteem (Clayton, Cattarello, Day, & Walden, 1991; Harmon, 1993; Ringwalt, Ennett, & Holt, 1991). In contrast, other researchers mentioned students’ increased self-esteem as the only positive outcome of DARE (Ennett et al., 1994). These inconclusive findings put in question the effectiveness of DARE in influencing some of the factors that are believed to mediate substance use. The discussed limitations of DARE evaluations are its inability to randomly assign students to intervention programs, possible interference of other education programs that may also impact adolescent substance use, and the use of unsound methodology for data analysis.

Closely related to this is the implementation of programs aimed at educating students about the consequences of alcohol and marijuana use. Even though these programs may be very informative, the impact of their messages may heavily depend on how they are delivered and received by students. If students feel that their school is trying to help them by having drug education programs, they may respond to them in a very positive way. If, on the other hand, they feel that participation in these programs is imposed on them, they may respond in an undesirable manner. For instance, one big criticism of DARE is the use of police officers as instructors for the program delivery (Ennett et al., 1994; Lynam, et al., 1999). First, the bare presence of a police officer in a classroom may evoke resentment and rejection in adolescents toward an authority figure (Santrock, 2006). Second, although police officers receive formal training prior to coming to classrooms, they may still not be adept to teach the curriculum as well as teacher
would do. Finally, another limitation of the DARE curriculum is that its content may be too broad and not specifically focused on one preventative feature.

Although DARE, as a large scale program, emerged to be ineffective, there are some smaller scale prevention programs that have shown success in preventing adolescent substance use. For example, *Project Northland* that was implemented among students in grades 6, 7, and 8 was found to have manifold benefits (Perry et al., 1996). Students who participated in the program reported lower alcohol consumption, decreased tendency to use alcohol, and lower intake of cigarettes and alcohol together compared to students in the control group.

In addition, program participants displayed an increased self-efficacy in resisting peer influence to use alcohol and improved parent-child communication about the consequences of drinking. An additional example is a project named *Preparing for the Drug Free Years*, which targets middle school children and their parents in rural areas. This program was found to directly reduce adolescent alcohol use from grade 6 to grade 9. It also reinforced parental norms against substance, enhanced parenting skills, use and helped parents to maintain ‘proactive family management practices’ (Park, Kosterman, Hawkins, Haggerty, Duncan, Duncan, & Spoth, 2000). *Strengthening Families Program* is another example of a prevention program that in addition to reducing adolescent alcohol consumption improved their relationship with parents (Kumpfer & Alvarado, 2003). These programs have been evaluated as effective based on the comparisons between groups of school that were randomly assigned to either treatment or control condition. It is worth noting that all of the effective programs have a number of structural and organizational elements and all of them actively involve students, parents, and schools in their implementation. This is one more line of evidence confirming that adolescent substance use
is multifactorial phenomenon whose examination cannot, and should not, be secluded from other contexts.

Moreover, students’ perceptions of the school climate and social dynamics within the school are also imperative for preventing substance use (Dewey, 1999). Students’ feelings of attachment to their school, teachers, and classmates had been found to reduce the prevalence of substance use (Dornbusch et al., 2001; Roberts et al., 2008). As in the case of family attachment, students who feel disconnected and alienated from their schools might turn to destructive peer groups for social support and understanding (Petrakis, Flay, & Miller, 1995).

Academic achievement has been found to negatively correlate with substance abuse (Andrews et al., 1991; Cohen and Rice, 1997; Dewey, 1999). Students of lower academic achievement are commonly identified among substance users (Dewey, 1999; Leatherdale, Hammond, & Ahmed, 2008). However, the directionality of this relationship is unclear. Perhaps students who choose to use substances perform poorly at school as a direct consequence of drinking or smoking marijuana. A second plausible explanation is that these students usually have problematic peers, who, in turn, influence them to skip classes and neglect academic responsibilities (King et al., 2006). Moreover, Andrews and colleagues (1991) suggest that an important factor that underlies the relationship between academic achievement and substance use is students’ motivation. They discovered that students with low motivation were more likely to initiate marijuana use, which then negatively impacted their academic achievement.

Demographic Indicators

Demographic variables, such as socioeconomic status (SES), race, and sex, have received a substantial attention in all domains of social sciences. They also deserve to be properly surveyed in this study as all three demographic indices have been found to relate to substance use

There has been an ongoing debate about whether and how SES influences adolescent substance use. Traditionally, it has been believed, and confirmed in a number of studies, that students who come from lower SES families are more likely to use both alcohol and drugs (Reinherz et al., 2000; Droomers, Schrijvers, Casswell, & Mackenbach, 2003). However, there is emerging evidence that suggests the contrary. Some researchers have disclosed that the prevalence of substance use is higher among adolescents of higher SES status (Ennett et al., 1997; Hanson & Chen, 2007; Parker, Weaver, & Calhoun, 1995).

One reason for such conflicting findings may lie in the operational definition of SES. This variable is usually composed of at least two or three different indicators, such as income, education level, and occupation. The exact compositional structure of SES, and the scaling properties of its components are usually not explicitly discussed in research studies. Hence, the construct mutually labeled as SES may have very different meanings for different authors. Hanson and Chen (2007), for example, pointed out that a single component of SES (i.e., the availability of financial resources) was more predictive of adolescent substance use than their overall SES. Considering problematic properties of a composite SES, I will separately evaluate the contribution of each SES component (i.e., parents’ education level, occupation, and income) to adolescent substance use.

With regard to the role of race and sex in predicting substance abuse, the empirical evidence in this realm is very congruent with each other. In general, males tend to use both alcohol and drugs more than females (Johnson, O'Malley, & Bachman, 1999; Leatherdale, Hammond, & Ahmed, 2008; Windle, 1990). This is true for the amount and frequency of alcohol
and drug use (Johnson, O'Malley, & Bachman, 1999). Researchers who examined racial differences in substance use patterns reported that Caucasian students are more likely to use substances than students of other races (Barnes & Welte, 1986; Boles et al., 1994; Karlsen, Rogers, & McCarty, 1998; Parker, Weaver, & Calhoun, 1995; Windle, 1990). This finding might be directly related to usually higher SES of Caucasian adolescents and thus greater availability of resources to afford illegal substances (Parker, Weaver, & Calhoun, 1995).

It is important to acknowledge again that the environmental and personality factors discussed above might confound the relationship between school policies and alcohol and drug use. In addition to the potentially confounding role of family, community, and peer influence, demographic variables may also act as confounders. For example, adolescents of a certain SES or race may be intentionally sent to schools with specific policy measures on substance use. In this case one would not know whether any link between school policies and reported substance use is truly existent or is confounded by students’ demographic variables. Furthermore, the effectiveness of a particular policy measure might be strengthened by moderating variables such as increased student monitoring on school grounds. It is thus imperative to identify and properly classify all available measures that can potentially augment or diminish any effects that school policy measures might have on alcohol and drug use.

Theoretical Hypotheses

Having reviewed the wide range of factors that are found to be associated with adolescent substance use, it became evident that the penalizing features of different school policies did not receive a great deal of empirical attention. Before attempting to empirically examine the relationship between the severity of school policies and students’ alcohol and drug use, it is
imperative to review theoretical arguments for the implementation of more or less severe school policies regarding alcohol and substance use in adolescents.

**Behavioural Approach**

First, one should consider behaviourism and its explanation for punishment. From a behavioural perspective, a severe punitive school policy that utilizes a direct suspension or expulsion for the use of alcohol or illegal drugs in school represents an example of a type I punishment (Vockell, 2006). Type I punishment is defined as introducing something unpleasant or unwanted into an individual’s life (e.g., reprimand). By implementing punishment, behaviourists argue that the occurrence of an unwanted behavior will decrease in frequency. In the same manner, schools that adhere to more punitive policies for alcohol and drug use assume that more severe levels of punishment would eradicate the unwanted behaviour faster. However, Vockell (2006) explains that in order for it to be effective, punishment needs to be delivered consistently after every instance of unwanted behaviour. In the real world setting, the detection of every instance of illegal drinking or drug use on school grounds is rather difficult, especially in schools with a large student population and low student monitoring. Thus, even if punitive punishment has positive theoretical qualities, its administration and practical effectiveness is highly contingent upon the detection of alcohol and drug use.

Even behaviourists acknowledge that type I punishments only teach a person what not to do and influence a person receiving punishment to avoid the punishment administrator and the situation in which it was administered. Consistent with some past research on tobacco use, evidence has shown that severe punishment may decrease the unwanted behaviour on school grounds but does not guarantee that the behaviour will not reoccur in a different setting where it is less likely to be monitored and punished (Evans-Whipp et al., 2004; Martin & Pear, 2006;
Researchers found that after the introduction of the smoking ban on school property in Ontario, student tobacco use at schools drastically decreased (Northrup, Ashley, & Ferrence, 1998). However, the prevalence of smoking remained the same; it only transferred to other locations such as sidewalks near schools, shopping malls, parks, etc.

In order to be truly effective, the norms implemented by school policies should be promoted and enforced beyond school properties as much as possible. This may be achieved by involving parents and entire communities in youth tobacco and substance use prevention. If parents, youth organizations, local businesses, churches, and other community members are actively involved in delivering strong anti-substance use messages and in monitoring adolescents in their community, the policy effectiveness can perhaps have a greater impact on adolescent substance use.

Based on the principles of rewards and punishments outlined by the behavioural theories, it is possible to hypothesize the direction of the association between school policies and alcohol and marijuana use among adolescents. Knowing that the primary goal of school policies is to prevent student substance use, it is sensible to assume that students would perceive the costs associated with policy violation to be greater than the potential benefits of alcohol and marijuana use. Under this assumption, I derived the first hypothesis.

Hypothesis 1: More severe school policy measures will be related to fewer instances of overall alcohol and marijuana use among grade 10 and 12 students. Accordingly, maximizing the severity of punishment should be linked to a reduction in alcohol and drug use among adolescents.

The behavioural approach also offers an alternative explanation for why drinking and substance use might be prevalent among adolescents. From the reward perspective, behaviour is
more likely to persist if it is immediately followed by a reward (Martin & Pear, 2006). Even though schools usually impose punishment for alcohol and drug use, the same illegal behaviours might be highly rewarded among one's peers, especially if the peers are also involved in drinking and substance use. In addition to social rewards, drug use is usually followed by immediate physiological rewards, such as sudden energy gain and euphoric feelings (Tiffany, 1990). If adolescents perceive that the benefit of substance use are greater than its costs (e.g., legal punishment), they may be more likely to begin or continue drinking and using drugs.

Social Influence Approach

The second important theoretical construct that can explain the link between school policies and substance abuse are the principles of social influence (Cialdini, 2001). Two social influence principles might be helpful for understanding alcohol and drug abuse in adolescents. First is the principle of scarcity. As evident in the economic and human relationship literature, objects and opportunities are perceived more valuable when they are scarce (Cialdini, 2001; Devarajanand & Fisher, 1982). In line with the principle of scarcity, when school policies strictly prohibit the use of alcohol and drugs on school grounds, adolescents might perceive this as a scarcity of opportunities for drinking and drug use. Thus, the prohibited behaviors might become more desirable and adolescents might be more inclined to perform them.

Another similar principle that suggests this phenomenon is known as the “Romeo and Juliette effect”. For instance, when parents are against their child's romantic relationship, their disapproval usually results in the child's increased interest and determination to remain in the relationship. Likewise, Cialdini (2001) states that the best way to influence teenagers to do something is to ban it. The explanation for such reaction is that human beings do not like to be constrained. When we feel that our freedom of choice is restricted in any way, we tend to resist it
in order to restore our sense of freedom and control. Punitive school policies may pose a threat to adolescents’ perceived sense of freedom. As a result, the adolescents might be tempted to go against the policies in order to remove the imposed control upon their behaviours. In this case, the more severe and more explicit the school policies are regarding alcohol and substance abuse, the more likely adolescents might be to resist and violate these policies.

Analogous with the discussed principles of social influence, one can assume that school policy measures are perceived as a restriction to adolescents’ freedoms. Under this assumption, it is feasible to derive a second hypothesis.

Hypothesis 2: More severe school policy measures will be related to the increased instances of overall alcohol and marijuana use among grade 10 and 12 students.

Furthermore, social proof is also a principal of social influence that can be used to explain the link between policy measures and adolescent behaviour (Cialdini, 2001). This principle states that people use behaviours of others in their surrounding as a reference for their own behaviours. Although some might equate this phenomenon with peer influence, it certainly has a much larger dimension than the pure peer influence. Peer influence is usually mentioned to operate through direct contact, socialization, and verbal or physical pressure (McLellan & Pugh, 1999; Santrock, 2006). However, social proof includes observing others’ behaviours and taking them as a clue to how one should behave. This implies that by merely observing other students, teachers, school administrators and community members, adolescents might create a prototype of how they should act and react in regard to school policy measures. In this case, the overall school and residential environment can serve as important exemplifiers of desired behaviours. Additionally, Cialdini (2001) explained that the principle of social proof becomes increasingly powerful in ambiguous situations. Adolescents may perceive the situations in which alcohol and
drugs are used as very novel and confusing and may simply follow others as a way of reducing their ambivalence.

After reviewing both hypotheses outlined in this paper, it becomes evident that they are not in line with each other. On one hand, hypothesis 1 is grounded on the principles of behaviourism and predicts a negative relationship between the severity of school policies and adolescent alcohol and marijuana use. On the other hand, hypothesis 2 follows the scarcity principle of social influence, and thus predicts a positive relationship between the degree of punitive measures imposed by school policies and adolescent alcohol and marijuana use. Supportive evidence for one of these two hypotheses would provide a good foundation for an exhaustive questioning of the theory by which the other one was guided.

As already discussed in this paper, we should keep in mind that neither school policies nor substance use among adolescents operate in isolation from other factors (Kirkcaldya et al., 2004). The hypothesized relationships between school policies and alcohol and marijuana use may be greatly altered by any of the previously described personality and environmental factors. The importance of this study also resides in the fact that the relationship between school policies and adolescent alcohol and marijuana use will be examined through the prism of some key moderating variables (see Appendix 1).

In general, adolescents tend to display an increased level of rebellious behaviour and to challenge institutional norms as part of their autonomy development (Laursen, 1995; Miller, Alberts, Hecht, Trost, & Krizek, 2000; Rutter, Graham, Chadwick, & Yule, 1976). Accordingly, schools that have highly authoritarian systems might evoke sedition and resistance to rules in adolescents. If, on the other hand, schools (a) foster student-teacher collaboration, (b) involve students in the governing body, (c) provide opportunities for open discussions, and (d) take into
account students’ perspective, students will more likely feel valued and connected to their schools and, thus, comply with school policies (Dewey, 1999; Petraitis, Flay, & Miller, 1995). Being involved in school decision-making process may increase liking toward school and teachers, create the feeling of belongingness in adolescents, and decrease their resentment toward rule-following (Cialdini, 2001). An example of such initiative that produced mutually beneficial outcome for students, teacher, and school administrators was the Reaching Success though Involvement project implemented in 17 schools in the US (Furtwengler, 1996). These schools seriously involved students in making decisions intended to improve school effectiveness by regularly meeting with student representatives and acknowledging their’ suggestions. As a result of this project initiative, student discipline, student-teacher interactions, and general student involvement in school activities were notably improved, whereas the instances of truancy and in-school suspensions markedly decreased. Students’ feelings of belongingness and responsibilities toward their school were also enhanced by this project. Consequently, engaging students in school affairs and developing their awareness of school policies can result in more students obeying school policies (regardless of their punitive consequences). High levels of student engagement in school affairs may protect students at risk against potentially negative peer influence and personality factors that can trigger substance use in adolescents.

It is worth noting that the presented theories are non-congruent in their explication of how different degrees of punitive measured imposed by school policies might impact alcohol and substance abuse in adolescents. Behavioural and social influence theories provide different arguments for the effects that rigorous punitive policies might have on potential outcomes. In summary, behavioural approach advocates that increased punishment should decrease drinking and drug use, whereas social influence theory proposes that the implementation of severe
policies on alcohol and drug abuse might backfire and produce unwanted effects. The research on this topic is very scarce and inconclusive. The direct effect of school policies on substance use beyond school grounds has not been extensively discussed in the literature. There are results that document a decrease in smoking on school grounds as a result of more severe and comprehensive school policies (Evans-Whipp et al., 2004). However, they do not provide clear evidence for whether the overall smoking pattern outside of schools also changed.

Aim of the Study

The purpose of this study was to investigate the relationship between the severity of school policies on alcohol and drug abuse and the actual drinking and drug use behaviours reported by adolescents (i.e., on and beyond school grounds). It will be informative to learn whether, for instance, more punitive school policies are linked to fewer instances of alcohol and drug use among students compared with less severe school policies. This study will directly test the competing theories about the role that punitive policies might have in adolescents' use of alcohol and illegal drugs.
Chapter 3

Method

Sample

I used data for grade 8, 10, and 12 students from three waves of the National Education Longitudinal Study (NELS) collected from 1988 to 1992. The study began in 1988 by sampling grade 8 students who were followed into adulthood. The sample consists of 12,144 students enrolled in several hundreds schools. This sample is nationally representative and should thus enable generalizability of the findings to other grade 10 and 12 students in the US.

Variables and Measures

Independent variables. The independent variable in this study is the type of school policy, defined as severity of punitive actions for alcohol and drug use in a specific school. This measure was based on school administrators’ responses to the survey question, “At your school, what happens to a student who is caught doing one of the following (drinking alcohol, using marijuana, cocaine, etc.)”. The six possible answers were: no action-warning, detention, in-school suspension, out-of-school suspension, transfer to another school, and expulsion. For analytical purposes, I merged these responses into three distinct categories referring to in-school punishment, out-of-school punishment, and expulsion. The rationale for doing so was that the three categories are qualitatively different in terms of the punishment severity and immediate consequences that a student needs to face. For instance, a detention would probably have markedly different short and long-term consequences for a student compared to an expulsion.

Outcomes. Two major dependent variables are reported frequency of alcohol and drug use by students in the last 12 months. Even though the same information is available for different time spans of use (i.e., 30 days and lifetime), the reason for focusing on substance use in the last
12 months is twofold. First, a period of 30 days may be too short to observe any instances of substance use. Even if there were some observed they would probably not represent the general trend of substance use. Second, lifetime substance use would not be very informative of adolescent substance use in a specific grade and would contain some overlapping information for grades 10 and 12. More importantly, lifetime use may not be a reflection of school policy influence because it may have started before students entered high school.

*Scale.* Alcohol and drug use were assessed on a 4-point ordinal scale indicating the number of occasions alcohol and drugs were used (0 = 0 occasions, 1 = 1-2 occasions, 2 = 3-19 occasions, and 3 = 20+ occasions). Alcohol consumption was additionally assessed by asking how many times a student had five or more drinks in a row in the last two weeks. The response options for this question ranged from *none* to *ten or more times.* More information on sampling techniques, item selection and evaluation, and polychoric reliability between students and parents’ responses can be obtained from the US National Center for Education Statistics and the report written by McLaughlin and colleagues (1997).

Because students’ individual reports were used as a measure of their alcohol and drug consumption, some readers may have concerns about social desirably bias that sometimes leads to underreporting. However, Kirkcaldya and colleagues (2004) explained that student self-report is a very common methodological procedure for obtaining information about students’ substance use. Furthermore, they stated that social desirability impression is negatively correlated with drug dependency. In other words, substance users and addicts are not concerned about leaving a good social impression on others and are thus not hesitant to report their patterns of substance use. Nonetheless, considering that the questionnaires were administered through schools, a certain number of students might have underreported their actual substance use.
Covariates. In addition to investigating the relationship between school policies and adolescents substance use, it was necessary to take into account a number of covariates that may alter this relationship and partially explain the prevalence of substance use among adolescents. A selected number of students, parents, and school measures obtained in grade 8 were taken as relevant covariates in this study (see Appendix A). The covariate selection was grounded in the reviewed literature on substance use, and the available NELS measures were matched to the environmental, personality, and demographic factors that were found to pertain to substance use. Due to the limited information in the grade 8 data set, it was not possible to assess every aspect of family, peer, and school influence. Nonetheless, the questions that were indicative of peer, family, and school influences were considered in the original pool of covariate indicators.

Moreover, it was necessary to summarize the certain groups of questions into single measures that would represent a specific construct of interest (e.g., parental involvement). In the NELS questionnaire, there were several broad domains with questions pertaining to family life, school life, school work, etc., but none of them were compounded into individual scores or subgroups of scores that would capture more specific constructs within the broad categories. Because it was neither sensible nor practical to include more than 30 raw questions as covariates, it was necessary to combine some of them into single scores. This was achieved by conducting a round of principal component analyses and by merging those questions that had the highest loadings on the same component. Almost all groups of contextually similar questions exhibited primary loadings (greater than .40) on only one component validating their belongingness to the same construct. The newly-created compound variables were labeled as parental monitoring, parental school involvement, and school environment (see Appendix A). These variables were
deemed as continuous on a 4-point scale with response options ranging from strongly agree to strongly disagree.

Those questions containing information about students’ perception of parental supervision, restrictions, and requirements were marked as parental monitoring. More specifically, parental monitoring included students’ ratings of parental homework supervision, limitations to go out with friends and watch TV, and requirements to do household chores. The rationale for doing so was based on the exiting literature in this field (Bahr et al., 1998; DiClemente et al., 2009). Parental school involvement was assigned to the questions that assessed parental engagement and participation in their child’s school life. The third compound variable, labeled as school environment, has the most complex nature because it enfolds two aspects of school life: 1) students’ perceptions about student-teacher relations and teaching quality and 2) students’ perceptions about school spirit and discipline. The rest of the covariates used in this study were taken directly from the NELS questionnaire. It is important to mention that the same group of grade 8 covariates was used for predicting adolescent substance use in both grades 10 and 12. However, one additional measure pertaining to a family history of drug obtained in grade 10 was added as a covariate in the grade 12 model.

Analytic Procedures

The dependent variables were categorical and were ordered in an ascending fashion; it was thus sensible to perform a series of ordinal logistic regression analyses, one for each outcome variable (i.e., alcohol and drug use in the last 12 months in grades 10 and 12). The major assumptions of ordinal logistic regression are adequate cell counts and parallel regression lines. There should be at least 80% of cells with counts of five or more cases. This condition becomes more difficult to satisfy with an increasing number of categorical predictors in a
regression model. In order to minimize the number of empty cells, I dichotomized most of the multi-categorical predictors.

Initially, I conducted an ordinal regression analysis, but the test of parallel lines was statistically significant. This finding violated the basic assumption of ordinal regression. Ordinal regression was thus deemed inappropriate, and multinomial logistic regression was chosen instead. Next, I conducted a series of multinomial regression analyses by including and excluding different groups of covariates in order to obtain a final prediction model and in order to learn which variables were the most significant predictors of adolescent substance use.
Chapter 4
Results

Prevalence of Substance Use

Descriptive statistics for alcohol and marijuana use in grades 10 and 12 are presented in Tables 1 and 2. It is imperative to note that 82.4% of grade 10 students reported using alcohol on one or more occasions in their lifetime, whereas 70.5% have used it in the last 12 months, and 40.7% in the last 30 days. Alcohol use rates were even higher among grade 12 students showing an increase of about 10% for both recent and lifetime alcohol use. Approximately 90% of students in this US nationally representative sample reported using alcohol at least once by the time they reached grade 12. Among students who are alcohol users, 18.4% said that they had drank on at least 20 occasions within the last year implying that, on average, these students consumed alcohol more than once every month. In terms of binge drinking, more than 20% of grade 10 students reported having five or more drinks in a row in the last two weeks, whereas this proportion increased by 5% for grade 12 students.

Table 2 contains information on adolescent marijuana use. It is evident that 19.2% of grade 10 students reported using marijuana at least once in their lifetime, whereas 13.3% of grade 10 students reported doing so in the last 12 months. The most recent marijuana use (in the last 30 days) was reported by about 7% of grade 10 students. Similarly to alcohol consumption, the prevalence of marijuana use increased from grade 10 to grade 12 by about 7%. With respect to sex differences, rates of alcohol and marijuana use were almost identical for male and female students in grade 10. The only exception was binge drinking, which was more prevalent among male students. Sex differences in grade 12 were more noticeable, with males reporting higher
rates of alcohol and marijuana use as well as binge drinking. This sex difference in substance use ranged from 5% to 10% in grade 12.

Policy Practices

The severity of reported punitive measures for school policy violations varied depending on the nature of the policy contravention (Table 3). For alcohol use at school, 62.6% of schools reinforce out-of-school suspension and 27.1% of schools employ expulsion. Similar prevalence of out-of-school suspension and expulsion was observed for alcohol possession at school. For drug use at school, 53.5% of schools reported suspending their students from school, and 38.2% of schools expel their students. With regards to drug possession, out-of-school suspension and expulsion were the most prevalent practices for this rule violation (50.8% and 41.5% respectively). However, most schools (74.1%) administer expulsion to students who are caught selling illegal drugs on school grounds and only 22.1% of schools resort to out-of-school suspension.

The original regression models for alcohol and marijuana use included about twenty continuous and categorical predictors that were deemed as relevant predictors of adolescent substance use. The first set of results revealed that not all predictors in the model were significant. The insignificant predictors were sequentially removed from the initial model in order to obtain the best fitting final model. The main predictor of interest, school policy measures, was included in every examined model.

Final Model for Alcohol Use

The models that had the most adequate fit to the data and best predicted alcohol use are presented in Tables 4 and 5. Both models were significantly different from the null model with no predictors. In addition, they displayed an adequate fit to the data indicating that they were not
significantly different from the perfect model. However, the school policy measure was not significant in predicting student alcohol use at any frequency level of its consumption. This was the case for both grade 10 and grade 12. With regard to the covariates, several of them emerged as significant predictors of alcohol use. I will begin by describing the covariates of the model for alcohol use in grade 10 and will then proceed to the model for grade 12.

First, school environment in middle school was significant in predicting alcohol use in grade 10 for all levels of consumption. For example, students who strongly agreed that the dynamics between students and teachers was positive, that teaching was good, and the discipline was fair were about 5 times less likely to use alcohol on any number of occasions in the past year compared to those students who expressed a strong disagreement on these matters. Drug availability in middle school was predictive of alcohol use in grade 10. If someone offered to sell drugs to students in grade 8, they were 2 to 3 times more likely to use alcohol on any number of occasions in grade 10.

Nonetheless, high school sector (i.e., public versus private), the racial composition of student population, the structure of a typical school day (as reported by school administrators), and the prevalence of substance use in students’ previous school did not significantly predict alcohol use among grade 10 students. Additionally, school safety as reported by students was also a non-significant predictor of alcohol use.

Second, parental monitoring and parental marital status were also predictive of alcohol use. Students who reported being often monitored by their parents (guardians) were 4.90 times less likely to use alcohol on 20 or more occasions compared to the students who reported never being monitored. In addition, students of married parents were 1.47 times less likely to consume
alcohol. Parental school involvement, however, did not display significance in predicting adolescent alcohol use.

Third, peers’ perceptions about their classmates also proved to be important in predicting adolescent alcohol use. Students who reported that their peers think of them as troublemakers were 1.54 to 2.78 times more likely to consume alcohol than students who were not perceived in such way by their peers.

Fourth, personal factors such as tobacco use and students’ grades in grade 8 were predictive of alcohol use in grade 10. Students who reported using tobacco in grade 8 were about 2 times more likely to drink on 3 or more instances in grade 10. Students’ grades were predictive of alcohol use in a negative direction. For every additional GPA point in grade 8, students were 1.32 times less likely to consume alcohol in grade 10. However, composite standardized scores in reading and mathematics in middle school were not predictive of alcohol use in high school.

With regard to the personality factors such as self-concept and locus of control, none of them emerged as significant predictors of alcohol use in high school.

In terms of the demographic variables, students’ sex, race, and SES were significant at predicting drinking behaviour. Male students were 1.33 times more likely to drink more frequently (20 or more occasion in the last 12 months) than female students. Caucasian students were 4.46 and 5.20 times more likely to consume alcohol than Asian and African American students respectively. Adolescents of higher SES were more likely to use alcohol than those of lower SES. SES was transformed into a continuous variable with a range from -2.8 to 2.8. For every additional SES point, students were about 1.2 times more likely to drink on 3 or more occasions in the last year. However, SES was not significant in predicting the likelihood of drinking once or twice in the last year.
The model that most adequately predicted adolescent alcohol use in grade 12 was almost identical to the model that dealt with alcohol use in grade 10 (refer to Table 5). As in the previous model, the severity of school policy measures was not significant in predicting alcohol use in grade 12. The rest of the predictors referring to school environment, parental monitoring, personal factors, and demographic variables did significantly predict drinking in grade 12. Their odds ratios had the same direction and very similar magnitudes to those described in the grade 10 model. The only exception was tobacco use in grade 8, which did not predict alcohol use in grade 12.

An additional predictor that was included in the grade 12 model was the history of drug use in a family in the last two years. This measure was not available for grade 10 students, but it showed to be a significant predictor of alcohol use in grade 12. More specifically, if an adolescent's family member had used drugs in the last two years, that adolescent was 3.65 times more likely to use alcohol on 20 or more occasions in grade 12.

The pseudo R-square values for the models predicting alcohol use in grade 10 and grade 12 were .12 and .13 respectively.

**Final Model for Marijuana Use**

The models that most adequately predicted marijuana use in grades 10 and 12 had very similar composition of predictors as those models that predicted alcohol use in these grades. Both models were statistically different from the null model, and both displayed an adequate fit to the data. The main dependent variable, school policy measure, did not significantly predict marijuana in either grade. This was true for all three frequency levels of consumption.

First, I will evaluate the final multinominal regression model for marijuana use in grade 10 (Table 6). As in the model for alcohol use in grade 10, school environment was a significant
predictor of marijuana use in this grade. Student who strongly believed that their teachers taught well, supported students, responded to their needs, and exerted fair discipline were more than 5 times less likely to use marijuana on any number of occasions compared to students whose believes were very negative on these matters. Drug availability on school grounds in grade 8 predicted marijuana use in grade 10 in a positive direction. If someone offered to sell drugs to students in grade 8, they were 3.25 times more likely to use marijuana on 20 or more occasions in grade 10.

With regard to the family influence, parents’ marital status was the only significant predictor of marijuana use in grade 10. Students of married parents were about 1.5 times less likely to smoke marijuana once or more times in grade 10 compared to students whose parents were not married. Parental involvement in school life and parental monitoring were not relevant predictors of marijuana use.

Likewise in the models for alcohol use, peers’ perceptions of their classmates did predict marijuana use in grade 10. Those students who were perceived as troublemakers by their peers were 3.1 times more likely to use marijuana on 20 or more instances in grade 10.

Students who used tobacco in grade 8 were 3 times more likely to use marijuana once or twice and 4.05 times more likely to use marijuana 20 or more times in grade 10 compared to the students who have never used tobacco before. Students’ grades in grade 8 were also predictive of marijuana use in grade 10. For every additional GPA point that a student earned in grade 8, he or she was 1.68 times less likely to use marijuana two years later.

Finally, race was the only demographic variable that predicted marijuana use in grade 10. Caucasian students were 2.53 times more likely to smoke marijuana 3 or more times than Asian students. In addition, Caucasian students were 8.26 times more likely to use marijuana 20 or
more times in grade 10 than were African American students. Unlike in the alcohol model, students’ sex and their SES were not able to predict use of marijuana in grade 10.

The set of covariates that was significant in predicting marijuana use in grade 10 was also significant in predicting marijuana use among grade 12 students (Table 7). The odds ratios of most covariates in grade 12 resembled those in grade 10. The only difference was in the decreased odds ratios for tobacco use and drug availability in grade 8. These ratios decreased from 4.05 in grade 10 to 2.22 in grade 12 for tobacco use in middle school and from 3.25 to 2.0 for drug availability in middle school.

In addition, SES was a significant predictor of marijuana use in grade 12 even though it displayed no significance in grade 10. For every extra point on the SES scale, students were 1.4 times more likely to consume marijuana 20 or more times in grade 12. Likewise in the model for alcohol use, the history of drug use among family members was added as a covariate in the grade 12 model. Adolescents who reported that one of their family members had a problem with drug use in the last two years were 8.54 times more likely to use marijuana on 20 or more instances in grade 12.

The pseudo R-square values for the marijuana use models in grades 10 and 12 were .14 and .15 respectively.
Chapter 5
Discussion

The purpose of this study was to evaluate the effectiveness of school policies aimed to reduce adolescent alcohol and marijuana use. The author tested two competing hypotheses with regard to the link between school policy measures and adolescent substance use. The crucial difference between the two hypotheses was in the direction of association between policy measures and student substance use. First hypothesis stated that more severe school policy measures would be related to fewer instances of overall alcohol and marijuana use among grade 10 and 12 students, whereas the second hypothesis predicted that more severe school policy measures would be related to increased instances of overall alcohol and marijuana use among the same group of students.

Neither hypothesis was supported. The main results revealed that school policy measures were not significant in predicting either alcohol or marijuana use at any frequency level of its consumption. This was true for both grade 10 and grade 12 students. These results imply that high school students were equally likely to use alcohol and marijuana regardless of the severity of punitive policy measure that existed in their school. In other words, schools that enforced expulsion for substance use were as likely to have students who use alcohol and marijuana as those schools that prescribed detention for the same policy violation. In addition, the severity of school policy measures was also not significant in predicting the frequency of adolescent substance use in grades 10 and 12.

The reasons for these findings can be traced from multiple sources. First, it is possible that school policy measures indeed have no impact on adolescent substance use. Perhaps
adolescents who choose to use alcohol and marijuana have little respect for and are not easily constrained by the sanction measures in their school.

Second, it is plausible that school policies are not implemented with equal fidelity and consistency across all schools. A recent study on tobacco policies showed that proper enforcement of school policies was related to lower rates of smoking on school grounds (Adams, Jason, Pokorny, & Hunt, 2009). Despite school administrators’ claims that they implement one of the six levels of punishment for policy violation, it is not certain whether these measures were indeed reinforced when students were found to use alcohol or marijuana. The nonexistence of association between policy measures and adolescent substance use may be a result of low fidelity of policy implementation. Researchers in this area generally warn that it is very difficult to achieve the absolute fidelity because policy implementation rarely occurs in ideal school settings (Dusenbury, Brannigan, Falco, & Hansen, 2003).

However, the finding that school policy measures are not related to overall adolescent alcohol and marijuana use is aligned with the studies that found no relationship between school policies and overall tobacco use among students (Charlton & While, 1994; Clarke et al., 1994; Kumar, O’Malley, Johnson, 2005; Rosendahl et al., 2002). It is very important to note that this study examined school policy measures with respect to overall adolescent alcohol and marijuana use (i.e., on school grounds and beyond). In relation to tobacco use, one of the past findings indicated that more severe school policies were related to fewer instances of tobacco use on school ground, but not to overall adolescent tobacco use (Charlton & While, 1994). The association between school policies and adolescent alcohol and marijuana use may follow a similar pattern.

Additional Findings
In addition to learning that the severity of policy measures was not significant in predicting adolescent alcohol and marijuana use, this study revealed that some other factors shall be seriously considered when studying this phenomenon. First, certain school characteristics emerged as significant predictors of both alcohol and marijuana use. Remember that school environment was defined in terms of student-teacher relations, teaching quality, school discipline, and school spirit. If these aspects of school environment were positively judged by students, their chance of alcohol and marijuana use (on 20 or more occasions) was decreased by about 5 times compared to students who had very negative perceptions of school environment. Drug availability in grade 8 had a positive association with adolescent substance use in later years. Students who reported that someone offered to sell them drugs in grade 8 were 2 to 3 times more likely to consume both alcohol and marijuana in grades 10 and 12 on any number of occasions. The above results mimic those found in the past (Allison et al., 1999; Evans-Whipp et al., 2004).

Second, parental component also displayed significance in predicting adolescent substance use. Specifically, frequent parental monitoring decreased the likelihood of alcohol use by almost 5 times in both grades 10 and 12, but it showed no significance in decreasing marijuana use. This line of finding is partially consistent with previous research that found that parental monitoring was related to lower risks of both alcohol and drug consumption (DiClemente et al., 2009; Parsai, Marsiglia, & Kulis, 2008). The reason for this may be traced in differential operational definitions of parental monitoring. In this study, parental monitoring was comprised of students’ perceptions of parental supervision, constraints, and requirements, whereas other researches might have operationalized it differently. Parental marital status also played a role in predicting adolescent substance use in this study. Adolescents whose parents are
married were about 1.5 times less likely to use both alcohol and marijuana compared to adolescents whose parents are separated.

Furthermore, history of drug use in a family had a very salient role in predicting both alcohol and marijuana use in grade 12 students. If students reported that their family member had used drugs in the last two years, they themselves were about 9 times more likely to use marijuana on 20 or more occasions in grade 12 compared to students whose family members did not use any drugs. In addition to the decreased risk of marijuana use, these students were almost 4 times more likely to use alcohol in grade 12. This finding has been noted in the past and through this study verifies the danger of living in a family where drug use is present and accepted (Boyle et al., 2001; Reinherz et al., 2000; Windle, 2000). As discussed earlier, children who see their parents and siblings consuming drugs at home may not only learn that this behaviour is permissible but may also think that drug use is a remediation from stressful life events (Windle, 2000).

The third factor that consistently proved to predict adolescent alcohol and marijuana consumption is peers’ perceptions of the examined students. Students who thought that their peers perceived them as troublemakers were 2 to 3 times more likely to use alcohol and marijuana on 20 or more occasions in both grades 10 and 12 compared to those students who did not think so regarding this issue. Even though there was no information about direct peer influence, this variable was indicative of students’ awareness of their ‘social status’ among their peers, which, in turn, was related to their substance use. Nonetheless, it is impossible to trace whether students who were seen as troublemakers were more inclined to use substances or whether the troublemaker status was a product of substance use.
Additionally, adolescent tobacco use in grade 8 was predictive of both alcohol and marijuana use in grade 10 but not in grade 12. Students who smoked in grade 8 were 2 times more likely to drink on 3 or more instances in grade 10 and were 4 times more likely to use marijuana on 20 or more occasions in the same grade. Historically, tobacco use in earlier years was found to predict marijuana use in later years (Einstein et al., 1975; Leatherdale et al., 2008). Why this pattern was not observed for grade 12 students is not very clear.

Students’ academic achievement expressed through GPA in grade 8 was predictive of substance use in grades 10 and 12, but composite standardized scores from middle school had no association with substance use in high school. As expected from the past findings, students with higher GPA in grade 8 were less likely to use both alcohol and marijuana in subsequent grades (Andrews et al., 1991; Cohen & Rice, 1997; Dewey, 1999).

The significance of demographic variables in predicting adolescent substance varied depending on a type of substance use and students’ grade level. For example, adolescents’ sex, race, and SES were predictive of alcohol use in both grades 10 and 12. However, race was predictive of marijuana use in both grades, whereas SES predicted only marijuana use in grade 12. With regard to sex differences in alcohol use, male students were only about 1.3 times more likely to drink alcohol on 20 or more occasions compared to female students, but this odds ratio increased to 2 in grade 12. The established evidence on sex differences in adolescent substance use revealed that males tend to use both alcohol and drugs more than females do (Johnson, O'Malley, & Bachman, 1999; Leatherdale, Hammond, & Ahmed, 2008; Windle, 1990). However, this study did not detect the sex difference in marijuana use among grade 12 students.
With the reference to race, Caucasian students were more likely to use alcohol and marijuana than Asian and African American students in both grades 10 and 12. Specifically, Caucasian students were 5 to 8 times more likely to consume substances in grades 10 and 12 than African American students and about 4 times more likely to do so than Asian students. This supports most of the previous findings about Caucasian students having the greatest risk of substance use (Barnes & Welte, 1986; Boles et al., 1994; Karlsen, Rogers, & McCarhty, 1998; Parker, Weaver, & Calhoun, 1995; Windle, 1990). However, Hispanic, Native American, and Alaskan students displayed the same likelihood of substance use as Caucasian students in this study.

Lastly, I decided to use the available composite measure of SES because the individual components of SES showed no significance in predicting adolescent substance use in some of the preliminary models. Despite the claim that single components of SES can better predict adolescent substance use than the composite SES score, this study found that composite SES was a better predictor of substance use in grades 10 and 12 (Hanson & Chen, 2007). Higher SES scores were indicative of an increased risk for alcohol use in both grades and of a greater risk for marijuana use only in grade 12. This result is in line with the newer research findings suggesting that greater financial resources and higher social status provide more opportunities for substance use (Ennett et al., 1997; Hanson & Chen, 2007).

Limitations and Directions for Future Research

Due to the limited information in the NELS data set, I was not able to test the second condition in both of my hypotheses. Specifically, there was no information about students’ perceived costs of policy violations. The information about students’ perceptions of policy restrictiveness was also unavailable. In addition, it would have been useful if I had information
for all of the confounding variables that were mentioned in the introductory section. Although it was possible to control for a large number of confounders, some of them such as peer influence, parenting styles, students’ attachment styles, students’ previous knowledge about substance use, and community influence were absent from the regression model. The inclusion of these confounding variables in the model might have altered the results of this study. Researchers who intend to further pursue this topic should consider designing new studies that would compensate for some of the informational deficits in this data set.

Another potential limitation of this study is the missing information on the fidelity of policy implementation. As already mentioned, the answers of school administrators about policy measures might not have been in line with the actual implementation of the policy rules. However, the issue of implementation fidelity is beyond the scope of this study but is certainly a topic that deserves more attention in future research.

With respect to the analytical procedures, it is worth noting that a logistic multinomial regression was used to analyze the available data. This type of analysis produced the results that are based on individual student differences but not on school differences. Even though some school factors were controlled in the model, all predictor variables were analyzed at the same level. The use of a more sophisticated hierarchical linear model would perhaps generate more refined results that would differentiate between the variances contributed to student and school characteristics. In this way it would be possible to examine both random and fixed effects at both levels of analysis.

An additional limitation is the categorical nature of most of the variables in the final model. For practical and analytical purposes, some multi-category variables had to be transformed into dichotomous variables, which might have resulted in a certain information loss.
However, due to the large data set, most of the categories were well represented, and empty cells were not present.

It is also important to mention that the data set is about 20 years old. The trends in adolescent substance use may have changed since then as well as students’ responses to school policies. Lastly, as was acknowledged in the introductory section, the additional factors in this study that were examined as covariates could have acted as moderators or perhaps as mediators. For example, parental monitoring in grade 8 that was controlled in the final model could have changed in grade 10 as a consequence of school policies and become a mediator. I had no means of examining possible mediating or treatment confounding effects of the covariates presented in Appendix A, but this is certainly an important task for prospective research.

Practical Implications

This study added to and expanded the existing knowledge about school policies and adolescent alcohol and marijuana use. In summary, the results point out that adolescent substance use is a multifactorial problem and should thus be addressed in such a way. School policies should be framed and implemented on the basis of the existing empirical evidence on substance use. In addition, equally cautious steps should be taken toward proper and effective implementation of those policies. It yet remains to be found whether school policies fail to be effective because of their narrow scope or because their improper and inconsistent implementation.

This study has potential implications for policymakers and school administrators who wish to modify the existing punitive policies on substance use. Based on the study’s findings, policymakers should not argue for constructing more severe policy measures on substance use. Instead, they may choose to place more emphasis on prevention and intervention programs that
more specifically target adolescents, their peers, parents, and teachers. For instance, preventative actions may include devoting more attention to improving student-teacher interactions, enhancing teachers’ interest in students, improving the quality of teaching, having well-defined and consistent behavioural rules at school, increasing students’ sense of belongingness, eliminating drug trade on school grounds, providing after-school programs and services for parents who cannot always monitor their children, and assisting parents in developing good relationships with their adolescents.

Moreover, it should be noted that smoking, alcohol, and marijuana use are related to use of more harmful drugs such as LSD, cocaine, heroin, etc. (Kirkcaldy et al., 2004). Health, social, and economic costs associated with prolonged alcohol and drug use are very often irreversible (Kirkcaldy et al., 2004). Hence, it is imperative that these and other empirical findings on alcohol and drug use be taken seriously by individuals and social institutions. Informed by the study’s findings, policymakers, parents, teachers, and school administrators can take appropriate actions to minimize the risk factors associated with substance use and to ensure that adolescents are developing into healthy and addiction-free young people. These actions may involve developing research-based school policies, and prevention and intervention programs that would assist adolescents in making informed choices regarding alcohol and drug use.
References


Table 1

*Reported Proportions (%) of Alcohol Use among Students in Grades 10 and 12*

<table>
<thead>
<tr>
<th>Alcohol use</th>
<th>Grade 10</th>
<th>Grade 12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lifetime</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 occasions</td>
<td>17.6</td>
<td>11.7</td>
</tr>
<tr>
<td>1-2 occasions</td>
<td>24.3</td>
<td>16.0</td>
</tr>
<tr>
<td>3-19 occasions</td>
<td>35.0</td>
<td>31.9</td>
</tr>
<tr>
<td>20+ occasions</td>
<td>23.1</td>
<td>40.4</td>
</tr>
<tr>
<td><strong>Last 12 months</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 occasions</td>
<td>30.5</td>
<td>22.9</td>
</tr>
<tr>
<td>1-2 occasions</td>
<td>31.4</td>
<td>25.7</td>
</tr>
<tr>
<td>3-19 occasions</td>
<td>29.6</td>
<td>33.0</td>
</tr>
<tr>
<td>20+ occasions</td>
<td>8.6</td>
<td>18.4</td>
</tr>
<tr>
<td><strong>Last 30 days</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 occasions</td>
<td>59.3</td>
<td>49.3</td>
</tr>
<tr>
<td>1-2 occasions</td>
<td>26.4</td>
<td>28.7</td>
</tr>
<tr>
<td>3-19 occasions</td>
<td>12.9</td>
<td>19.1</td>
</tr>
<tr>
<td>20+ occasions</td>
<td>1.4</td>
<td>2.9</td>
</tr>
</tbody>
</table>
Table 2

*Reported Proportions (%) of Marijuana Use among Students in Grades 10 and 12*

<table>
<thead>
<tr>
<th>Marijuana use</th>
<th>Grade 10</th>
<th>Grade 12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lifetime</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 occasions</td>
<td>80.7</td>
<td>73.3</td>
</tr>
<tr>
<td>1-2 occasions</td>
<td>9.0</td>
<td>10.4</td>
</tr>
<tr>
<td>3-19 occasions</td>
<td>6.2</td>
<td>8.6</td>
</tr>
<tr>
<td>20+ occasions</td>
<td>4.2</td>
<td>7.7</td>
</tr>
<tr>
<td><strong>Last 12 months</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 occasions</td>
<td>86.7</td>
<td>82.3</td>
</tr>
<tr>
<td>1-2 occasions</td>
<td>6.8</td>
<td>7.8</td>
</tr>
<tr>
<td>3-19 occasions</td>
<td>4.4</td>
<td>6.2</td>
</tr>
<tr>
<td>20+ occasions</td>
<td>2.1</td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Last 30 days</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 occasions</td>
<td>93.1</td>
<td>90.4</td>
</tr>
<tr>
<td>1-2 occasions</td>
<td>4.1</td>
<td>5.3</td>
</tr>
<tr>
<td>3-19 occasions</td>
<td>2.1</td>
<td>3.0</td>
</tr>
<tr>
<td>20+ occasions</td>
<td>0.7</td>
<td>1.4</td>
</tr>
</tbody>
</table>
Table 3

Proportion (%) of Schools that Use the Following Punitive Measures for Policy Violations

<table>
<thead>
<tr>
<th>Type of punitive measure</th>
<th>Alcohol possession</th>
<th>Alcohol use</th>
<th>Drug possession</th>
<th>Drug use</th>
<th>Selling illegal drugs</th>
</tr>
</thead>
<tbody>
<tr>
<td>No action</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Detention</td>
<td>0.4</td>
<td>0</td>
<td>0.2</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>In-school suspension</td>
<td>6.6</td>
<td>5.1</td>
<td>3.4</td>
<td>2.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Out-of-school suspension</td>
<td>66.7</td>
<td>62.6</td>
<td>50.8</td>
<td>53.5</td>
<td>22.1</td>
</tr>
<tr>
<td>Transfer to another school</td>
<td>3.8</td>
<td>5.2</td>
<td>4.1</td>
<td>5.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Expulsion</td>
<td>22.5</td>
<td>27.1</td>
<td>41.5</td>
<td>38.2</td>
<td>74.1</td>
</tr>
</tbody>
</table>
Table 4

*Coefficients and Odds Ratios for Predictors of Alcohol Use on 20 or more Occasions among Grade 10 Students*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exp (B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>School policy on alcohol use (Expulsion)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In school punishment</td>
<td>1.32</td>
<td>0.85-2.05</td>
</tr>
<tr>
<td>Out of school punishment</td>
<td>1.18</td>
<td>0.94-1.47</td>
</tr>
<tr>
<td>School environment</td>
<td>1.91**</td>
<td>1.51-2.41</td>
</tr>
<tr>
<td>Someone offered to sell drugs in grade 8 (Yes)</td>
<td>3.42**</td>
<td>2.42-4.85</td>
</tr>
<tr>
<td>Parental monitoring</td>
<td>1.63**</td>
<td>1.38-1.93</td>
</tr>
<tr>
<td>Parents’ marital status (Married)</td>
<td>1.24</td>
<td>0.94-1.64</td>
</tr>
<tr>
<td>Peers see me as a troublemaker (Yes)</td>
<td>2.78**</td>
<td>2.21-3.50</td>
</tr>
<tr>
<td>Tobacco use in grade 8 (Yes)</td>
<td>2.62**</td>
<td>1.65-4.16</td>
</tr>
<tr>
<td>GPA in grade 8</td>
<td>1.32**</td>
<td>1.13-1.53</td>
</tr>
<tr>
<td>Sex (Male)</td>
<td>1.34**</td>
<td>1.10-1.64</td>
</tr>
<tr>
<td>SES</td>
<td>1.27**</td>
<td>1.10-1.47</td>
</tr>
<tr>
<td>Race (White)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>4.46**</td>
<td>2.47-8.06</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.23</td>
<td>1.18-1.81</td>
</tr>
<tr>
<td>Black, not Hispanic</td>
<td>5.20**</td>
<td>2.82-9.61</td>
</tr>
<tr>
<td>American Indian, Alaskan</td>
<td>3.74</td>
<td>1.25-17.54</td>
</tr>
</tbody>
</table>

*Note. For categorical variables, reference categories are indicated in parenthesis.*

**p < .01
Table 5

*Coefficients and Odds Ratios for Predictors of Alcohol Use on 20 or more Occasions among Grade 12 Students*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exp (B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>School policy on alcohol use (Expulsion)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In school punishment</td>
<td>1.31</td>
<td>0.90-1.90</td>
</tr>
<tr>
<td>Out of school punishment</td>
<td>1.11</td>
<td>0.92-1.33</td>
</tr>
<tr>
<td>School environment</td>
<td>1.41**</td>
<td>1.15-1.73</td>
</tr>
<tr>
<td>Someone offered to sell drugs in grade 8 (Yes)</td>
<td>1.97**</td>
<td>1.41-2.75</td>
</tr>
<tr>
<td>Parental monitoring</td>
<td>1.41**</td>
<td>1.23-1.63</td>
</tr>
<tr>
<td>Parents’ marital status (Married)</td>
<td>1.28**</td>
<td>1.00-1.63</td>
</tr>
<tr>
<td>Peers see me as a troublemaker (Yes)</td>
<td>2.32**</td>
<td>1.88-2.85</td>
</tr>
<tr>
<td>Family member used drugs (Yes)</td>
<td>3.65**</td>
<td>2.78-4.80</td>
</tr>
<tr>
<td>GPA in grade 8</td>
<td>1.37**</td>
<td>1.20-1.57</td>
</tr>
<tr>
<td>Sex (Male)</td>
<td>2.08**</td>
<td>1.75-2.47</td>
</tr>
<tr>
<td>SES</td>
<td>1.51**</td>
<td>1.33-1.70</td>
</tr>
<tr>
<td>Race (White)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>3.34**</td>
<td>2.29-4.85</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.14</td>
<td>1.19-1.56</td>
</tr>
<tr>
<td>Black, not Hispanic</td>
<td>4.65**</td>
<td>3.04-7.09</td>
</tr>
<tr>
<td>American Indian, Alaskan</td>
<td>2.28</td>
<td>1.30-6.76</td>
</tr>
</tbody>
</table>

*Note. For categorical variables, reference categories are indicated in parenthesis.*

**p < .01
Table 6

*Coefficients and Odds Ratios for Predictors of Marijuana Use on 20 or more Occasions among Grade 10 Students*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exp (B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>School policy on alcohol use (Expulsion)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In school punishment</td>
<td>0.47</td>
<td>0.11-2.06</td>
</tr>
<tr>
<td>Out of school punishment</td>
<td>1.38</td>
<td>0.92-2.07</td>
</tr>
<tr>
<td>School environment</td>
<td>1.99**</td>
<td>1.32-3.00</td>
</tr>
<tr>
<td>Someone offered to sell drugs in grade 8 (Yes)</td>
<td>3.25**</td>
<td>2.05-5.15</td>
</tr>
<tr>
<td>Parents’ marital status (Married)</td>
<td>1.54*</td>
<td>1.02-2.44</td>
</tr>
<tr>
<td>Peers see me as a troublemaker (Yes)</td>
<td>3.10**</td>
<td>2.05-4.70</td>
</tr>
<tr>
<td>Tobacco use in grade 8 (Yes)</td>
<td>4.05**</td>
<td>2.44-6.71</td>
</tr>
<tr>
<td>GPA in grade 8</td>
<td>1.68**</td>
<td>1.30-2.18</td>
</tr>
<tr>
<td>Race (White)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>2.36</td>
<td>1.37-7.63</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.55</td>
<td>1.42-3.42</td>
</tr>
<tr>
<td>Black, not Hispanic</td>
<td>8.26*</td>
<td>1.13-58.82</td>
</tr>
<tr>
<td>American Indian, Alaskan</td>
<td>1.55</td>
<td>5.08-12.19</td>
</tr>
</tbody>
</table>

*Note. For categorical variables, reference categories are indicated in parenthesis.

*p < .05. **p < .01*
Table 7

*Coefficients and Odds Ratios for Predictors of Marijuana Use on 20 or more Occasions among Grade 12 Students*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exp (B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>School policy on alcohol use (Expulsion)</td>
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<td></td>
</tr>
<tr>
<td>In school punishment</td>
<td>0.69</td>
<td>0.28-1.69</td>
</tr>
<tr>
<td>Out of school punishment</td>
<td>1.11</td>
<td>0.82-1.50</td>
</tr>
<tr>
<td>School environment</td>
<td>2.42**</td>
<td>1.75-3.35</td>
</tr>
<tr>
<td>Someone offered to sell drugs in grade 8 (Yes)</td>
<td>2.00**</td>
<td>1.33-3.04</td>
</tr>
<tr>
<td>Tobacco use in grade 8 (Yes)</td>
<td>2.22**</td>
<td>1.33-3.71</td>
</tr>
<tr>
<td>Parents’ marital status (Married)</td>
<td>1.52*</td>
<td>1.04-2.20</td>
</tr>
<tr>
<td>Peers see me as a troublemaker (Yes)</td>
<td>2.33**</td>
<td>1.71-3.19</td>
</tr>
<tr>
<td>Family member used drugs (Yes)</td>
<td>8.54**</td>
<td>6.29-11.61</td>
</tr>
<tr>
<td>SES</td>
<td>1.40**</td>
<td>1.14-1.72</td>
</tr>
<tr>
<td>Race (White)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>3.83**</td>
<td>1.38-10.63</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2.00</td>
<td>1.01-4.03</td>
</tr>
<tr>
<td>Black, not Hispanic</td>
<td>5.31**</td>
<td>1.90-14.92</td>
</tr>
<tr>
<td>American Indian, Alaskan</td>
<td>1.24</td>
<td>3.63-5.62</td>
</tr>
</tbody>
</table>

*Note.* For categorical variables, reference categories are indicated in parenthesis.

*p < .05. **p < .01*
Appendix A
Detailed description of the variables used in the study

Categorical variables

Sex: male, female
Race: Asian/Pacific Islander, Hispanic, Black/not Hispanic, American Indian/Alaskan, White
Parents’ marital status: married, not married (widowed, separated, never married, marriage-like relationship)
Tobacco use in grade 8: yes, no
Someone offered to sell me drugs at school (grade 8): yes, no
Students in my class see me as a troublemaker: yes, no
A family member has used drugs or had been in a drug rehabilitation program in the past two years: yes, no

Continuous variables

Socioeconomic status composite: family income, both parents’ education, both parents’ occupation. It was standardized and scaled from -2.8 to +2.8.

Parental monitoring was composed of four answers provided by students. The answer options were often, sometimes, rarely, and never. The questions asked, “How often do your parents:
1) check whether you have done your homework,
2) require you to do work chores around the home,
3) limit the amount of time you can spend watching TV,
4) limit the amount of time for going out with friends on school nights.”

School environment was composed of seven answers provided by students. The response options consisted of: strongly agree, agree, disagree, and strongly disagree. The questions asked students to indicate to which extent they agree or disagree with the following statements:
1) There is real school spirit
2) Rules for behaviour are stick
3) Discipline is fair
4) The teaching is good
5) Students get along with teachers
6) Teachers are interested in students
7) Teachers praise my effort.
Grades composite: from 0.5 to 4.0.

Parental Involvement was composed of the following four answers provided by students:

1) parents attended a school meeting,
2) parents spoke to a teacher/counselor,
3) parents visited student’s class,
4) parents attended a school event.